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MEDITERRANEAN RAIL FREIGHT CORRIDOR
Spain-France-Italy-Slovenia-Croatia-Hungary

MEDITERRANEAN RFC IMPLEMENTATION PLAN TT 2023/2024

Version control

Evolution Index	Date	Modification / comments	Written by
V2Dec2016	2 December 2016	General Update including the new line Nimes Montpellier	PMO
V09Jan2017	09 January 2017	Executive Board Comments	PMO
V19Jan2017	19 January 2017	Línea Figueras Perpignan S.A. took over the Infrastructure Manager competencies from TP FERRO	PMO
V24Febr2017	24 February 2017	SZ-I contact update	PMO
V08Jan2018	08 January 2018	Yearly update	PMO
V26Jan2018	26 January 2018	New maps	PMO
V11Oct2018	11 October 2018	MED RFC GA approval new member joined	PMO
V4Dec2018	4 December 2018	New maps	PMO
V26Apr2019	26 April 2019	Correction of misspellings	PMO
V18Nov2019	18 November 2019	RFI List of Projects update	PMO
V03Dec2019	3 December 2019	MED RFC GA approval of the yearly updates of technical parameters, bottlenecks in Chapter 2 and list of projects, ERTMS deployment and forecasts for 2025 and 2030 in Chapter 6.	PMO
V5Febr2020	5 February 2020	SZ-I List of Projects update	PMO
V26August2020	26 August 2020	Correction of misspellings	PMO
V08Dec2020	8 December 2020	MED RFC GA approval of the yearly updates in Chapter 2 and in Chapter 6	PMO
V08Dec2020	8 December 2020	MED RFC GA approval of Transport Market Study update in Chapter 3	PMO
V11Jan2021	11 January 2021	MED RFC ExBo approval of Market Analysis Study update in Chapter 3	PMO
V18Jan2021	18 January 2021	Correction of typos in Market Analysis Study update in Chapter 3	PMO
V22Jan2021	22 January 2021	RFI representation update	PMO
V8Febr2021	8 February 2021	Correction of typos in List of Measures in Chapter 4	PMO

	6 August 2021	Fundamental update (Chapters 1 4 and 5)	PMO
	22 Sept 2021	Fundamental update (Chapters 1 4 and 5)	GA
V26Oct2021	26 Oct 2021	Fundamental update (Chapters 1 4 and 5)	ExBo
V27Oct2022	27 Oct 2022	Corridor objectives Chapter 5	ExBo
V01Dec2022	01 Dec 2022	Yearly regular update	GA
	09 January 2023	New link to the CID Book	PMO

Contents

1 Introduction

The Rail Freight Corridors (RFCs) have been established to strengthen Europe-wide rail freight transport by removing bottlenecks and technical barriers across Countries, especially at the borders. The Improvement of the connections to freight terminals and in between industrial areas, HUBs and the most populated locations is also a fundamental step to boost rail freight traffic and multimodality. The Mediterranean RFC is committed to enhance performance quality and cooperation, coordination and harmonisation across the rail sector.

A key focus was addressed to respond to the needs for improvements of the cross-border freight traffic, fostering co-operation across borders both at the level of Member States and rail infrastructure managers (based on the rules set in the Framework for Capacity Allocation on the one hand and coordinating the international rail freight capacity on the other hand) with a sufficient involvement of users and terminals in the development of the European rail freight system. Therefore, several governance layers have been put in place to channel and articulate the different needs of the stakeholders and finally to make decisions accordingly.

All these activities shall support the modal shift from road to rail and lead to meet the targets of the transport and environmental policy of the European Union. In order to be competitive with other modes of transport, international and national rail freight services, which have been opened up to competition since 1 January 2007, should be able to benefit from a good quality service in terms of capacity, infrastructure, and traffic management.

Legally, the RFCs are based on the Regulation (EU) 913/2010, which entered into force on 9 November 2010. The date for the establishment of the RFC Mediterranean was set on 10th November 2013.

Since the initial Implementation Plan in 2013 and the major update in 2016 (when Croatia joined), the update is based on the requirements of CID Common Structure developed under the umbrella of RailNetEurope (RNE). Otherwise, the document is updated yearly as regards Chapter 2 "Corridor Description" and Chapter 6 "Investment Plan".

1.1 Aim of the Implementation Plan

The Implementation plan is periodically updated, following its first submission to the Executive Board in 2013. It has different purposes:

- First, it is a management tool for the Executive Board (ExBo) and the Management Board (MB) or General Assembly (GA) members, to present the numerous tasks that derive from the operation, also supporting the supervision role of the ExBo set out in Article 8 of the Regulation. In this regard, it is a basic document that shall be regularly updated with the yearly changes and progresses along the corridor. It is a point of reference that also supports the work of the Member IMs/ABs.

- Second, the Implementation Plan aims at presenting in a transparent way to all the stakeholders and potential users the main characteristics of the corridor, the measures taken, and the planned procedures of corridor operation. It is regularly published on the website of Med RFC and CIP.

- Third, the yearly update of the Chapters "Corridor Description" and "Investment Plan" are supporting the customers to understand the infrastructure developments over time.
  The regular update (every 4 years) of the other Chapters, such as "Market Analysis Study", "List of Measures" and "Objectives" and performance of the corridor" shows the strategic developments of the corridor.

- Fourth, the purpose of the Implementation Plan is to keep track of the progresses and achievements generated by the activity of the Mediterranean RFC and check regularly the progress made.

This new version was approved by the Executive Board on the 26th of October 2021

2 Corridor Description

The definition and exact description of lines and terminals contained in this Rail Freight Corridor, according to the definition of freight corridor (Article 2.2.a), has been a task developed by the Management Board in cooperation with the relevant Infrastructure Managers, and involving the Advisory Groups.

All Mediterranean RFC locations included in the Annex II of the Regulation have been adequately incorporated into this Corridor.

The selection of railway lines and terminals is based on current and expected traffic patterns and information provided by the Infrastructure Managers and the results of Transport Market Study. Especially where various alternative options exist, the lines suitability to freight traffic with regard to infrastructure parameters like maximum gradients, permitted train-lengths, axle-loads and loading gauges have been taken into account.

Designated lines, given the important traffic flows that already exist, coincide with those largely used today. Besides, the main lines along the principal route outlined in the Regulation (EU) 913/2010/EU together all the amendments Almeria-Valencia / Algeciras / Madrid-Zaragoza / Barcelona-Marseille-Lyon-Turin-Milano-Verona-Padua / Venice-Trieste / Koper- Ljubljana / Rijeka-Zagreb-Budapest-Zahony ("Mediterranean Corridor"), the Corridor includes diversionary routes frequently used 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.

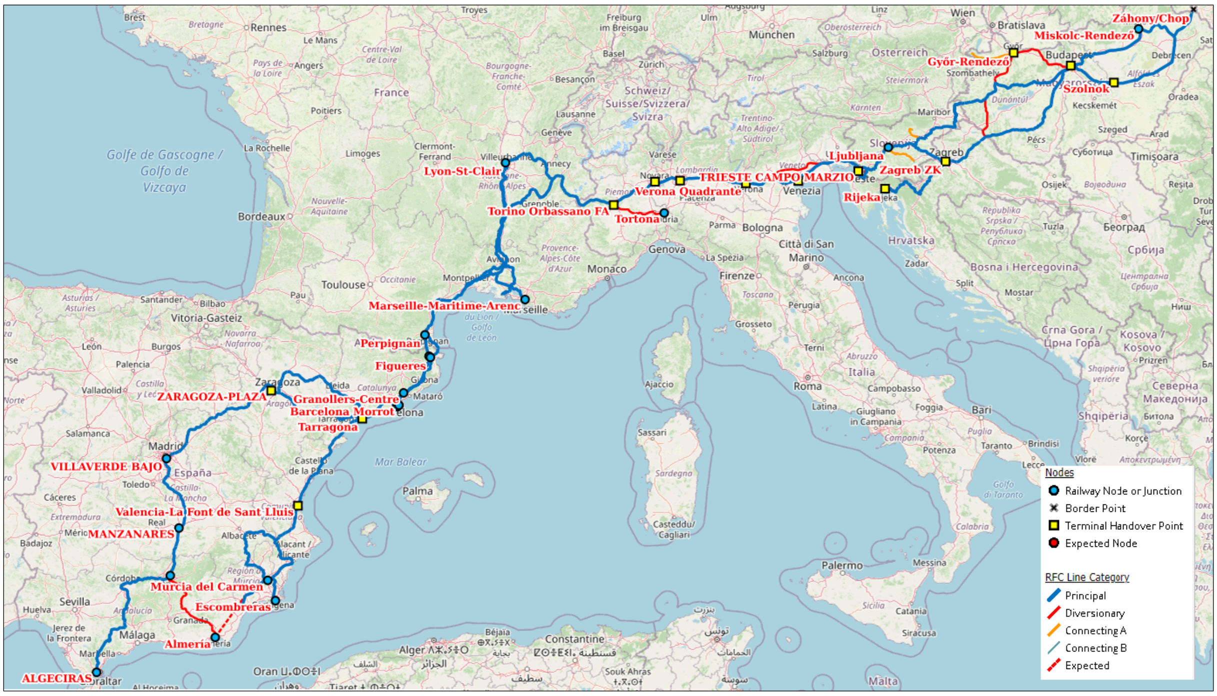
In some cases, parallel railway lines have been included in order to provide sufficient capacity in this corridor. In addition, lines that may not play an important role for long-haul freight traffic today but may do so in the future are included. All railway lines with dedicated capacity and expected to hold pre-arranged train paths, have been designated to this corridor.

When it comes to terminals, all terminals along designated lines have been designated to the corridor as well, except if a terminal does not have any relevance for the traffic in the corridor. Each Port along the corridor has been considered as a single terminal, even in the case that they hold in their facilities more than one rail intermodal or freight yard. The railway lines of this Corridor connect terminals of relevance to rail freight traffic along the principal route, especially:

- marshalling yards
- major rail-connected freight terminals
- rail - connected intermodal terminals in seaports, airports and inland waterways

According to Article 9.1.a of Regulation 913/2010/EU, railway lines and terminals designated to this Corridor are exactly and unambiguously described in this Implementation Plan, by the maps and detailed tables included in therein. The Implementation Plan provides information on the bottlenecks along the Corridor, as well as an overview over existing traffic patterns (both freight and passenger traffic). The Regulation promotes the harmonization of infrastructure with the specific objectives to remove bottlenecks and to harmonize relevant parameters like train lengths, train gross weights, axle loads and loading gauges. Reference is made to the TEN-T corridor, emphasizing that interoperability is an essential feature of the Rail Freight Corridors. The characterization of the Corridor included in this chapter of the Implementation Plan is essential to achieve these goals.

2.1 Key Parameters of Corridor Lines



The length of the Mediterranean RFC is over 7.967 km, according to the table shown below.

	Total LENGHT	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/ FEEDER	UNDER CONSTRUCTION
SPAIN	**3.397**	3.015	240		142
FRANCE	**1.515**	1.515			
ITALY	**861**	636	113	112	
SLOVENIA	**457**	457			
CROATIA	**375**	375			
HUNGARY	**1.428**	1.143	285	16	
TOTAL	**8.049**	**7.141**	**638**	**128**	**142**

Mediterranean RFC in Italy includes the Torino-Alessandria-Tortona bypass solution for dangerous goods (connecting feeders).

Mediterranean RFC principal routes constitute about 88,7 % of all lines. Section Almeria-Murcia (Spain) is currently under construction. In Spain, Italy and Hungary 638 km of diversionary routes have been included, for train rerouting in case of disturbance. One of these routes is the alternative corridor selected to bypass works under development in the Almeria-Murcia section. Also, more than 90 terminals have been included in Mediterranean RFC, according to the following distribution:

- Spain: 56 terminals
- France: 25 terminals
- Italy: 12 terminals
- Slovenia: 7 terminals
- Croatia: 8 terminals
- Hungary: 10 terminals

The description of Mediterranean RFC includes a list of:

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

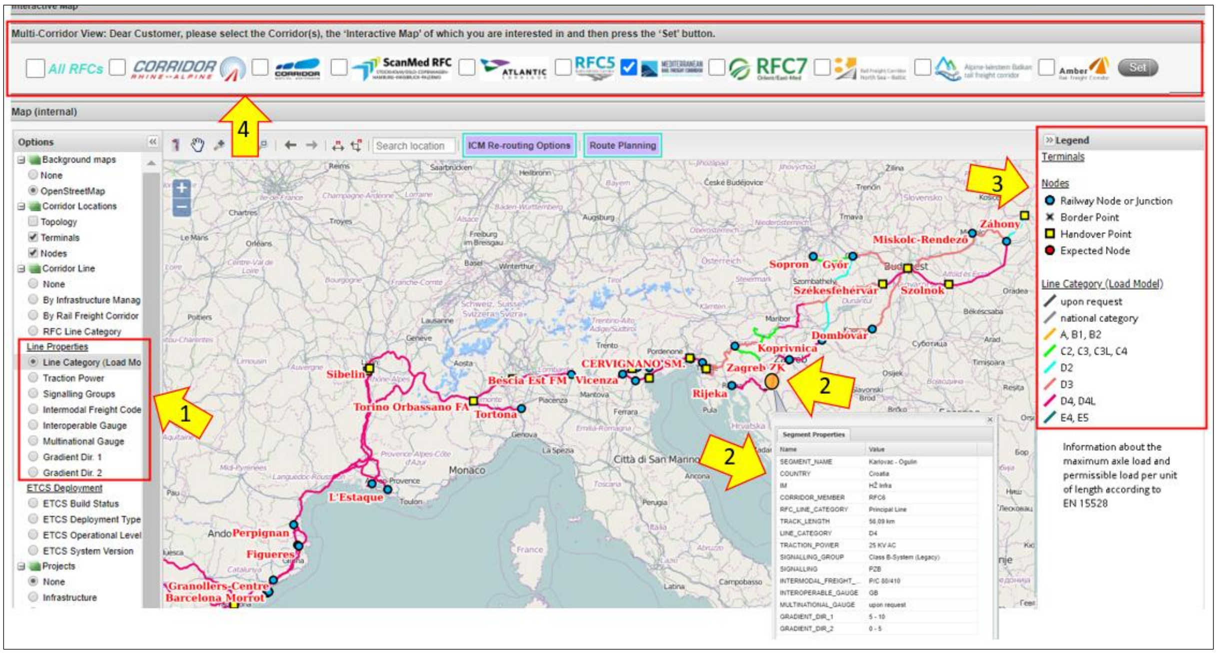
For designated lines, the description comprises a detailed and systematic definition of all infrastructure parameters relevant for rail freight traffic, including:

- Type of line: principal, diversionary, and connecting/feeder
- Section length, in kilometres
- Track gauge: International Standard gauge (1435 mm) or Iberian gauge (1668 mm)
- 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 and passenger vehicles especially in the tunnels
- Power supply: Type of current and voltage for electrified lines (DC 1.500V, DC 3.000V & AC 25.000V)
- Signalling and interlocking systems: Type of signalling systems implemented on each line
- Gradient: Maximum line gradient in both directions of each line of the corridor (Towards NE – Algeciras-Madrid to Záhony and towards SW Záhony to Madrid-Algeciras)

Regulation (EU) 913/2010 – Article 9 (1.a) requests a description of the characteristics of the freight corridor. For designated lines, the description comprises a detailed and systematic definition of all infrastructure parameters. Together with the other RFCs, RFC Mediterranean also uses Customer Information Platform (CIP) link to inform about the complete set of line properties:

To find the desired parameters CIP should be visited at:
https://cip.rne.eu/apex/f?p=212:24:11382039485075:::::

In the Login page the 'RU/Shipper' button should be clicked, so you will land on the interactive map with the multicorridor view of all the RFCs. In case you just want to check Med RFC, on top of the interactive map "multicorridor view" deselect All RFCs and thick the Med RFC box.



In CIP, the line properties information is given on the map. The user can select the different line properties using the left side tab (1) to see the applicable values for all corridor lines, but also on single line sections by a click on the route (2). On the l right side of the screen there is the legend (3). The Multicorridor view, for selecting the RFCs you are interested in is placed on top of the interactive map (4).

According to Article 2.2.c of Regulation 913/2010/EU, 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.

Terminals are described in the Corridor Information Document Section 3.

2.1.1 Spain

	SECTION LENGHT	LINE TYPE			TRACK GAUGE		DOUBLE TRACK	MAX. TRAIN LENGHT INCL. TRACTION									AXLE LOAD			LOAD PER METRE			TRAIN SPEED				LOADING GAUGE		POWER SUPPLY			SIGNALING SYSTEM								GRADIENT	
	km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	1435 mm	1668 mm		350 m	450 m	500 m	550 m	575 m	600 m	625 m	650 m	750 m	20,0 T/axle	21,0 T/axle	22,5 T/axle	6,4 T/m	7,2 T/m	8,0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	% towards NE	% towards SW
ALGECIRAS - CORDOBA	305	X				X	–			X									X			X				X	45/364	GHE16												24	23
ALGECIRAS - GAUCIN	57	X				X	–			X									X			X				X	45/364	GHE16												22	23
GAUCIN - RONDA	49	X				X	–			X									X			X				X	45/364	GHE16				X								22	23
RONDA -BOBADILLA	70	X				X	–			X									X			X				X	45/364	GHE16												24	18
BOBADILLA - MONTILLA	74	X				X	–			X									X			X				X	45/364	GHE16		X		X								17	17
MONTILLA - CORDOBA	55	X				X	–			X									X			X				X	45/364	GHE16		X		X								17	17
CORDOBA - MANZANARES-	245	X				X													X			X				X	45/364	GHE16		X		X								13	16
CORDOBA - ANDUJAR	79	X				X	–				X								X			X				X	45/364	GHE16		X		X								11	12
ANDUJAR - LINARES	48	X				X	–				X								X			X				X	45/364	GHE16		X		X								5	13
LINARES - VADOLLANO	9	X				X	X			X									X			X				X	45/364	GHE16		X		X								13	16
VADOLLANO - SANTA CRUZ DE MUDELA	67	X				X	–			X									X			X				X	45/364	GHE16		X		X								13	16
SANTA CRUZ DE MUDELA - MANZANARES	42	X				X	X			X									X			X				X	45/364	GHE16		X		X								13	16
MANZANARES - MADRID	213	X				X	X			X									X			X				X	45/364	GHE16		X		X								10	7
MANZANARES -ALCAZAR DE SAN JUAN	49	X				X	X			X									X			X				X	45/364	GHE16		X		X								6	5
ALCAZAR DE SAN JUAN - CASTILLEJO	84	X				X	X			X									X			X				X	45/364	GHE16		X		X								10	7
CASTILLEJO - ARANJUEZ	15	X				X	X			X									X			X				X	45/364	GHE16		X		X								6	5
ARANJUEZ - MADRID	66	X				X	X			X									X			X				X	45/364	GHE16		X		X								6	5
MADRID - ZARAGOZA	333	X				X	X			X									X			X				X	45/364	GHE16		X		X								17	16
MADRID VICÁLVARO - GUADALAJARA	44	X				X	X			X									X			X				X	45/364	GHE16		X		X								8	12
GUADALAJARA - CALATAYUD	186	X				X	X			X									X			X				X	45/364	GHE16		X		X								14	16
CALATAYUD - RICLA	36	X				X	–			X									X			X				X	45/364	GHE16		X		X								2	10
RICLA - GRISÉN	34	X				X	X			X									X			X				X	45/364	GHE16		X		X								2	10
GRISÉN - CASETAS	13	X				X	X			X									X			X				X	45/364	GHE16		X		X								2	10
CASETAS - ZARAGOZA PLAZA	21	X				X	X			X									X			X				X	45/364	GHE16		X		X								17	16
ZARAGOZA - TARRAGONA	583	X				X	5%			X									X			X				X	45/364	GHE16		X		X								17*	16*
ZARAGOZA PLAZA - BIF CARTUJA	21	X				X	X			X									X			X				X	45/364	GHE16		X		X								17	16
BIF CARTUJA - TARDIENTA	61	X				X	–			X									X			X				X	45/364	GHE16		X		X								10	18*
TARDIENTA - SELGUA	70	X				X	–			X									X			X				X	45/364	GHE16		X		X								17	16*
SELGUA - LÉRIDA	61	X				X	–			X									X			X				X	45/364	GHE16		X		X								16	18*
LÉRIDA - PLANA	68	X				X	–			X									X			X				X	45/364	GHE16		X		X								17	17*
PLANA - REUS	21	X				X	–			X									X			X				X	45/364	GHE16		X		X								3	14*
REUS - TARRAGONA	18	X				X	X			X									X			X				X	45/364	GHE16		X		X								1	15*
BIF CARTUJA - SAMPER	72	X				X	–			X									X			X				X	45/364	GHE16		X		X								19*	16
SAMPER - REUS	155	X				X	–			X									X			X				X	45/364	GHE16		X		X								17*	16
PLANA - S VICENTE C	36	X				X	–			X									X			X				X	45/364	GHE16		X		X								8	14
ALMERÍA - MURCIA	200	X																																							
ALMERIA - LORCA	142	X																																							
LORCA - MURCIA CARGAS	58	X				X	–			X									X			X				X	45/364	GHE16				X								9	16
ALMERIA - MOREDA	123		X			X	–		X										X			X				X	45/364	GHE16				X								28	22
ALMERIA - HUENEJAR DÓLAR	78		X			X	–		X										X			X				X	45/364	GHE16		X		X								28	7
HUENAJAR DÓLAR - MOREDA	45		X			X	–		X										X			X				X	45/364	GHE16				X								22	22
MOREDA - LINARES	117		X			X	–			X									X			X				X	45/364	GHE16				X								23	23
MOREDA - LINARES	117		X			X	–			X									X			X				X	45/364	GHE16				X								23	23
ESCOMBRERAS - MURCIA	81	X				X	20%			X									X			X				X	45/364	GHE16				X								15	16
ESCOMBRERAS - EL REGUERÓN	65	X				X	–			X									X			X				X	45/364	GHE16				X								15	16
EL REGUERÓN - MURCIA CARGAS	16	X				X	X			X									X			X				X	45/364	GHE16				X								4	4
MURCIA - CHINCHILLA	158	X				X	–			X									X			X				X	45/364	GHE16				X								13	9
MURCIA CARGAS - CIEZA	44	X				X	–			X									X			X				X	45/364	GHE16				X								13	7
CIEZA - HELLIN	63	X				X	–			X									X			X				X	45/364	GHE16				X								12	9
HELLIN - CHINCHILLA	51	X				X	–			X									X			X				X	45/364	GHE16				X								13	8
CHINCHILLA - VALENCIA	181	X				X	98%			X									X			X				X	45/364	GHE16		X		X								13	14
CHINCHILLA - LA ENCINA	79	X				X	X			X									X			X				X	45/364	GHE16		X		X								13	13
LA ENCINA - JATIVA	48	X				X	X			X									X			X				X	45/364	GHE16		X		X								10	14
JATIVA - VALENCIA FSL	54	X				X	94%			X									X			X				X	45/364	GHE16		X		X								7	11
LA ENCINA - ALICANTE	78	X				X	–		X										X			X				X	45/364	GHE16		X		X								17	6
LA ENCINA - ALICANTE	78	X				X	–		X										X			X				X	45/364	GHE16		X		X								17	6

	SECTION LENGHT	LINE TYPE			TRACK GAUGE		DOUBLE TRACK	MAX. TRAIN LENGHT INCL. TRACTION									AXLE LOAD			LOAD PER METRE			TRAIN SPEED				LOADING GAUGE		POWER SUPPLY			SIGNALING SYSTEM								GRADIENT	
	km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	1435 mm	1668 mm		350 m	450 m	500 m	550 m	575 m	600 m	625 m	650 m	750 m	20.0 T/axle	21.0 T/axle	22.5 T/axle	6.4 T/m	7.2 T/m	8.0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	‰ towards NE	‰ towards SW
ALICANTE - EL REGUERON	67	X				X		X											X			X				X	45/364	GHE16				X								12	14
ALICANTE - EL REGUERON	67	X				X		X											X			X				X	45/364	GHE16				X								12	14
VALENCIA - CASTELLÓN	70	X				X	X			X									X			X				X	45/364	GHE16		X		X								11	14
VALENCIA FSL - SAGUNTO	30	X			x	X	X			X									X			X				X	45/364	GHE16		X		X								11	12
SAGUNTO - CASTELLON	40	X			x	X	X			X									X			X				X	45/364	GHE16		X		X								7	14
CASTELLON - BIF. CALAFAT	145	X				X	X			X									X			X				X	45/364	GHE16		X		X								15	14
CASTELLON - VINAROZ	77	X				X	X			X									X			X				X	45/364	GHE16		X		X								15	14
VINAROZ - ALDEA	38	X				X	X			X									X			X				X	45/364	GHE16		X		X								13	12
ALDEA - BIF. CALAFAT	30	X				X	X			X									X			X				X	45/364	GHE16		X		X								11	12
BIF. CALAFAT - TARRAGONA	41	X				X	–			X									X			X				X	45/364	GC		X		X						X		13	12
TARRAGONA - BARCELONA AREA	78	X				X	X		X										X			X				X	45/364	GHE16		X		X								14	13
TARRAGONA - S VICENTE C	25	X				X	X		X										X			X				X	45/364	GHE16		X		X								9	6
S VICENTE C - VILLAFRANCA P	24	X				X	X			X									X			X				X	45/364	GHE16		X		X								14	5
VILLAFRANCA P - MARTORELL	25	X				X	X			X									X			X				X	45/364	GHE16		X		X								14	13
MARTORELL - CASTELLBISBAL	4	X				X	X			X									X			X				X	45/364	GHE16		X		X								1	7
BARCELONA AREA	51	X			X	X	X			X									X			X				X	45/364	GHE16		X		X								15	15
CASTELLBISBAL - MOLLET	25	X			X	X	X			X									X			X				X	45/364	GHE16		X		X						X*		15	15
BARCELONA CAN - RUBI	25	X			X	X	X			X									X			X				X	45/364	GHE16		X		X						X*		15	15
BARCELONA AREA - FRENCH BORDER CLASSIC IBERIAN LINE	150	X					X			X									X			X				X	45/364	GHE16		X		X								15	15
MOLLET - GRANOLLERS	10	X				X	X			X									X			X				X	45/364	GHE16		X		X								12	0
GRANOLLERS - S CELONI	22	X				X	X			X									X			X				X	45/364	GHE16		X		X								15	14
S CELONI - MAÇANET M	19	X				X	X			X									X			X				X	45/364	GHE16		X		X								6	12
MAÇANET M - GERONA	30	X				X	X			X									X			X				X	45/364	GHE16		X		X								10	10
GERONA - FIGUERAS	41	X			X	X	X			X									X			X				X	45/364	GHE16		X		X								15	15
FIGUERAS - PORTBOU	26	X				X	X			X									X			X				X	45/364	GHE16		X		X								15	15
PORTBOU - CERBERE	2	X				X				X									X			X			X		45/364	GHE16	X	X		X	X							0	8
BARCELONA AREA - INTERNATIONAL SECTION MIXED TRAFFIC HIGH SPEED LINE	134	X			X		X									X			X			X				X	45/364	GHE16			X	X						X		18	18
BARCELONA - MOLLET	20	X			X		X									X			X			X				X	45/364	GHE16			X	X						X		18	18
MOLLET - GERONA	76	X			X		X									X			X			X				X	45/364	GHE16			X	X						X		18	18
GERONA - FIGUERAS VILAFANT	34	X			X		X									X			X			X				X	45/364	GHE16			X	X						X		18	18
FIGUERAS VILAFANT - INTERNATIONAL SECTION	4	X			X		X									X			X			X				X	45/364	GHE16			X	X						X		18	18
INTERNATIONAL SECTION	44	X			X		X									X			X			X				X	45/364	GHE16			X							X		18	18
FIGUERAS - PERPIGNAN	44	X			X		X									X			X			X				X	45/364	GHE16			X							X		18	18

NOTES:

* In Barcelona-Rubí and Castelbisbal-Mollet sections, ETCS L1 is only available for standard gauge trains.
* Portbou-Cerbere section is formed by one track for each gauge. The broad gauge one (ASFA, DC 3 KV) is managed by ADIF and the standard gauge one (KVB, CD 1'5 KV) is managed by SNCF Réseau.
* In Zaragoza-Tarragona sections, freight trains usually run NE by the Cartuja-Tardienta-Selgua-Lérida-Plana-Reus route, and SW by the Cartuja-Samper-Reus route. Thus, global gradients are considered in this way.

2.1.2 France

	SECTION LENGHT	LINE TYPE			TRACK GAUGE		DOUBLE TRACK	MAX. TRAIN LENGHT INCL. TRACTION									AXLE LOAD			LOAD PER METRE			TRAIN SPEED				LOADING GAUGE		POWER SUPPLY			SIGNALING SYSTEM								GRADIENT	
	km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	1435 mm	1668 mm		350 m	450 m	500 m	550 m	575 m	600 m	625 m	650 m	750 m	20,0 T/axle	21,0 T/axle	22,5 T/axle	6,4 T/m	7,2 T/m	8,0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	‰ towards NE	‰ towards SW
PORTBOU - PERPIGNAN	**43**	**X**			**X**														**X**			**X**					**45/364**	**45/364**	**X**				**X**								
PORTBOU - CERBERE	2	X			X*	X*	–*		X										X			X	X				GB	GB	X*	X*		X*	X*							5.0	10.0
CERBERE -COLLIOURE	14	X			X		X									X			X			X		X			GB	BB	X				X							11.0	15.0
COLLIOURE - PERPIGNAN	27	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	5.0
INTERNATIONAL SECTION - PERPIGNAN	**5**	**X**			**X**		**X**									**X**			**X**			**X**				**X**	**GB1**	**GB1**	**X****		**X****		**X**							**0.0**	**10.0**
PERPIGNAN - MONTPELLIER	**158**	**X**			**X**		**X**									**X**			**X**			**X**					**GB1**	**GB1**	**X**				**X**							**5.0**	**5.0**
PERPIGNAN - GRUISSAN	51	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	5.0
GRUISSAN - NARBONNE	10	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	5.0
NARBONNE - MONTPELLIER	97	X			X		X									X			X			X				X	GB1	GB1	X				X							5.0	5.0
MONTPELLIER - NÎMES OC'VIA HIGH SPEED	**80**	**X**			**X**		**X**									**X**			**X**			**X**				**X**	**PC70/400**	**PC70/400**			**X**		**X**						**X**	**12.5**	**12.5**
MONTPELLIER - AVIGNON	**142**	**X**			**X**		**X**									**X**			**X**			**X**					**GB1**	**GB1**	**X**				**X**								
MONTPELLIER - NÎMES	50	X			X		X									X			X			X				X	GB1	GB1	X				X							4.0	4.0
A) NÎMES - VILLENEUVE-LES-AVIGNON (VIA REMOULINS)	38	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	10.0
VILLENEUVE - LES-AVIGNON - AVIGNON	5	X			X		X									X			X			X	X				GB1	GB1	X				X								
B) NÎMES - TARASCON	27	X			X		X									X			X			X				X	GB1	GB1	X				X							6.0	7.0
TARASCON - AVIGNON	22	X			X		X									X			X			X			X		GB1	GB1	X				X							8.0	8.0
AVIGNON - LYON	**283**	**X**			**X**		**X**									**X**			**X**			**X**					**GB1**	**GB1**	**X**				**X**								
A) VILLENEUVE - LES-AVIGNON - PONT ST ESPRIT	44	X			X		X									X			X			X				X	GB1	GB1	X				X							5.0	6.0
PONT ST ESPRIT - PEYRAUD	127	X			X		X									X			X			X				X	GB1	GB1	X				X							5.0	6.0
PEYRAUD - GIVORS	44	X			X		X									X			X			X			X		GB1	GB1	X				X							10.0	5.0
GIVORS - CHASSE SUR RHÔNE	3	X			X		X									X			X			X	X				GB1	GB1	X				X							7.0	5.0
B) AVIGNON - LIVRON	107	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	5.0
LIVRON - VALENCE	17	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	5.0
VALENCE - CHASSE SUR RHÔNE	85	X			X		X									X			X			X			X		GB1	GB1	X				X							5.0	5.0
CHASSE SUR RHÔNE - LYON PART DIEU	25	X			X		X									X			X			X				X	GB1	GB1	X				X							12.0	11.0
LYON PART DIEU - VENISSIEUX	4	X			X		X									X			X			X			X		GB1	GB1	X				X							8.0	5.0
VALENCE - MONTMELIAN	**152**	**X**			**X**		**X**									**X**			**X**			**X**					**GB1**	**GB1**					**X**							**5.0**	**5.0**
VALENCE - MOIRANS	80	X			X		X									X			X			X					GB1	GB1					X							5.0	5.0
MOIRANS - GRENOBLE	18	X			X		X									X			X			X					GB1	GB1	X				X							5.0	5.0
GRENOBLE - MONTMELIAN	54	X			X		X									X			X			X					GB1	GB1					X							5.0	5.0
LYON - MODANE	**231**	**X**			**X**		**X**									**X**			**X**			**X**					**GB1**	**GB1**	**X**				**X**								
LYON PART DIEU - AMBÉRIEU	46	X			X		X									X			X			X				X	GB	GB	X				X							8.0	10.0
AMBÉRIEU - CULOZ	50	X			X		X									X			X			X			X		GB1	GB1	X				X							12.0	12.0
CULOZ - CHAMBERY	36	X			X		X									X			X			X				X	GB1	GB1	X				X							10.0	10.0
CHAMBERY - ST PIERRE D'ALBIGNY	48	X			X		X									X			X			X				X	GB1	GB1	X				X							10.0	10.0
ST PIERRE D'ALBIGNY - ST. JEAN DE MAURIENNE	23	X			X		X									X			X			X			X		GB1	GB1	X				X							6.0	18.0
ST. JEAN DE MAURIENNE - MODANE	28	X			X		X									X			X			X			X		GB1	GB1	X				X							30.0	30.0
MARSEILLE - MIRAMAS	**52**	**X**			**X**		**X**									**X**			**X**			**X**					**GB**	**GB**					**X**								
MARSEILLE ST CHARLES - L'ESTAQUE	10	X			X		X									X			X			X			X		GB	GB	X				X							5.0	5.0
L'ESTAQUE - MIRAMAS PAR ROGNAC	42	X			X		X									X			X			X				X	GB	GB	X				X							5.0	5.0
LAVALDUC - MIRAMAS	16	X			X		X									X			X			X		X			GB	GB	X				X							10.0	5.0
LAVALDUC - FOS-VIGUERAT	12	X			X		X									X			X			X		X			GB	GB	X				X							10.0	5.0
MIRAMAS - AVIGNON	**111**	**X**			**X**		**X**									**X**			**X**			**X**					**GB1**	**GB1**	**X**				**X**								
A) MIRAMAS - AVIGNON (PAR CAVAILLON)	65	X			X		X									X			X			X				X	GB1	GB1	X				X							8.0	8.0
B) MIRAMAS - TARASCON	46	X			X		X									X			X			X		X			GB1	GB1	X				X							11.0	11.0

* Portbou-Cerbere section is formed by one track for each gauge. The broad gauge one (ASFA, DC 3 KV) is managed by ADIF and the standard gauge one (KVB, CD 1'5 KV) is managed by SNCF RÉSEAU

2.1.3 Italy

		SECTION LENGHT	LINE TYPE			MAX. TRAIN LENGHT INCL. TRACTION								AXLE LOAD			LOAD PER METRE			TRAIN SPEED				LOADING GAUGE		POWER SUPPLY			SIGNALING SYSTEM										GRADIENT	
		km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	450 m	500 m	550 m	575 m	600 m	625 m	650 m	750 m	20,0 T/axle	21,0 T/axle	22,5 T/axle	6,4 T/m	7,2 T/m	8,0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	BEM	BCA	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	‰ towards NE	‰ towards SW
ITALY	**MODANE-TORINO**	**102**	**X**					**X**								**X**			**X**				**X**	**45/364**			**X**						**X**	**X**					**30**	**28**
	MODANE-CONFINE FRANCESE	4	X					X*								X			X			X		45/364			X						X	X					0	28
	CONFINE FRANCESE-TORINO	98	X							X						X			X				X	45/364			X						X	X					30	0
	TORINO-NOVARA	**99**	**X**							**X**						**X**			**X**				**X**	**80/410**			**X**						**X**	**X**					**14**	**13**
	NOVARA-MILANO	**45**	**X**						**X**							**X**			**X**				**X**	**80/410**			**X**						**X**	**X**					**5**	**7**
	MILANO-VERONA	**148**	**X**								**X****					**X**			**X**				**X**	**80/410**			**X**						**X**	**X**					**6**	**10**
	VERONA-PADOVA	**82**	**X**								**X**					**X**			**X**				**X**	**80/410**			**X**						**X**	**X**					**5**	**5**
	VERONA-VICENZA	52	X								X					X			X				X	80/410			X						X	X					5	5
	VICENZA-PADOVA	30	X								X					X			X				X	80/410			X						X	X					5	3
	VICENZA-PORTOGRUARO (by Cittadella)	**113**		**X**				**X**								**X**			**X**			**X**		**80/410**			**X**						**X**	**X**					**6**	**7**
	VICENZA-CASTELFRANCO V.	36		X				X								X			X			X		80/410			X						X	X					6	7
	CASTELFRANCO V.-TREVISO	25		X					X							X			X			X		80/410			X						X	X					1	4
	TREVISO-PORTOGRUARO	53		X					X							X			X			X		80/410			X						X	X					5	4
	PADOVA-BIVIO D'AURISINA	**131**	**X**						**X**							**X**			**X**			**X**		**80/410**			**X**						**X**	**X**					**9**	**10**
	PADOVA-VENEZIA	29	X								X					X			X				X	80/410			X						X	X					3	3
	VENEZIA-PORTOGRUARO	59	X						X							X			X				X	80/410			X					X		X					8	8
	PORTOGRUARO-BIVIO D'AURISINA	43	X							X						X			X			X		80/410			X					X		X					9	10
	BIVIO D'AURISINA-VILLA OPICINA	**15**	**X**							**X**						**X**			**X**		**X**			**80/410**			**X**				**X**			**X**					**15**	**0**
	BIVIO D'AURISINA-TRIESTE	**14**	**X**							**X**						**X**			**X**		**X**			**80/410**			**X**						**X**	**X**					**14**	**1**
	TORINO-ALESSANDRIA	90		X					X							X			X			X		32/350			X						X	X					6	12
	ALESSANDRIA-TORTONA	22		X					X							X			X		X			45/364			X					X		X					6	4

* the maximum train length could be up 600 m after verification of RFI

** the maximum train length is 750 m in the section Pioltello - Treviglio – Brescia

2.1.4 Slovenia

		SECTION LENGHT	LINE TYPE			TRACK GAUGE	DOUBLE TRACK	MAX. TRAIN LENGHT INCL. TRACTION								AXLE LOAD			LOAD PER METRE			TRAIN SPEED				LOADING GAUGE		POWER SUPPLY			SIGNALING SYSTEM										GRADIENT	
		km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	1435 mm		450 m	500 m	525 m	570 m	597 m	600 m	650 m	750 m	20,0 T/axle	21,0 T/axle	22,5 T/axle	6,4 T/m	7,2 T/m	8,0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	BEM	BCA	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	‰ towards NE	‰ towards SW
SLOVENIA	**VILLA OPICINA (BORDER) - DIVACA**	**12**	**X**			**X**	**X**						**X**					**X**		**X**		**X**				**99/429**			**X**								**X**		**X**		**10**	**0**
	VILLA OPICINA (BORDER) - SEZANA	3	X			X	X						X					X		X		X				99/429			X								X		X		10	0
	SEZANA - DIVACA	**8**	X			X	X						X					X		X		X				99/429			X								X		X		8	0
	KOPER - DIVACA	**48**	**X**			**X**	-			**X**								**X**		**X**		**X**				**90/410**			**X**								**X**		**X**		**25**	**20**
	DIVACA - LJUBLJANA	**105**	**X**			**X**	**X**						**X**					**X**		**X**		**X**				**82/412**			**X**								**X**		**X**		**8**	**12**
	LJUBLJANA - HODOS	**246**	**X**			**X**	**56%**				**X**							**X**		**X**			**X**			**80/401**			**X**								**X**		**X**		**10**	**11**
	LJUBLJANA - ZIDANI MOST	64	X			X	X				X							X		X			X			99/429			X								X		X		1	3
	ZIDANI MOST - PRAGERSKO	73	X			X	X								X			X			X			X		90/410			X								X		X		9	9
	PRAGERSKO - HODOS	109	X			X	-						X					X			X			X		80/401			X								X		X		10	11
	ZIDANI MOST - DOBOVA	**50**	**X**			**X**	**X**				**X**							**X**		**X**			**X**			**99/429**			**X**								**X**		**X**		**1**	**4**

2.1.5 Croatia

		SECTION LENGHT	LINE TYPE			TRACK GAUGE		DOUBLE TRACK	MAX. TRAIN LENGHT INCL. TRACTION										AXLE LOAD				LOAD PER METRE			TRAIN SPEED				INTERMODAL LOADING GAUGE	LOADING GAUGE		POWER SUPPLY			SIGNALING SYSTEM													GRADIENT / (INCLINE)	
		km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	1435 mm	1520		200 m	360 m	450 m	500 m	550 m	575 m	600 m	625 m	650 m	750 m	18,0 T/axle	20,0 T/axle	21,0 T/axle	22,5 T/axle	6,4 T/m	7,2 T/m	8,0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Lines	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	KVB	BCA	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	APS	ID	O	‰ towards NE	‰ towards SW
CROATIA	**Rijeka - Zagreb RK**	**241,579**																																																
	Rijeka - Sušak-Pećine	2,962	X			X				X												X			X		X			52/368	GB				X							X							26	0
	Rijeka Brajdica - Sušak Pećine	2,923	X			X					X											X			X	X				52/368	GB				X							X							21	-
	Sušak Pećine - Škrljevo	9,012	X			X				X												X			X	X				52/368	GB				X							X							26	-
	Bakar - Škrljevo	11,715	X			X				X												X			X	X				52/368	GB				X							X							26	0
	Škrljevo - Lokve	40,362	X			X				X												X			X	X				52/368	GB				X							X							26	17
	Lokve - Moravice	37,691	X			X				X												X			X	X				52/368	GB				X							X							3	18
	Moravice - Ogulin	29,749	X			X									X							X			X	X				52/368	GB				X							X							3	8
	Ogulin - Karlovac	56,033	X			X						X										X			X	X				80/410	GB				X							X							5	8
	Karlovac - Zagreb RK	**51,132**	X			X						X										X			X	X				80/410	GB				X							X							7	8
	Zagreb RK - Koprivnica - St. Bor.	101,380																																																
	Zagreb RK -Sesvete	**11,981**	X			X		X						X								X			X			X		80/410	GC				X							X							6	5
	Sesvete - Dugo Selo	**10,156**	X			X		X						X								X			X				X	80/410	GC				X							X							1	5
	Dugo Selo - Koprivnica	65,839	X			X		X***				X										X			X				X	80/410	GC				X							X							8	6
	Koprivnica - Botovo - St. Bor.	13,404	X			X						X										X			X				X	80/410	GC				X							X							4	5
	St. Bor. Savski Marof - Zagreb RK	35,335																																																
	St. Bor. - Savski Marof	5,095	X			X		X								X						X			X				X	80/410	GC				X							X							0	3
	Savski Marof - Zaprešić	**6,552**	X			X		X							X							X			X				X	80/410	GC				X							X							0	1
	Zaprešić - Zagreb Zap. Kolodvor	**13,003**	X			X		X				X										X			X				X	80/410	GB				X							X							3	3
	Zagreb Zap. Kolodvor - Zagreb RK	**10,685**	X			X		X****				X										X			X		X			80/410	GB				X							X							3	4

APS - automatic block system
ID - inter station dependence
O - other safety devices
*** double track: section line Vrbovec- Križevci
**** double track: section Zagreb Klara - Zagreb RK

2.1.6 Hungary

	SECTION LENGHT	LINE TYPE			TRACK GAUGE		DOUBLE TRACK	MAX. TRAIN LENGHT INCL. TRACTION								AXLE LOAD***			LOAD PER METRE			TRAIN SPEED				LOADING GAUGE***/****		POWER SUPPLY			SIGNALING SYSTEM													GRADIENT	
	km	PRINCIPAL ROUTE	DIVERSIONARY	CONNECTING/FEEDER	1435 mm			450 m	500 m	550 m	575 m	600 m	625 m	650 m	750 m	20,0 T/axle	21,0 T/axle	22,5 T/axle	6,4 T/m	7,2 T/m	8,0 T/m	v ≤ 75 km/h	75 < v ≤ 90 km/h	90 < v ≤ 100 km/h	v > 100 km/h	UIC Guideline	Tunnels	DC 1500 V	DC 3000 V	AC 25000 V	ASFA	KVB	BEM	BCA	BACC	SCMT	PZB	EVM	ETCS L1	ETCS L2	APS	ID	O	‰ towards NE	‰ towards SW
HODOS - ZALALÖVŐ	**21**	X			X		-							X				X		X				X		70/400				X										X					12.0	12.0
ZALALÖVŐ - BOBA	**81**	X			X		-							X				X		X				X		70/400				X										X					10.8	10.9
BOBA - SZÉKESFEHÉRVÁR	**115**	X			X		-					X					X			X				X		70/400				X								X							11.0	10.6
SZÉKESFEHÉRVÁR - BUDAPEST	**67**	X			X		X								X			X		X					X	70/400				X								X							7.0	7.2
BUDAPEST - NYÍREGYHÁZA	**260**	X			X		X								X			X		X					X	70/400				X								X							8.0	6.0
NYÍREGYHÁZA - TUZSÉR	**58**	X			X		X								X			X	X						X	70/400				X								X							3.0	3.3
TUZSÉR - ZÁHONY	**8**	X			X		-								X			X	X						X	70/400				X														X	1.6	0.9
BOBA - CELLDÖMÖLK	10		X		X		X					X						X		X				X		70/400				X								X							4.5	4.1
CELLDÖMÖLK - GYŐR	71		X		X		-					X						X	X					X		70/400																		X	6.7	6.2
GYŐR - BUDAPEST	133		X		X		X								X			X		X					X	70/400				X									X						8.8	8.5
BUDAPEST FERENCVÁROS - SOROKSÁR TERMINÁL (BILK)	13			X	X		-								X			X		X		X				70/400				X														X	10.0	9.0
BUDAPEST FERENCVÁROS - SOROKSÁRI ÚT KIKÖTŐ	7			X	X		-	X								X			X			X				70/400																		X	10.0	9.0
BUDAPEST - MISKOLC	**176**	X			X		X								X			X		X					X	70/400				X								X							6.8	8.0
MISKOLC - NYÍREGYHÁZA*	**88**	X			X		Partly								X			X	X						X	70/400				X								X							3.2	5.0
ÉRD - BUDAPEST	**19**	X			X		X					X						X		X					X	70/400				X								X							9.6	7.6
PUSZTASZABOLCS - ÉRD	**31**	X			X		X					X						X		X					X	70/400				X								X							9,0	8.0
RÉTSZILAS - PUSZTASZABOLCS	**40**	X			X		-					X						X		X					X	70/400				X								X							7.7	7.8
DOMBÓVÁR - RÉTSZILAS	**72**	X			X		-					X						X		X					X	70/400				X								X							7.0	7.7
KAPOSVÁR - DOMBÓVÁR	**31**	X			X		-					X						X		X				X		70/400				X								X							4,4	5,0
SOMOGYSZOB - KAPOSVÁR	**41**	X			X		-					X						X		X				X		70/400				X														X	7.1	7,1
GYÉKÉNYES - SOMOGYSZOB	**30**	X			X		-					X						X		X				X		70/400				X														X	6,7	6.4
GYÉKÉNYES - MURAKERESZTÚR**	16		X		X		-					X						X	X					X		70/400				X								X							4.0	5.0
MURAKERESZTÚR - NAGYKANIZSA**	13		X		X		-					X						X	X					X		70/400				X								X							4.9	1.7
NAGYKANIZSA - ZALASZENTIVÁN**	53		X		X		-					X						X	X					X		70/400																		X	1.7	6.2

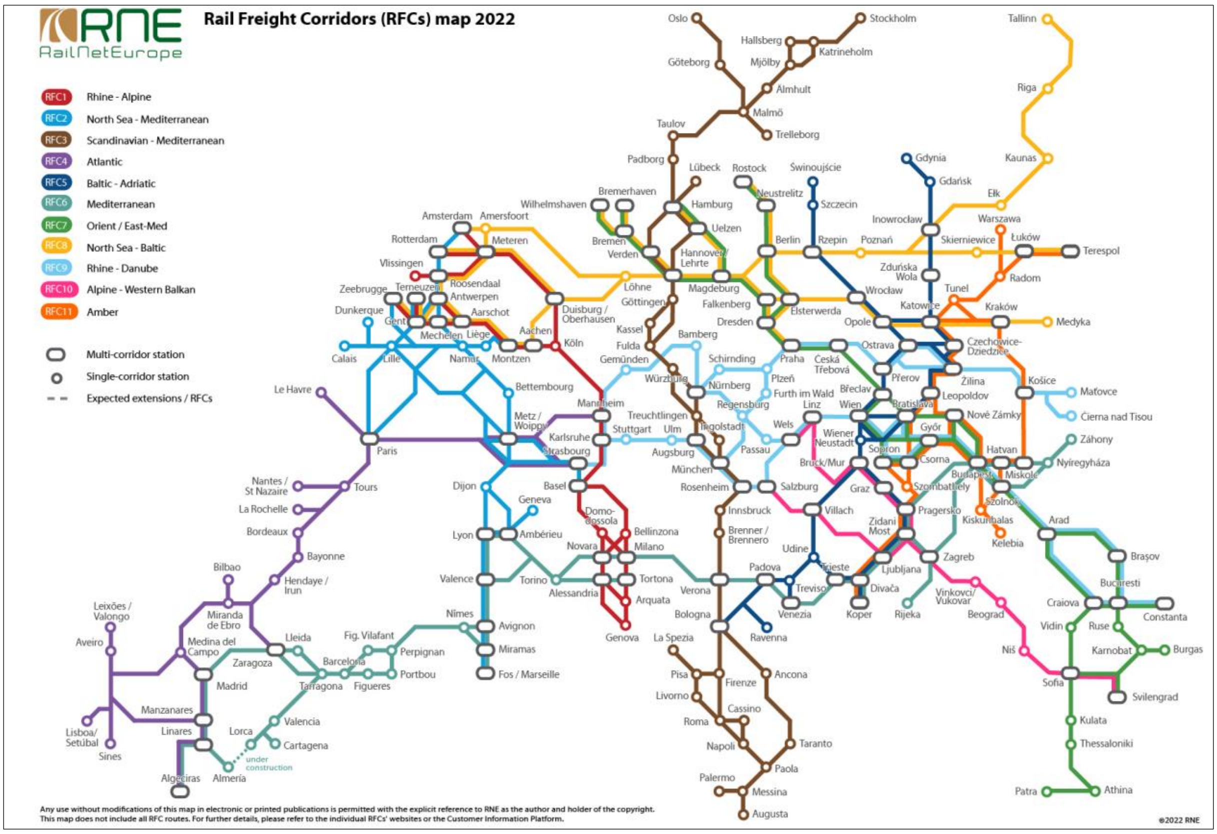
*Between Mezőzombor - Nyíregyháza (45 km) only single track
** In line with the decision of the ExBo on 20 April 2018
*** With permission as special consignment
**** Applied value can be different in certain cases according to NS
APS - automatic block system
ID - inter station dependence
O - other safety devices

Connections with Other Corridors

RFC MED has connections with nine other RFCs: 1, 2, 3, 4, 5, 7, 9, 10 and 11 and some of their sections are overlapping (7).

Actually, Mediterranean RFC has the following connections with other RFCs:

- in Algeciras-Madrid with Rail Freight Corridor 4 (set up on the 10th November 2013) as overlapping section since the 1stof January 2016
- in Lyon and Ambérieu-en-Bugej with Rail Freight Corridor 2 (set up on the 10th November 2013); Lyon – Marseille is overlapping section from the 10th in November 2015
- in Milano with Rail Freight Corridor 1 (set up on the 10th November 2013)
- in Verona with Rail Freight Corridor 3 (set up on the 10th November 2015)
- in Venice and Koper with Rail Freight Corridor 5 (set up on the 10th Novemb2er 2015); the Line Venice/Koper-Pragersko is overlapping section form the 10th of November 2015
- in Győr-Budapest and Budapest-Szajol with Rail Freight Corridor 7 (set up on the 10th November 2013); this line is overlapping section from the 10th of November 2013
- in Ljubljana-Zagreb with Rail Freight Corridor 10 (set up on the 22 March 2020); this line is overlapping section from the 22 March 2020
- in Koper with Rail Freight Corridor 11 (set up on the 1st February 2019); the Line Koper-Pragersko-Hodos-Zalaszentiván is overlapping section form the 1st of February 2019
- in Győr-Budapest and Budapest-Szajol with Rail Freight Corridor 9 (set by the 10th November 2020); this line will be overlapping section from the 10th of November 2020



2.2 Corridor Terminals

Freight terminals, inland ports, maritime ports and airports connect transport modes in order to allow multi-modal transport of goods. Where freight terminal means a structure equipped for transhipment between at least two transport modes and for temporary storage of freight such as seaports, inland ports, airports and (dry ports) rail-road terminals. Freight terminals for the transhipment of goods within the rail mode and between rail and other transport modes are one of the components of railway transport infrastructure. The technical equipment associated with railway lines includes electrification systems, equipment for the loading and unloading of cargo in stations, logistic platforms and freight terminals. It includes any facility necessary to ensure the safe, secure and efficient operation of vehicles.

Terminal requirements relate to the anticipated scale and nature of the freight and the operations involved in accessing sidings and handling the transfer of the cargo. This can split between the rail-side operations and the road/water/air-side operations.
In general, a terminal need being:

- alongside an existing railway line
- alongside a major highway route
- just on the bank of sea bay or bank of an inland waterway
- on flat terrain, level with the railway line
- near to the origin/destination of freight
- distant from residential areas
- next to developable land for expansion

For intermodal terminals additional requirements are:

- room to store containers
- hard standing
- space for crane/stacker movements
- at least 3 running lines together with reception sidings
- space for road vehicles' movements

The railway lines, and where appropriate rail ferry lines of a RFC, connect a terminal of relevance to rail freight traffic along the route to:

- marshalling yards
- major rail-connected freight terminals
- rail-connected intermodal terminals in seaports and along inland waterways

A list of the terminals designated to the corridor has been worked out, agreed upon and regularly updated. The designation is based on national assessment and evaluation (to be updated according to Transport Market Study and consultation with the Terminal Advisory Group). All nodes indicated in the Annex of Regulation 913/2010/EU are connected.

The list of terminals is available in CID Book Section 3 Terminal Description at a link:
https://www.medrfc.eu/wp-content/uploads/2023/01/1-med-rfc-cid-tt2024-v3-09-01-2023.pdf

2.3 Bottlenecks and congested infrastructure

Our RFC carried out a Capacity Study in 2014. For common understanding the same definition of bottlenecks as per set in (15) of Definitions Article 2 of Regulation (EU) No 1316/2013 was used. Bottleneck means a physical, technical or functional barrier which leads to a system break affecting the continuity of long-distance or cross- border flows and which can be surmounted by creating new infrastructure, or substantially upgrading existing infrastructure, that could bring significant improvements which will solve the bottleneck constraints.

All the analysis, assessments and classifications were made upon definition above. The key technical parameters, infrastructure requirements set in Article 39 of Regulation (EU) No 1315/2013, were considered obligatory and common part of the future elements of the transport infrastructure for both passengers and freight transport capacity.

- full electrification of the line tracks and sidings;
- at least 22,5 t axle load;
- 100 km/h line speed;
- freight trains with a length of 740 m;
- full deployment of ERTMS;
- track gauge for railway lines 1.435 mm (it applies only to new lines formally);

Identification of bottlenecks

Identification and classification of bottlenecks as a process is deriving from 2 different channels, with respect to the different kinds of traffic (freight and passenger). As a step to make a prioritization of the bottlenecks and stakeholder needs, the outcome of the classification is depending on the internal procedures of the IMs. Basically, 3 levels of priority can be set: top, medium and low priority.

- The identification is based on the experiences and findings by the traffic management professionals of the IMs, as a part of their everyday job. Realising the constraints generated especially during the peak periods.
- Another channel of identification is based on the stakeholders’ consultation, both on national and RFC level (TAG/RAG events). Of course, these channels are mainly dealing with problems of the freight RUs.

Removal of bottlenecks

This Implementation Plan provides a description of the main bottlenecks identified along the corridor, integrating information given by Infrastructure Managers. This analysis can help Member States, Infrastructure Managers and other stakeholders to prioritize key infrastructural and capacity projects, which possibly constitute bottleneck removal actions.

Improvements in performance and infrastructure parameters, the effects on the corridor are available together with the identical bottleneck description.

Development and implementation of these projects are critical to increase rail services and improve performance of rail freight sector. In the case of bottlenecks removal, there are further details available in the Chapter 6 on Investment Plans, in the section Benefits of the projects (Chapter 6.2 List of projects) defined country by country.

2.3.1 Spain

Track gauge

As the Iberian gauge in most of the Spanish sections of Mediterranean RFC, penalizes rail transportation competitiveness. It is remarkable the effort carrying out to overcome this situation along the Mediterranean RFC coastline, in a process on which current passengers and freight traffic is living together with the works.

One of the key works already in March is the change of the track gauge, from Iberian to UIC along the stretch between Castellón and Tarragona, which means the first case of a conventional section on which no further Iberian gauge will be available.

Maximum train length

Existing limitations to train length, do not allow in part of the Corridor, the operation of freight trains with the maximum interoperable length 750 m, would improve rail transportation competitiveness.

Lack of capacity for international Rail Transport

In order to manage the expected boost of the new HSL for mixed traffic between Barcelona and the French Border, the conventional line between Barcelona and Portbou could act to absorb traffic too. Then TEN-T parameters on this line should play a key role.

Access to Ports and Terminals

The Spanish sections have been grouped to ensure to continuity of flows in four sections in priority order: French border to Barcelona, Zaragoza, Madrid and Valencia, to Algeciras meria and diversionary lines. The access to ports and terminals will be adopted to UIC Gauge in parallel with the installation of UIC Gauge along the corridor. As one of main the milestones of the process to boost the traffic through the new line to the French Border, it is the improvement of the current UIC gauge access to the Port of Barcelona.

In the other bound, considering the increasing traffic in the multimodal connections of the Mediterranean Ports with the North of Africa, which are demanding Rail capacity inland, as an example the Algeciras line different actions are running to improve not only capacity but infrastructure performance and reliability.

Abroñigal Logistic Terminal is the heart of Madrid's intermodal traffic but lacks capacity in its facilities to absorb the traffic demand. New project to enhance Vicálvaro Multimodal Terminal is in construction phase. It is going to answer the market demand on logistics, as strategic located at Madrid Belt South-east Industrial Belt, with direct connection to Zaragoza, Barcelona and Valencia. Capacity along the South part of Madrid Belt could be key to reach a comprehensive integration of freight traffic.

Finally, the line linking the port of Valencia to Zaragoza via Teruel is being already upgraded in order to lighten national traffic through Mediterranean RFC coast line and also to improve its characteristics to be used in case of disturbances.

2.3.2 France

New line Montpellier-Perpignan

This new line will be the chain to join the Spanish high-speed section Barcelona-Figueres and its link with Perpignan with the new bypass between Nîmes and Montpellier and the lines to Lyon, will be effective in several phases:

- a first phase between Montpellier and the east of Béziers - this phase corresponds to the sections of the rail network currently the busiest. It is planned to be in operation in 2034
- subsequent phases between Béziers and Perpignan. It is planned to be in operation in 2044.

The mixed use of the line freight/passengers, which will allow avoiding the saturation of the current axe and holding the increase of trucks traffic in the French motorway A9. It will also allow capacity and speed increases in the rail corridor.

Rail link Lyon - Turin

The project to link Lyon, Chambéry and Turin includes the creation of a 140 km line. A real alternative to the road, this new route will facilitate exchanges and travel for all train users. It will be a tremendous driving force for local economic development and will also be an open door to Europe. It is expected to be commissioned by 2032.

This major project will be carried out in two phases:

- phase 1: the work will start on the Lyon-Chambéry axis. The works will consist of a 78 km mixed line for passengers and freight between Lyon and Avressieux (entry into Savoy) via the Dullin l'Epine tunnel
- phase 2: the works include the construction of the first part of the freight route between Avressieux and Saint-Jean-de-Maurienne. The route will pass through the Chartreuse, Belledonne and Glandon tunnels and will allow the passage of the large gauge rail motorway. Of the 62 km of new line created, 53 km will pass through these tunnels. A viaduct will be built to cross the A41 and Isère rivers

The objectives of this project are numerous: by facilitating the extension of the high-speed network, this new line will allow an increase in TGV frequencies and the introduction of high-speed TER services. Faster journeys will thus facilitate the movement and exchange of travellers across the Alps. Specifically, for freight, it will be a concrete and sustainable alternative to road transport. This new route will guarantee an efficient link for companies using freight transport. They will also benefit from a wider choice of services available: rail motorway, conventional freight, or combined freight. They will also be able to take advantage of a new direct route between the Lyon railway junction and Italy

The Lyon railway junction

This junction is:

- on the Northern Europe - Mediterranean axis and on 2 European freight corridors (RFC Mediterranean and RFC North Sea – Med)
- at the heart of national and international high-speed links
- on a territory of 7.9 million inhabitants in Auvergne-Rhône-Alpes with a strong demographic growth

Located at the convergence of 15 European, national and regional railway lines, the Lyon railway junction is extremely busy, and its infrastructures are at the limit of capacity. This is why a short and medium-term mobilization plan has been put in place with the objective of restoring the system's robustness by acting on all components: operations and standards, equipment, regeneration of installations and investment works. This plan was approved by ministerial decision on 2 June 2015.

2.3.3 Italy

New High-Speed Line Milano - Venezia

The main works for quadrupling of the Treviglio-Brescia line, as first functional phase of the new High-Speed line Milano-Verona, has been completed in 2016.

Works for section Brescia – Verona have already started. Also, for the first phase of the section Verona and Vicenza, RFI and General Contractor have signed an agreement in August 2020.

The high-speed line between Milano and Venezia will enhance capacity to the Mediterranean Corridor both for freight and passenger trains. It will guarantee a system of four tracks with separation for trains with different speed and it will increase the quality and the punctuality of the traffic. This is particularly relevant in the Verona Node where there will be separate routes for long distance trains, regional trains and freight trains.

Also, it will be a reduction of long-distance trains travelling times between Milano and Venezia.
The new line will have the following technical characteristics:

Brescia – Verona

- Maximum speed 300 km/h;
- Maximum gradient 12 0/00;
- Signalling: ERTMS level 2;

Verona – Vicenza (First Phase)

- Maximum speed 250 km/h;
- Maximum gradient 12 0/00;
- Signalling: ERTMS level 2;

Milano Node upgrading (Milano Lambrate, Porta Garibaldi, Monza, Rho)

The node of Milan is characterized by a high promiscuity of rail traffic due to overlapping of metropolitan, regional, long distance and freight traffic. Such a state of promiscuity, combined with a high volume of traffic, actually prevents the increase of regional traffic of the Milan area and undermines the freight transport development.

Within the framework of the Torino – Padova project, many actions are provided related to the node of Milan, which actually consist of a new traffic management control centre, and between Milano Greco and Monza, a new interlocking system equipped with shorter sections. These interventions will allow a rationalization of traffic management and an increase in the capacity offered by the existing infrastructure.

With the increase of rail traffic witnessed in recent times along the main lines, stations of old conception as Milano Lambrate have become bottlenecks, either for passenger or freight traffic. One of the initiatives considered a priority to strengthen the capacity of Milan Lambrate node regards the specialization of lines by traffic type. A new project has been drafted to separate passenger from freight traffic by limiting as much as possible interference.

Upgrading of Venezia-Trieste (speeding up of existing line)

The upgrading of Venezia – Trieste existing line is one of the most important projects in the Northeast area of Italy. The main goal of the project is to reduce the travel time between Venezia and Trieste and to contribute to the increasing of capacity between Venezia Mestre and Monfalcone up to 10 trains per hour per direction. The upgrading will remove also the actual speed limitation for train with axle load of 22,5 t and also improve the layout of some station (750 m track length).

The number of block section will be increased with the installation of the new signalling system. These will allow also increase in both capacity and speed. The actual signalling system permits maximum speed of 160 km/h.

The project will be developed according to the following construction phases:

1. New Signalling System (2025)
2. Removal Level crossing (2025/2027)
3. Route variants between Mestre and Ronchi (2030)
4. New Line between Ronchi and Aurisina (2031)

The project is partially funded (only phase 1).

2.3.4 Slovenia

Lack of capacity in lines

The rising volume of traffic, with simultaneously increasing demands in terms of quality and quantity, requires a unique, harmonized and generally valid understanding to be developed as regards available railway-infrastructure capacity. According to UIC Leaflet 406 single-track is considered as 100% utilized if the percentage of capacity utilization approaches to 85%. For double tracks with mixed traffic is this percentage 75%.

Slovenia has temporarily limited capacities on the following line sections:

- Divača-Koper, single track line (capacity of the line is 94 trains/24h), capacity consumption is 102 %, - in July 2018 the section was declared as congested
- Ljubljana-Divača, double track line (capacity of the line is 153 trains/24h), capacity consumption is 83 %.

At some railway stations in Slovenian part of RFC MED, has been also elaborated lack of the capacities. Railway nodes with the lack of the capacities:

- Ljubljana railway node (due to the peak hours for passenger trains, short station tracks),
- Zidani Most railway node (due to the peak hours for passenger trains, lack of tracks and short tracks).

Some measures to increase the capacities and eliminate the bottlenecks at the critical railway sections and nodes has already been started:

- Divača-Koper, the second new track is under construction. Plans are that the construction works is going to be finished in 2026. After that year between Divača and Koper will be two single track lines.
- Ljubljana-Divača: the upgrading of the line with construction works started in 2021 and is going to be finished in 2027.
- Ljubljana railway node: upgrading of the main passenger station of the node Ljubljana is foreseen in the first phase. The construction works will start in 2023. The second phase include other stations inside the Ljubljana railway node.
- Zidani Most railway node: project documentation to eliminate the bottleneck is in progress.

Axle loads and train weight limits

Category D3 (Load per unit length 7,2 t/m and axle load 22,5 t) is considered as normal category for the Slovenia's rail lines for international transit traffic. The goal targeted by development projects is to ensure the axle load D4 (8,0 t/m and 22,5 t) on entire Mediterranean RFC sections in Slovenia.

Train length

Maximum permitted length of freight trains in Slovenia is 740 meters (with traction included). On particular lines permitted length is extra restricted because of short station tracks.

We now have restrictions on the following lines:

- Sežana border – Ljubljana maximum permitted length of the train 600 m.
- Divača – Koper t. 525 m.
- Pragersko – Ormož – Hodoš border 600 m.
- Dobova border – Zidani Most - 570 m;
- Zidani Most – Ljubljana - 570 m;

Our goal is to increase the length on all lines of Mediterranean RFC to 740m.

Tunnel Restrictions

The tunnel restrictions, with regard to the special dimensions of particular wagons in a train in a combined transport are considered with the codification of lines. Now we have on section Gornje Ležeče – Pivka because of tunnel restriction codification for combined transport reduced on profile P/C 82/412.

2.3.5 Croatia

Considering the current traffic volume there is no real bottlenecks on the line, but of course there are some obstacles in existing infrastructure characteristics that could cause bottlenecks in the future if the traffic volume will significantly increase.

Section line Rijeka – Skrad

On the section line Rijeka – Lokve due to the very unfavourable relief features of the line there are huge inclines / declines and thus great ruling line resistance up to 29 daN/t. Consequently, the train mass is limited and there is a need for two traction locomotives or a stronger one. In addition to this, till the Skrad station, tracks for the reception and dispatching of trains at the railway stations are less than 500 meters long. This of course limits the traffic flow and the line capacity as a whole. Given the existing configuration, as a possible solution arises the construction of a new railway line to bypass the hills, so-called "lowland line", which is in preparation.

Section line Zagreb RK – Karlovac

In order to enhance the competitiveness of corridor line from the port of Rijeka to Central Europe and further, there is a plan to build the second track on the line section Hrvatski Leskovac – Karlovac in the time horizon 2022 – 2026. With much more favourable characteristics of the future railway infrastructure, the requirements for the corridor traffic will be met as well as increase in line capacity according to European standards.

Section line Dugo Selo – Koprivnica – St. Border

In order to enhance the competitiveness of corridor line from the port of Rijeka to Central Europe and further, there is a plan to build the second track on the line section Dugo Selo - Koprivnica – State border – (Hungary) in the time horizon 2016 – 2025. With much more favourable characteristics of the future railway infrastructure, the requirements for the corridor traffic will be met as well as increase in line capacity according to European standards.

Section line Karlovac-Oštarije

In order to enhance the competitiveness of corridor line from the port of Rijeka to Central Europe and further, there is a plan to build new double railway line on the section Skradnik-Karlovac in the time horizon eventually by the year 2030.

2.3.6 Hungary

In case of MAV, the bottleneck is a constraint in the infrastructure that limits the number of trains able to pass through an area. For example, the number of tracks or the capacity of the signalling or power supply systems, the design speed, axel load, or train length limitation, which limit the number of trains the section can operating. The bottlenecks were identified mainly on the basis of the Detailed Feasibility Study on the subject. The same Study identified the interventions needed to remove bottlenecks. Other sources of data are feedback from customers and conclusions drawn from the results of traffic management statistics.

Budapest – Miskolc line section

There is a complex reconstruction on the Ferencváros – Miskolc line between Rákos and Hatvan stations, which enable the running of trains with axle load 22,5t. After it's finalized the capacity of the line will be at the earlier level.

Székesfehérvár – Boba line section

On the main route the most frequent section is between Boba and Ukk, there the available slots for freight trains are very limited and the number of passenger trains are increasing.

Modernization of the Southern Link Railway Danube Bridge

The project includes the construction of a new (third) bridge structure and the renewal of the two existing structure, as well as the design and implementation of the whole superstructure, tracks and associated railway facilities. The project was finalised in 2022.

Budapest – Százhalombatta line section

Between Kelenföld and Százhalombatta, the railway line is being completely rebuilt for 20.4 km. The speed restrictions will be eliminated, the design speed for the most sections will be 120 km / h and the axel load

225 kN. The catenary system is being rebuilt to its full length and remote-control system will be installed. The 120/25 kV transformer substation in Érd is upgraded. A new electronic interlocking and ETCS 2 train control system is being installed on the line.

Százhalombatta – Pusztaszabolcs line section

A new 12.1 km long track section is being built between Százhalombatta station - Ercsi junction, which will reconnect to the existing line between Ercsi and Iváncsa stations. The existing track between will be also upgraded. The rebuilt track is being designed at a speed of 160 km / h, and 225 kN axle load. A new electronic interlocking and ETCS 2 automatic train control system will be installed on the line.

Zalaszentiván–Nagykanizsa line section

The design speed on the section is 100/80 km/h, with the aim of maintaining the current speed. No speed increase is planned. Design axle load 225 kN, but no intervention will be made in case of axle load in station sidings, where the axle load remains 210 kN. All stations on the line section are equipped with D55 signalling system, with light-signal, single-centre, relay-dependent, train route on-train control system.

Budapest traverse (Kelenföld–Kőbánya)

The project includes the construction of a new (third) superstructure and the rebuilding of two existing superstructures, and the preparation at design level of the relayed railway tracks and associated railway facilities, and implementation.

Budaepest–Budaörs

120/140 km/h speed and 225 kN axle load, tracks 3rd and 4th on the right-hand side of the current track at-grade crossings, renovation/construction of separate level crossings (where necessary), rebuild of Budaörs station, and additional stops. The upgrading of the catenary system and overhead power supply and safety equipment, as well as upgrading of missing or substandard passenger facilities

Almásfüzitő–Komárom

160 km/h speed and 225 kN axle load on the whole section, rebuilding of multi-level crossing of main road No. 1. Curve corrections and station reconstructions and upgrading of the overhead line and power supply system, upgrading of signalling system for the high speed requirements. Missing or outdated passenger facilities upgrading.

Expected results in case of elimination of bottlenecks:
By removing the above-mentioned bottlenecks, an increase of around 50% in rail freight traffic is expected. A higher increase in passenger volumes is forecast if passenger train capacity increases and the performance of scheduled services improves substantially.

A detailed timetable for the implementation of the necessary measures can be found in the project list.

Congested infrastructure

As per the provision of Directive 2012/34/EU Congested infrastructure means an element, a section of infrastructure for which demand for infrastructure capacity cannot be fully satisfied during certain periods even after coordination of the different requests for capacity. In these cases, after a thorough capacity analysis a Capacity-enhancement plan are required to draft by the infrastructure manager, to include a measure or series of measures with a calendar for their implementation which aim to alleviate the capacity constraints which led to the declaration of an element of infrastructure as congested infrastructure.

There is no infrastructure declared congested on the network of Mediterranean RFC.

2.4 RFC Governance

The Regulation 913/2010/EU defines three levels in the governance structure:
The Executive Board (EB): shall be composed of representatives of the authorities of the Member States concerned. The body is responsible for defining the general objectives of the freight corridor, supervising and taking the necessary measures for improvement of the project. The participation of each Member State is obligatory.
The Management Board (MB): For each freight corridor, the Infrastructure Managers concerned and, where relevant the Allocation Bodies as referred, shall establish a Management Board responsible for taking all operative measures for the implementation of the regulation. The participation of each IM and AB is obligatory.

The MB makes its decisions based on a mutual consent. The MB was established by the signature of a Memorandum of Understanding among the parties, signed already in April 2012. Effective 1st of January 2014 the Management Board took the form of a EEIG (European Economic Interest Grouping). As a consequence, the role of the Management Board was taken over by the **General Assembly of EEIG Mediterranean RFC (hereafter: GA).** On the 7th of July 2016 HZI joined the EEIG and AZP left the EEIG. The EEIG was also renamed EEIG for Mediterranean RFC. On 11th October Oc' Via from France joined the EEIG.

A **Permanent Management Office (hereafter PMO)** was set up in Milan (Italy) to support the implementation of the Mediterranean - RFC 6 and to ensure the functioning of the EEIG. The migration of Corridor D EEIG towards Mediterranean RFC EEIG was implemented in early 2014. The PMO is led by the Managing Director and was composed of two other fulltime dedicated people in the start-up phase: one Infrastructure Adviser (who is also the EEIG Deputy Director) and one OSS leader. The corridor one-stop-shop is applying the dedicated C-OSS model of RNE from the 1st of July 2013.

Six EU Member States (Spain, France, Italy, Slovenia, Croatia and Hungary) are now involved in Mediterranean RFC. The Management Board has 9 members: 8 Infrastructure Managers and 1 Allocation Body.

8 Infrastructure Managers

1 Allocation Body

Advisory Groups (AGs): The MB set up Advisory Groups made up of:

Railway Undertakings interested in the use of the corridor.

Managers and Owners of the Terminals of the freight corridor including, where necessary, sea and inland waterway ports. These AGs may issue an opinion on any proposal by the MB, which has direct consequences for them. They may also issue their own-initiative opinions. The MB shall take any of these opinions into account.

The voice of customers is taken into account via the Terminal Managers and the Railway Undertakings Advisory Groups. Participation to AGs is on a voluntary basis. Advisory Groups members have a dedicated area in the Mediterranean RFC website, where all the materials under consultation are available. To join the Advisory Groups please contact the Permanent Management Office (PMO) and/or the representatives of the Advisory Group. One representative for each Advisory Group has been nominated to coordinate the position of the group. The Advisory Groups' opinion has to contain both majority and minority opinions. The organizational structure of the Corridor is included in the Internal Regulations of EEIG Mediterranean RFC.

The managers of the EEIG are appointed by the General Assembly with a mandate for 3 years. The acting managers mandate will be expiring on the 31st of May 2022.

Managing Director - EEIG Manager: Mr. Raffaele Zurlo.
Deputy Managing Director - EEIG Manager: Mr. Istvan Pakozdi.
Manager - EEIG Manager: Mrs. Nikolina Ostrman.

The General Assembly of Mediterranean RFC acts as Management Board. The General Assembly of Mediterranean RFC meets regularly, at least twice a year at the headquarters of the EEIG (Milano – via Ernesto Breda 28). The Chairman of the General Assembly is Mr. Manuel Besteiro. The EEIG managers are usually appointed for three years' renewable period unless otherwise decided by the General Assembly of the EEIG. The Managers are tasked with ensuring that operational and technical tasks incumbent upon the EEIG are duly accomplished**,** in accordance with the relevant provisions of the Regulation (EU) 913/2010, with the decisions and guidelines of the General Assembly and with the opinions and decisions of the Executive Board. The President of the EEIG coordinates the activity of the Managers and ensure the respect of the Act of Incorporation, of the internal Rules and of the Regulation 913/2010. He is not dedicated full time to the EEIG; he has an institutional role and is entitled to represent the EEIG in international events and before the European Commission, RNE and other European Institutions. As far as these functions are concerned, he can be replaced by the PMO Managing Director. He supervises the external relations of the EEIG, in cooperation with the Chairman of the GA and with the other two Managers, ensuring consistency of different information flows concerning the EEIG (website, publications, press release, leaflets, etc.). As far as these functions are concerned, he can be replaced by the PMO Managing Director

Coordination Group

Member	Representative
Administrador de Infraestructuras Ferroviarias (ADIF)	Manuel Besteiro
Línea Figueras Perpignan S.A. (LFP)	Petros Papaghiannakis
Société Nationale des Chemins de fer Français Réseau (SNCF Réseau)	Claire Hamoniau
Oc'Via	Kévin Kuba
Rete Ferroviaria Italiana (RFI)	Laura Fortunato
Slovenske Železnice-Infrastruktura d. o. o. (SŽ-I)	Miran Pirnar
HŽ Infrastruktura d.o.o. (HŽI)	Ivana Zanki
MÁV Hungarian State Railways	Diána Friedrich dr.
VPE – Hungarian Rail Capacity Allocation Office	Dóra Kondász

The Coordination Group was set up in order to support the Management Board members and the Permanent Management Office. In particular, the Coordination Group carries out the following activities:

- ensures a high-level general follow-up and coordination of the activities defined by the GA of the EEIG, in cooperation with the Managing Director of the PMO, with the Working Groups and with the Chairman of the GA
- contributes to prepare decisions of the GA and to their implementation
- advises and supports the PMO
- ensures an efficient communication flow between the EEIG (GA, Managers, PMO, Working Groups) and the internal structures of the EEIG Members, acting as contact point between national and corridor level

The Coordination Group organises at list two live meetings per year and videoconference meetings when needed.

Advisory Groups

The kick-off meeting for the setting up of the Advisory Groups of Mediterranean RFC was held in Budapest on 30th November 2012. The preparation of this meeting was based on a wide involvement of the stakeholders interested in the use of Mediterranean RFC, according to the principles of transparency and equality.

The following Advisory Groups meeting were organised so far by Mediterranean RFC:

Year	Event	Venue	Date
2012	TAG-RAG	Budapest (HU)	30/11/2012
2013	TAG-RAG	Barcelona (ES)	18/04/2013
2013	TAG-RAG	Marseille (FR)	29/10/2013
2014	TAG-RAG	Milano (IT)	12/03/2014
2014	TAG-RAG	Koper (SI)	30/10/2014
2015	TAG-RAG	Madrid (ES)	23/04/2015
2015	TAG-RAG	Budapest (HU)	19/11/2015
2016	TAG-RAG	Montpellier (FR)	26/05/2016
2017	TAG-RAG	Milano (IT)	26/01/2017
2017	TAG-RAG	Ljubljana (SI)	14/11/2017
2018	TAG-RAG	Valencia (ES)	31/05/2018
2018	TAG-RAG	Budapest (HU)	28/11/218
2019	TAG-RAG	Marseille (FR)	27/02/2019
2019	TAG-RAG	Rijeka (HR)	26/09/2019
2020	TAG-RAG	On-line event	24/09/2020
2021	TAG-RAG	On-line event	10/02/2021
2021	TAG-RAG	On-line event	14/09/2021

2022	TAG-RAG	On-line event	16/03/2022
2022	TAG-RAG	On-line event	24/11/2022

Mediterranean RFC organizes two TAG-RAG meetings per year, which alternatively take place on **the eastern or on the western** part of the Corridor.

Starting from the 6th Mediterranean RFC TAG-RAG meeting, the Management decided to introduce a new role within the context of the Advisory Groups: a **representative for each Advisory Group** in order to make the consultation process more effective and more useful for RUs and TMs. The representatives will encourage coordination within each Advisory Group and also towards other external institutions.

The Advisory Groups meeting are organised in order to establish a regular dialogue of the freight corridor management with its stakeholders. The consultation mechanism is mainly based on electronic tools (e-mail and website), on national contact points for operators (in order to facilitate communication and information) and on specific questionnaires to be used for collecting remarks and suggestions from Advisory Groups. This approach responds to the following aims:

- smooth, flexible and transparent communication flow between Management Board and Advisory Groups
- cost-effective system (2 physical meetings per year)
- wide-ranging involvement of Railway Undertakings and Terminals
- involvement of owners / operators potentially interested to join Advisory Groups, through publication of documents on the corridor website (invitation, presentations, minutes of meeting, etc.)
- efficient collection of opinions raised by railway operators
- direct contacts at local level (the use of national language can be very important for small operators mainly on technical matters)

In order to facilitate communication with local operators a national contact point is made available for each country concerned by the corridor, in charge of collecting the interests of participation at national level:

Member	Country	Contact name	E-mail	Telephone
ADIF	Spain	Manuel Besteiro	mbesteiro@adif.es	+34 913007772
LFP	ES/FR	Petros Papaghiannakis	ppapaghiannakis@lfpperthus.com	+34 972678800
SNCF Réseau	France	Claire Hamoniau	claire.hamoniau@reseau.sncf.fr	+33(0)153943325
Oc'Via	France	Kévin Kuba	k.kuba@ocvia.fr	+33 4 3448 00 61
RFI	Italy	Laura Fortunato	l.fortunato@rfi.it	+39 313 8088234
SŽ-I	Slovenia	Miran Pirnar	miran.pirnar@slo-zeleznice.si	+386 129 12 317
HŽI	Croatia	Ivana Zanki	ivana.zanki@hzinfra.hr	+385 1 378 3358
MÁV Co.	Hungary	Zoltán Nagy	nagy11z@mav.hu	+36 15113799

For consultation of applicants likely to use the corridor (art. 10 of Regulation 913/2010), the first draft of the Implementation Plan is submitted to the Advisory Groups of Mediterranean RFC taking place in spring. All RUs and terminal owners/managers which cannot attend physical meetings but are interested in the use of Mediterranean RFC and/or in the activity of the Advisory Groups may be involved by means of public information on https://www.medrfc.eu/ and direct contact with national contact persons. Moreover, the intention is to invite all the operators to each meeting so that new membership may always be possible. The composition of the Advisory Group is thus open and flexible, membership is not fixed, allowing newcomers the possibility to join the activity at any time, as recommended by Regulation 913/2010 and by the Handbook ("New membership should always be possible, and the composition of the Advisory Groups should be revised from time to time to allow an adjustment of the representation." - Handbook, point 3.4.1)

In order to ensure efficiency to physical meetings, attendance may depend on the number of requests ("Since any operator can claim to be interested in the use of the corridor, the number of possible participating in the Advisory Groups could be too high. Operators of different sizes and with different business models should be represented" - Handbook, point 3.4.1-3.4.2). According to a decision of the Executive Board of Mediterranean RFC, terminal owners/managers not giving the information requested by the Management Board will not be accepted into the Advisory Groups and their terminals can be excluded from the corridor.

Permanent Management Office

A Permanent Management Office (hereafter PMO) for Mediterranean RFC was set up in Milan (Italy) in a RFI fenced area during summer 2013 for daily corridor operations, leaded by the Italian partner RFI, to support the implementation of the Mediterranean RFC and to ensure the functioning of the EEIG. The selection of staff was made by the Management Board on 9th April 2013 among the candidates promoted by the Members, on the basis of specific evaluation criteria. The PMO is composed of 3 full time personnel: one Managing Director from RFI (Italy), one Deputy Director-Infrastructure Manager from MÁV (Hungary) and one OSS leader from SNCF Réseau. Each Member is responsible for the contractual relationship with its candidates selected for the PMO; terms and conditions of employment for PMO staff will be defined through specific agreements between the EEIG Mediterranean RFC and the Member promoting the candidate. In late 2014, the EEIG GA decided to hire a fulltime Office Assistant to support the work of the PMO and at the beginning of 2017 a part time Project Manager.

The **internationality** of the team is considered as a **key** requirement to ensure a fair balance of representation among the partners and a corridor-oriented perspective overcoming national views.

Managing Director – Raffaele ZURLO

The PMO is led by the Managing Director, who is a full-time manager dedicated to the EEIG and Mediterranean Corridor RFC. He is the head of the PMO and the main coordinator of all corridor related activities. He is responsible for the correct implementation of all tasks and obligations ensuing from the Regulation. The objectives and mission of the Managing Director are defined by the General Assembly of the EEIG.

Deputy Director / Infrastructure Advisor – Istvan PAKOZDI

He is a full-time manager dedicated to the EEIG and Mediterranean RFC. As Infrastructure Advisor, he also has the responsibility to constantly update and collect the technical parameters of the corridor, control and draft the geographical description of the network and complete the CID.

C-OSS Leader – Stephane DASTOT

The OSS leader has the role to be the **single contact point** for applicants to request and receive rail infrastructure capacity for freight trains (Pre-Arranged Paths and Reserve Capacity) crossing at least one border along the corridor. The OSS leader handles communication process between IMs, ABs and other C-OSSs and Terminals linked to the corridor. The objectives and mission of the OSS leader are defined in the Internal Regulations of Mediterranean RFC. His tasks are set in the Directive 2001/14/EC and Regulation (EU) 913/2010.

Project Manager - Giulia GARGANTINI

According to the decision of the General Assembly of Mediterranean RFC one Project Manager joined the PMO at the beginning of 2017. Under the monitoring of the Managing Director, she is responsible for different projects concerning the corridor developments and more generally she supports the PMO staff. Among others she is responsible, under the supervision of the Managing Director, preparation and coordination of the reporting procedure for the Connecting Europe Facility funding.

Administrative Assistant – Pamela CHIARAPPA

According to the decision of the General Assembly of Mediterranean RFC one Administrative Assistant joined the PMO. Under the monitoring of the Managing director, she is responsible for the administrative management of the EEIG and she supports the PMO staff in all the operational and administrative issues.

Working Groups

The Working Groups were set up in 2013 and their tasks are described in the Internal Regulations of Mediterranean RFC EEIG, these working groups are composed of experts appointed by the Members of the EEIG. The staff of the Permanent Management Office coordinate them. They assist the PMO and the Coordination Group in their work.
Currently there are seven Working Groups:

Infrastructure WG

This Working Group is in charge of the following tasks:

- review and update the Investment Plan along the corridor
- identify the bottlenecks along the corridor
- follow, with the Infrastructure Advisor of the PMO, the Capacity Study and the TMS
- update the infrastructure parameters (lines and terminals) constituting the Mediterranean Corridor
- interoperability
- analyse the outcomes of the Transport Market Study in order to improve the quality of the corridor

ERTMS WG

The ERTMS Working Group carries out the follow up of the activities related to the ERTMS deployment along the corridor. Stefano Marcoccio (RFI) leads this Working Group.

Traffic Management WG (TM WG)/Train Performance Management WG (TPM WG)

The Infrastructure Advisor leads these Working Group. The WG is in charge of the following tasks:

- Harmonization of national approaches in order to set up corridor model for traffic management
- Harmonization of national approaches in order to set up corridor model for traffic performance management
- cooperate in drafting the CID
- define the Priority rules
- draft the performance management report
- propose the corridor objectives.

Capacity & TCR WG

It assists the C-OSS in the coordination of the path requests and in the construction of the PaPs (Pre-arranged Paths). Moreover, it is in charge of the following tasks:

- promote compatibility between the Performance Schemes along the corridor
- propose the corridor objectives
- cooperate in drafting the CID
- promote coordination of works along the corridor aiming to minimize traffic disruptions

Communication WG

The Communication WG ensures the communication of the Corridor to all possible stakeholders. The Communication WG is leaded by Marisa Perez Villanueva (ADIF), and for the website part by Dóra Kondász Hobot (VPE). In particular the WG is in charge of the following tasks:

- update and development of the MED RFC website
- take care and analyse the Customer Satisfaction Survey
- Mediterranean RFC merchandising
- develop new communication tools
- organise conferences and events
- ensure the overall communication strategy of the corridor

Financial WG

The WG is in charge of the following tasks:

- prepare the budget
- analyse the balance sheet
- prepare the General Assembly members for the approval of the budget and the balance sheet

According to the future needs, the above-mentioned Working Groups may be modified or substituted by others. New Working Groups may also be set up when needed in order to deal with further issues that may arise.

3 Market Analysis Study

3.1 Background

The Regulation (EU) 913/2010 establishes the guideline for the development of a European rail network for competitive freight through the institution of nine Rail Freight Corridors (RFCs), six of which were set up in November 2013, while the last three in November 2015.

The development of these RFCs as well of the 9 Core Network Corridors (CNCs) together with the two Horizontal Priorities - ERTMS deployment and Motorways of the Sea Corridors - are complementary tools of the European Commission's (EC) strategy to improve rail freight transport making it more efficient and sustainable by upgrading the conditions for rail freight traffic along these corridors and to launch its development in terms of volume, market share, quality and reliability. The RFCs development is a key part of the policy aiming at achieving the modal shift objectives set up in the White Paper on Transport. These include shifting 30% of long-distance road freight onto more sustainable modes of transport by 2030, particularly rail.

The Med RFC – set up in 2013 – links the ports in the south-western Mediterranean region to the centre of the EU, following the coastlines of Spain, France, and crossing the Alps towards the east. It runs across northern Italy and continues east through Slovenia, Croatia and Hungary up to the Ukrainian border. Among the initial 9 RFCs envisaged by EU Regulation 913/2010, the Med RFC is one of the most interconnected in Europe. The Med RFC route is crossed, or it’s route overlaps, with nine other Rail Freight Corridor lines (Atlantic, North Sea – Mediterranean, Rhine – Alpine, Scandinavian-Mediterranean, Baltic-Adriatic, Orient / East - Mediterranean, Amber, Rhine-Danube and Alpine Western Balkan).

Med RFC is the results of a strong cooperation among Infrastructure Managers (IMs) and the Allocation Body belonging to the Corridor: ADIF, LFP Perthus, SNCF Réseau, OC'VIA, RFI, SŽ-I, HŽI, MÁV, VPE.
The main branches of the Corridor are identified in Annex of the RFC Regulation as follows: Almería – Valencia / Algeciras / Madrid – Zaragoza / Barcelona – Marseille – Lyon – Torino – Milano – Verona – Padova / Venezia – Trieste / Koper – Ljubljana/Rijeka – Zagreb – Budapest – Zahony (Hungarian-Ukrainian border).

Figure 1 - Mediterranean Rail Freight Corridor

The MED RFC, covering more than 7.000 km, is also enriched by 9 seaports and roughly 90 terminals.
For the upcoming years, the following are among the key challenges for the Med RFC in order to offer a competitive rail freight transport service:

- strengthening the cooperation between national rail infrastructure networks
- nurture the relationship between Railway Undertakings (RU), Terminals Managers and end-users
- develop user friendly IT-tools in cooperation with other RFCs to help plan international journeys, capacity booking, traffic management and quality monitoring
- improve the train monitoring and the quality of the services offered

In this context, one of the fundamental tools to monitor the performance of the Corridor in terms of transport flows and rail market share, is the Transport Market Study (TMS) that aims at analysing the current situation of rail traffic as well as estimating the potential transport demand expected by 2030 with the "full Corridor implementation" (Corridor's infrastructure compliant with TEN-T standards, main capacity bottlenecks solved, appropriate services able to run on the Corridor in an efficient way), with particular focuses on the potential modal shift against competitive mode of transport (road, short sea).
Consequently, the TMS intends to:

- provide an overview of the current transport market along the Corridor
- identify market evolution and trends
- provide transport demand forecasts after the implementation of the whole Corridor

Structure of the study

As input of the current study, a socio-economic analysis has been carried out in order to identify the "catchment area" as well as the drivers affecting the assessment of future scenarios.

Secondly, data gathering, and processing steps have been deployed in order to collect and harmonize open sources as well as data collected from all stakeholders involved in the Corridor activities to form a consistent database for the year 2016, defined as base year of the study.

Finally, the forecast of the future traffic flows will be deployed considering the COVID-19 global pandemic crisis. Although a time with such uncertainty has never seen before, the study was based on most recent data to provide as accurate forecast as possible.

3.2 Methodology

3.2.1 Scope and Perimeter of the study

As mentioned before, the objectives of the study are threefold:

- performing a socio-economic analysis to describe the context of the "catchment area" of the Med RFC as well as the drivers affecting the demand for freight transport
- assessing current freight flows and Origin-Destinations along the Corridor for rail, road and short-sea modes, with a focus on recent trends
- forecasting these flows by 2030 considering various reasonable scenarios of economic and infrastructure evolution

The first step to perform the study is to define the perimeter of the analysis. For the socio-economic analysis, we defined the catchment area of the Corridor as the NUTS 2 zones crossed by the Corridor infrastructure, completing with some neighbouring NUTS 2 zones in Italy (Val d'Aoste, Liguria, Emilia-Romagna, Trentino-Alto Adige), in order to consider a continuous area including Eastern Spain, South-eastern France, Northern Italy, Slovenia, Croatia and Hungary.

Following this definition, the Rail Freight Corridor's catchment area is composed by 31 NUTS 2 level zones from Andalucía in Spain to Észak-Alföld in Hungary (below).

Figure 2 - Zoning and catchment area

The main scope of the study is to analyse international freight flows that would potentially use the Corridor's infrastructure. Therefore, not only the catchment area but all other remaining zones (still at NUTS 2 level) have to be also considered in the "market area" of the Corridor, as long as they generate flows that are likely to use the RFC's infrastructure. This market area includes the whole European area and beyond, including Ukraine, Russia and Turkey.

In fact, to identify the international Origin-Destination pairs that constitute the market area of the Corridor, a preliminary assignment to a simplified network of 2030 was computed, considering the Corridor's implementation.

The assignment finds the minimum cost path between all origins and destinations at NUTS 2 level in Europe. This way flows that are currently using the RFC but also flows that use other routes today but could potentially use the Corridor with the expected improvements are considered (example: flows between northern France or Benelux and Italy via Switzerland today, or flows between Hungary and Italy via Austria today). Thanks to this network assignment, the interested O-D pairs, that would potentially be crossing at least one of the following borders, have been selected:

- ES - FR on the Mediterranean side
- FR - IT entire border
- IT - SI entire border
- SI - HU entire border
- SI - HR entire border
- HU - HR northern part of the border

This way, there is a significant notion of what the market area of international flows on the Corridor is in terms of O-D pairs, including possible itinerary shifts with the Corridor's implementation.

After this selection, the flows on the market area are defined and aggregated at three different levels:

- NUTS 2 Region x NUTS 2 Region;
- Country x Country;

- Intern, Exchange and Transit – as shown in Figure 1 – flows defined in the following manner:
  - Intern: flows between two NUTS 2 region belonging to the Corridor's catchment area
  - Exchange: flows between a NUTS 2 region of the catchment area and another NUTS 2 region (outside the RFC), but passing through one of the above-mentioned borders
  - Transit: flows between two NUTS 2 regions that do not belong to the catchment area but are passing through one of the above-mentioned borders

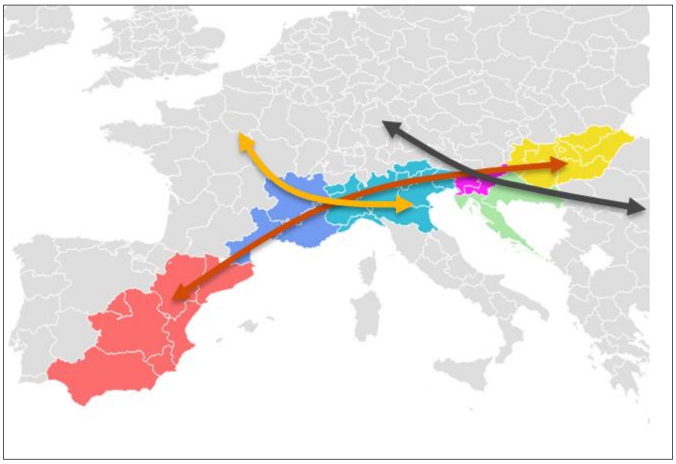


Figure 1 – Intern, exchange and transit flows

In addition to the analysis of the international flows, that constitute the main scope of the RFC, it is also important to have an overview of national freight traffic and of the passenger rail traffic on the various sections of the Corridor, in order to assess the global utilization of the infrastructure and identify the main capacity bottlenecks. To fulfil this objective, global train and road circulation data on each Corridor section has been collected and analysed.

3.2.2 Sources and data gathering for the study

With reference to the data taken into consideration for the preparation of the present Transport Market Study, this is based on two groups of data sources. The first is made up of open data which are available for public consultation, while the second is made up of data collected from different stakeholders of the freight market along the Mediterranean RFC.

All open sources presented in the following section have been considered to set up a consistent baseline data while through stakeholders' data further refitments on traffic have been performed.

3.2.2.1 Open sources

The Transport Market Study relies on the following open data sources:

- Eurostat sources for socio-economic data at Country or NUTS 2 level
- Eurostat sources on road, rail, and maritime freight traffic at Country or NUTS 2 level
- Etisplus matrices, composed by rail and road NUTS 2 x NUTS 2 Origin – Destination flows for 2010
- data from Alpine and Pyrenean transport observatories (OTP reports n°6 and 8, EU/CH yearly reports on "Observation and analysis of transalpine freight traffic flows")
- specific studies gathered by the consultants, especially on cross-border sections

In addition to the above-mentioned open sources, the TMS is also based on freight traffic flow data – for TENTec sections – gathered by the consultants in the framework of the Core Network Corridor studies.

The first activity of the TMS update was to organize all these sources together to create a consistent database for the year 2016, defined as base year of the study because it is the last available year where a complete and homogenous set of data could be found. Also, this year was not affected by particular events like long strikes, traffic interruptions or crisis like COVID-19. Where possible, more recent evolutions of traffic were investigated.

3.2.2.2 Stakeholders consultation

As already mentioned, open sources were used as base data of the TMS in order to define global volumes for 2016 and more recent trends where available.

With reference to rail volumes, a further refinement of the data was necessary to ensure the consistency and quality of the matrix. To this purpose, a specific consultation was set up involving all the main RFC Mediterranean stakeholders, which contributed directly to the study providing accurate data.

Transport data, for 2016, collected in the framework of the stakeholders' consultation are the following:

- Train Information System (TIS) data, which contains details on Mediterranean Rail Freight Corridor international traffic and prompt information on each Corridor's cross-border point
- circulated train services and average load factors data from each Infrastructure manager involved in the Corridor
- average load factors and running trains in the catchment area of the Corridor for main Railways Undertaking circulating on the Med RFC
- volumes and O-D pairs by mode of transport from some Road Rail Terminal managers
- volumes – specified by type of confinement of the goods and O-D – from main Mediterranean ports

All the data collected were analysed, checked and harmonized in order to provide an analysis of the current transport market along the Corridor for 2016.

3.2.2.3 Estimating flows in the market area for 2016

Having defined the Corridor's market area in terms of international Origin-Destinations pairs concerned, as explained previously, the traffic volumes in 2016 for each O-D and mode (road, rail, short sea) have been estimated in the following way:

- for rail and road, the 2010 Etisplus matrices were considered as starting database. Then:
  - a first growth rate between 2010 and 2016 has been calculated based on Eurostat transport data, at Country level or NUTS 2 level depending on data availability
  - traffic volumes at borders have been corrected to fit data from observatories and infrastructure managers at border crossings. As data given by the IMs are often in number of trains or wagons, assumptions on load factors have been made, ensuring consistency with average good weight by train where this kind data is available
  - traffic structure at NUTS 2 x NUTS 2 level has been refined and adapted to also fit O-D data from Infrastructure managers where available
- for the short sea mode, Eurostat data – available at port x maritime region level – were considered, statistically treated and confronted to supply data (in particular, in terms of number of Ro-Ro services available) to estimate a port x port matrix.

This way, a complete matrix for the Corridor's market area and for each mode has been estimated. This matrix is defined at NUTS 2 level and also subcategorised in eight groups of commodities.

3.2.3 Forecasting flows by 2030

Starting from the estimated 2016 matrix, the forecasting exercise has been implemented using successively two kinds of models: a global demand growth model, which forecasts the level of transport demand by O-D for all modes in 2030, and a logit modal split model, which estimates potential modal shifts between road, rail and short sea by 2030 according to the expected evolution of supply parameters.

The global demand growth model links traffic growth by Country x Country relation (import/export) and commodity group to economic indicators such as GDP. It is constituted by a series of econometric formulations which parameters are calibrated over long past time series: for this purpose, OECD data on impot/export by Country and commodity group and GDP since 1980 have been used.

The explanatory variable is generally the GDP of the importing Country. The formulations also include an autoregressive factor correcting a classical bias in time series analysis.

From these models, an elasticity of global demand growth by Country -> Country relation and commodity group to GDP was derived. Different forms of models (linear, log-log, box-cox) could be used. In this case, the best-fit models were used during the calibration at the base years but also checking their forecasting results. Cautious forecasting is made in the end, assuming that the elasticity of demand to GDP in the future will be slightly inferior to the one observed over the past period. Still, it is important to note that this kind of models are tendential and basically project the behaviour observed in the past, therefore do not consider any scenario of complete rupture.

Considering now the modal split model, this kind of discrete choice model is calibrated on stated preferences and revealed preferences surveys. It translates the preferences of the users for one mode or another into utility functions by mode that reflects the relative weight of different parameters in the mode choice: price, time, reliability and specific mode characteristics. The utility parameters depend on the commodity group. Then, the probability of choosing the mode "i" for a given O-D is given by the values of utility functions of the various modes "Ui" with the following "Logit" formula:

$$\%choice_i = \frac{exp(U_i)}{\sum_{i=1}^{n} exp(U_i)}$$

Price and time values by O-D, which are essential elements of the utility functions, are determined by a cost function calculated on our network model. In particular, cost functions are specific to the different kind of trains (combined transport, full trains or single wagons) and the kind of goods transported.

Based on these two models, the forecasting exercise needs a series of assumptions to be made on the evolution of their explanatory variables by 2030, mainly:

- GDP evolution by Country for the global demand growth model
- price and travel time for each O-D and mode for the modal choice model

Combining various assumptions on these variables, 5 scenarios have been developed. They all take into consideration:

- the potential effects of the COVID-19 crisis on GDP for the next five years
- the level of implementation of rail infrastructure improvements by 2030 and their expected effects on rail costs and travel times
- the evolution of road costs

The detailed assumptions for these scenarios and the rationale behind their construction is detailed in the chapter on "Future scenarios configuration".

3.2.4 Methodological differences with the previous RFC transport market study

3.2.4.1 Base year data and perimeter of the study

The previous Transport Market Study for the Mediterranean RFC performed in 2013, was based on 2010 data as a base year for projection. It was essentially based on Etisplus data, like the present one, but did not consider other sources like cross-border observatories or infrastructure manager data. As mentioned before, the new TMS has updated the base year data to 2016 considering various sources.

In addition, the previous TMS did not consider the short sea mode in the forecasting exercise.

There are also differences in the definition of the "catchment area" and the "market area" of the Corridor. In the previous study, the catchment area was constituted of the NUTS 2 zones crossed by Corridor 6 and the adjacent ones.

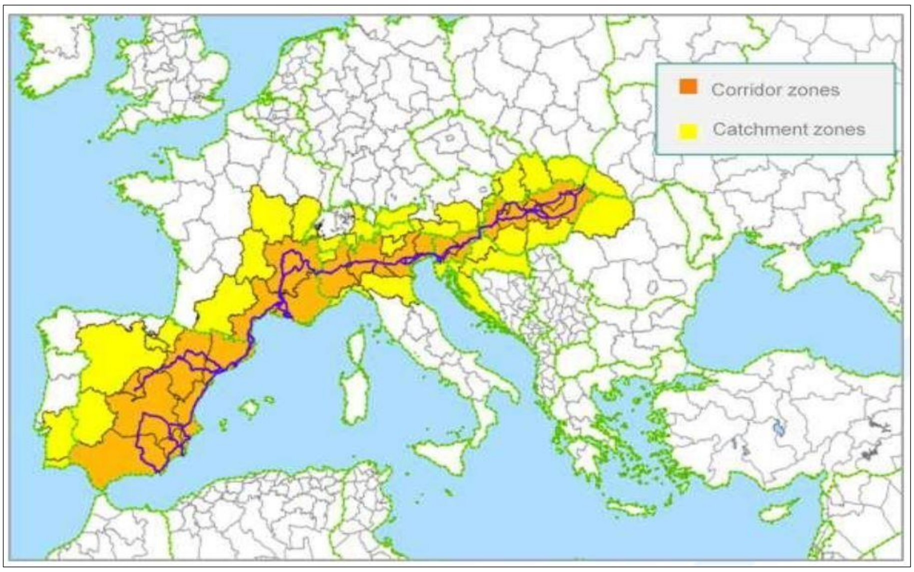


Figure 2 - Zoning and catchment area for the 2013 TMS

As illustrated in the figure above, the catchment area is a little bit wider as the one of the present TMS. But with Croatia being part of the Corridor now and the consideration of all northern Italian zones in the new catchment area, the differences are not too relevant.

More important differences are related to the definition of the "market area" of the Corridor and the selection of the O-D pairs that are considered to be relevant for the RFC.

In the previous study, an analysis of possibly preferred paths among different alternatives for all O-D pairs in the market area has been considered to assign flows to different border crossings. When a reasonable path is found crossing one of the borders between the Countries of the RFC (but not necessarily the minimum cost path), the O-D is considered in the market area. In conclusion, there are two major differences with the approach of the present study:

- the border between Spain and France was considered entirely in the previous study, whereas only the eastern part is considered in the present work. This represents about a gap of 50M tons of goods in the market area
- an O-D flow is considered as part of the market area of the Corridor in the new study only if its minimum cost path on the 2030 network crosses one of the above-mentioned borders

On both these criteria, the definition of the "market area" is now more restrictive than the one of the previous studies. As a logical consequence, the volume of goods in the market area in the present study be lower than the one of the previous TMS.

3.2.4.2 Forecasting models

The growth of overall demand by 2030 in the previous model was estimated through a decision tree/Bayesian network model. This kind of model is quite different from the econometric models used in the present study. But more importantly, GDP assumptions over the period 2010 – 2030 are different, as they were based on the official EU forecasts at the time for the "regular" scenario, with two sensitivity tests (±30%) for the worst-case and best-case scenarios.

The modal split model used in the previous study is a multinomial logit model like for the present one. It was calibrated at the time with a specific stated preferences survey. The assumptions made on evolutions of costs and travel time are very different, with no changes for these parameters with respect to 2010 in the regular case, and sensitivities to road cost (+20%) and rail travel time (-20%).

Keeping in mind these differences in both assumptions and methodological approach, a comparison of the results of the two studies is given in the last chapter of this report.

3.3 Current situation

3.3.1 Socio-economic context

The following section will focus on the analysis of the current situation in terms of macro-economic indicators, such as: population, employment, GDP, GVA and international trade along the Corridor and at EU level. Specifically, the analysis will define the socio-economic evolution between the years 2010-2016 and will provide a focus on the economic context for 2019 in terms of variations with reference to the 2016 base year.

The context area of the Corridor changes considerably from one Country to another, but also among regions within the same Country. This variability is given in terms of population as well as economic, cultural and other dimensions.

The socio-economic analysis is performed for the catchment area of the corridor (31 NUTS 2 zones) as defined above. When needed, comparisons at Country level are also provided.

3.3.1.1 Population and employment

The resident population on 1st January 2016 in the regions that are part of the Corridor amount to 90.211.279 growing from 89.168.626 in 2010 (+1,2%) as shown in Figure 3, whereas the EU-28 grew +1,4% from 503.170.618 to 510.181.874 residents. This means that people living in the regions crossed by the Med RFC represent around the 17,7% of EU residents.

There is a clear difference in residents' number; the East side of the Corridor is less inhabited (Hungary, Croatia and Slovenia regions) than the central and west part of the Corridor (where regions from Spain, France and Italy are located).

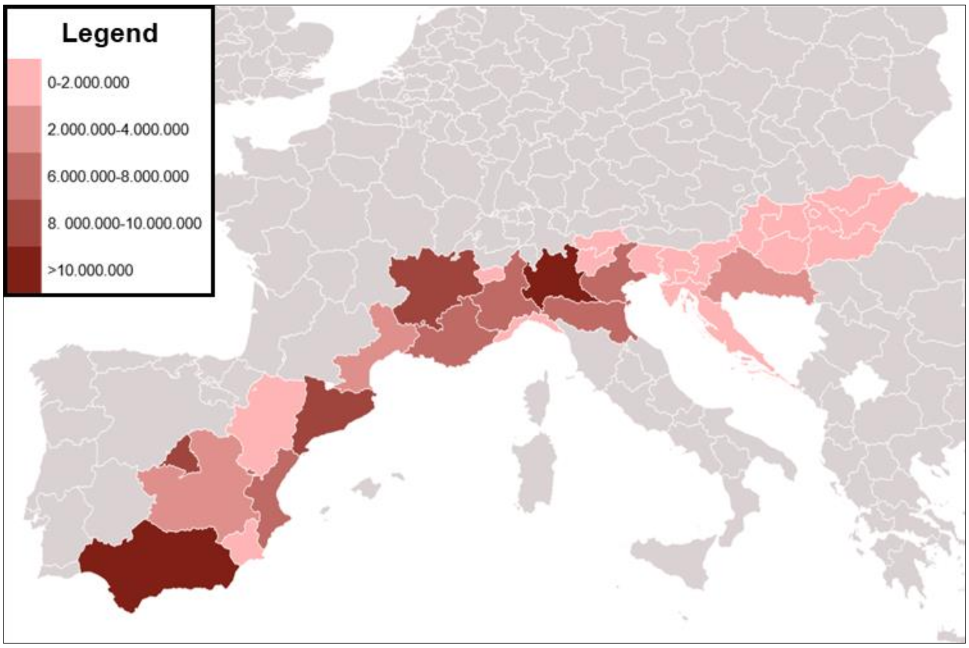


Figure 3 - Population distribution 2016 (Source: Elaborations on Eurostat data)

The active population – defined as people in the age between 15 and 74 years old – within the regions along the Corridor, was about 47.864.500 in 2016 growing around +1% from 47.408.700 in 2010 (Figure 4). Instead, within EU borders, the active population grew from 237.306.700 to 243.281.900 between 2010 and 2016, making a step of +2,5%.

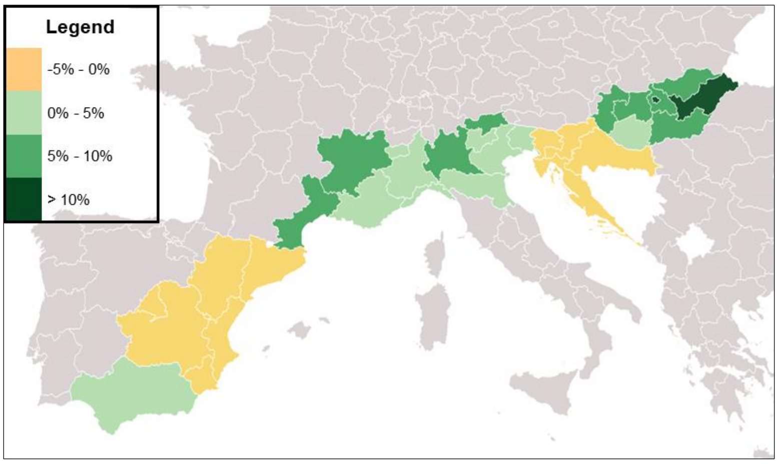


Figure 4 - Active population variation 2010-2016 (Source: Elaborations on Eurostat data)

This shows that along the Corridor, the rate of active population with respect to the EU in the same period of time has changed from 20% to 19,7%. Although it is a decrease, in the regions of the Corridor the active population rate is still among the higher in EU which means there is a major concentration of economically active people.

The employment rate of the age group 20-64, between 2010 and 2016, changed unevenly between Countries as well as among regions within the same Country like in Spain and Croatia. Comparing it with EU which grew from 68,5% in 2010 to 71,1% in 2016, thus by 2,6%, the average employment rate within the Corridor area has grown from 64,9% to 68,7% within the same period, thus 3,8%.

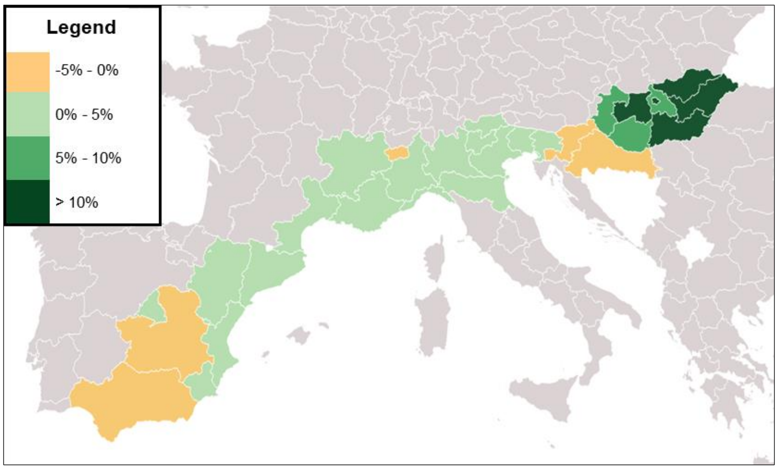


Figure 5 - Employment rate variation 2010-2016 (Source: Elaborations on Eurostat data)

From Figure 5 it can be noted the employment did not grow homogeneously. For instance, Hungarian regions had a two digits growth and generally above EU average, while in the south of Spain, north-west of Italy, part of Croatia and Slovenia the employment rate has decreased. The central part of the Corridor instead, grew like EU average.

Table 1 – Population, active population and employment rate per aggregated Corridor's Country (Source: Elaborations on Eurostat data)

Zone	Population [#]			Active population ['000]			Employment rate [%]		
	2010	2016	%Variation	2010	2016	%Variation	2010	2016	%Variation
Spain	31.984.865	32.002.631	0,1%	19.792	19.249	-2,7%	63,0	64,2	1,2
France	13.766.196	14.368.728	4,4%	8.147	8.460	3,9%	66,5	69,0	2,5
Italy	27.053.418	27.754.578	2,6%	12.328	12.750	3,4%	69,9	71,1	1,2
Slovenia	2.046.976	2.064.188	0,8%	1.036	992	-4,2%	70,4	70,2	-0,2
Hungary	10.014.324	9.830.485	-1,8%	4.202	4.586	9,1%	59,9	71,2	11,4

Croatia	4.302.847	4.190.669	-2,6%	1.905	1.827	-4,1%	61,8	61,0	-0,8
Corridor area	89.168.626	90.211.279	1,2%	47.409	47.865	1,0%	64,9	68,7	3,7
Europe	503.170.618	510.181.874	1,4%	237.307	243.282	2,3%	68,5	71,1	2,6

3.3.1.2 Gross Domestic Product

In 2016 the Gross domestic Product at market price of the Corridor area reached about 2.369 billion of Euros growing from 2.203 billion of Euros in 2010 (+7,5%), which means an average of 1,3% per annum. Whereas the EU reached a growth of about 16,6%, raising from a GDP of 12.846 billion of Euro in 2010 to 14.985 billion of Euro in 2016.

In other words, the GDP of the Corridor's area represented 17,2% of the EU in 2010 and 15,8% in 2016.

Absolute values of GDP for every region of the Corridor area are shown in Figure 6, where it is possible to notice the difference between the Countries on the West (Spain, France and Italy), which have higher GDP, and the three on the East (Slovenia, Croatia and Hungary) which have a lower one.

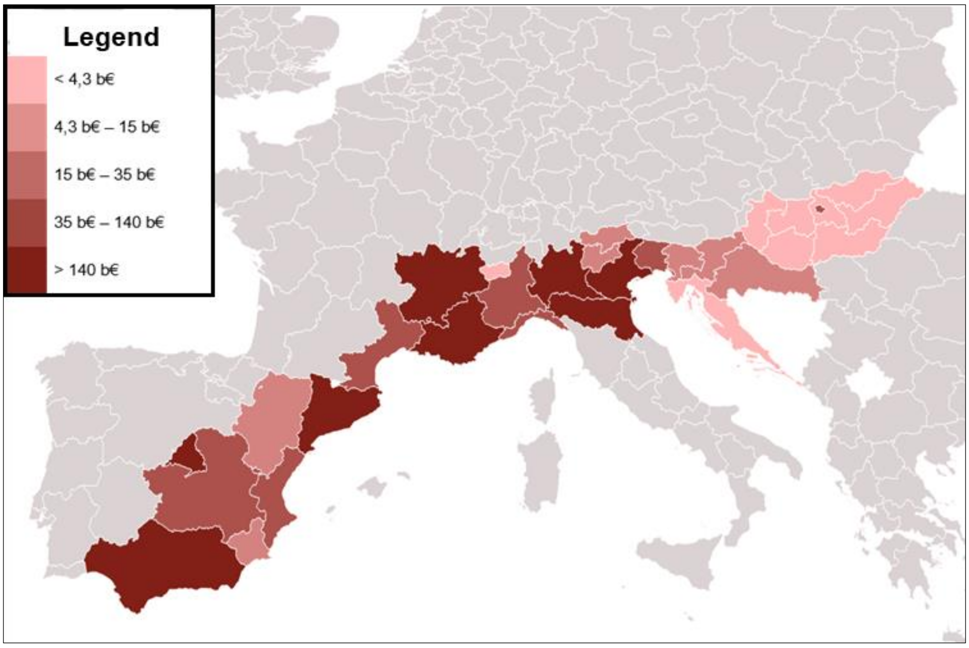


Figure 6 - GDP in 2016 (Source: Elaborations on Eurostat data)

The GDP along the Corridor grew in almost every region between 2010 and 2016. Additionally, despite the absolute value is lower, it can be noted how on the East part of the Corridor the GDP is growing faster (>10%) as shown in Figure 7[1].

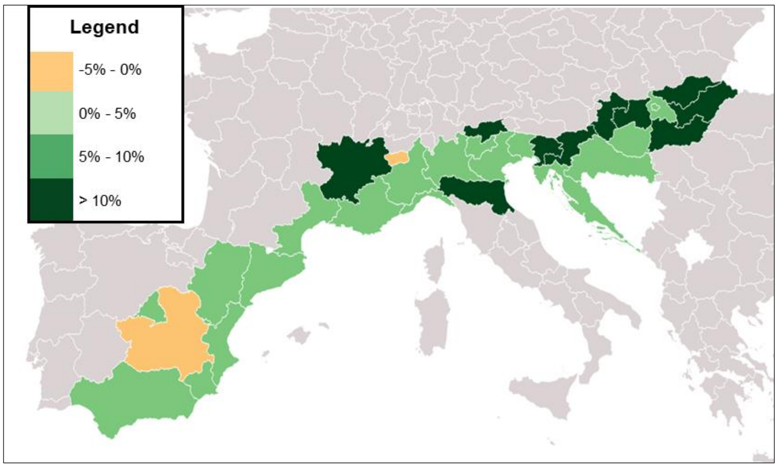


Figure 7 - GDP variation 2010-2016 (Source: Elaborations on Eurostat data)

[1] GDP per capita has been calculated as average by Country with population and GDP per regions.

Table 2 – GDP and GDP per capita per aggregated Corridor's zone (Source: Elaborations on Eurostat data)

Zone	GDP [mln €]			GDP per capita [€]		
	2010	2016	%Variation	2010	2016	%Variation
Spain	745.253	777.912	4,4%	22.667,1	23.560,8	3,9%
France	397.745	444.627	11,8%	27.936,3	29.789,6	6,6%
Italy	879.458	943.922	7,3%	33.043,4	34.500,1	4,4%
Slovenia	36.364	40.367	11,0%	18.027,8	19.765,8	9,6%
Hungary	98.987	115.259	16,4%	9.304,7	11.063,1	18,9%
Croatia	45.112	46.616	3,3%	10.382,6	11.041,1	6,3%
Corridor area	2.202.918	2.368.702	7,5%	24.705,1	26.257,3	6,3%
Europe	12.845.663	14.985.310	16,7%	25.529,4	29.372,5	15,1%

3.3.1.3 Gross Value Added

In 2016 the Gross Value Added of the Corridor area at basic prices reached about 2.121 billion of Euro, growing from 1.988 billion of Euro which makes a +6,7% increment between the years 2010 and 2016. At EU level, the GVA raised 16,2% in average, from 11.532 billion of Euro in 2010 to 13.399 billion of Euro in 2016.

This means that the economic activities in the regions touched by the Corridor represented 17,2% of the EU in 2010 and 15,8% in 2016.

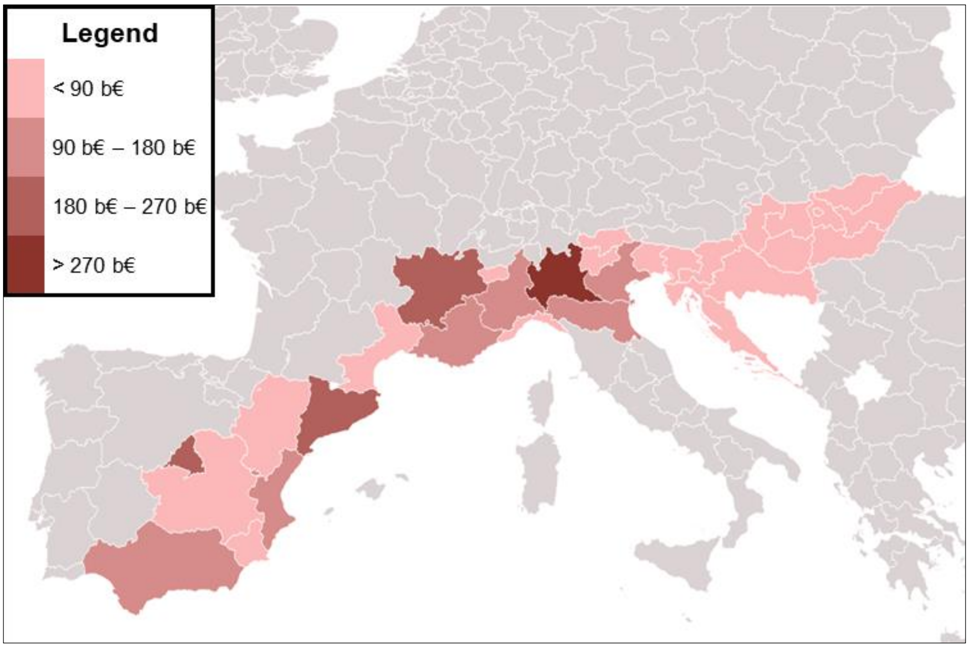


Figure 8 - GVA in 2016 (Source: Elaborations on Eurostat data)

Figure 9 shows how production of all the NACE activities changed between the years 2010 and 2016. On one hand, taking in consideration the average European growth, only some regions in the centre of the Corridor and the Hungarian ones could get the same level while, on the other hand, few regions decreased in their economic activities during the same period.

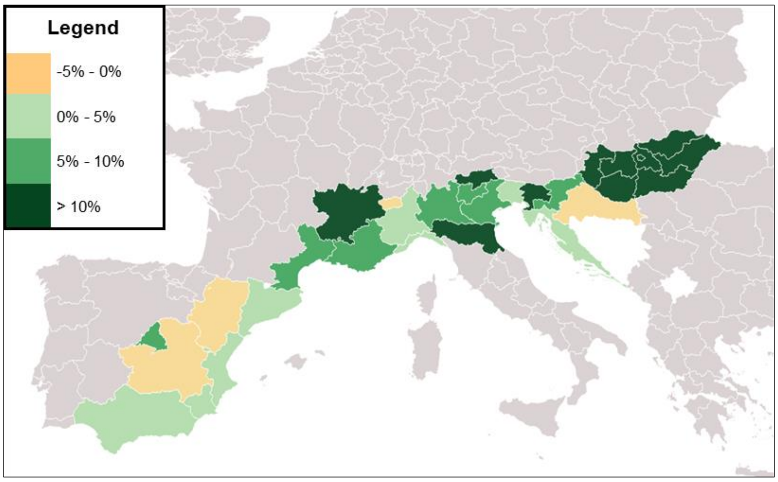


Figure 9 - GVA variation 2010-2016 for all NACE activities (Source: Elaborations on Eurostat data)

In particular, with reference to the industry sector, although a reduction was observed in few regions of the Corridor, it grew on the others more than the European average of 17,1%. On the other hand, the construction sector had decreased in almost every region within the Corridor and only few of them grew at similar rate than the European 5,8%.

The sector of services (compressed wholesale and retail sale; transport; accommodation and food services; information and communication) grew in almost every region within the Corridor but not all of them at the same rate; on the West part of the Corridor the sector grew less than the European 17,3%, in the central part some of them grew at similar rates and finally few regions on the East at higher rates.

3.3.1.4 International trade

In this section are reported the international trades in millions of Euros between each Country of the Corridor and the EU, and between each Country of the Corridor and outside the EU. In this case, due to the level of granularity of the available data, it has been considering the value per Country which the Corridor pass through instead of the NUTS 2 region.

The sections reported below – which describe both import and export intra and extra EU – are supported by a table where the last column is the 2010-2016 variation in percentage and a graph that reports trades in millions of Euro made by each Country every year.

In general, based on the order of magnitude of traded volumes, it is possible to distinguish two groups. The first one, composed by Spain, France and Italy, and located in the West part of the Corridor, have greater volumes of trade; whereas the second group, composed by Slovenia, Croatia and Hungary, have a one order of magnitude (sometimes two) lower than the others.

Meanwhile, if imports developed differently between the period 2010-2016 for the selected Countries, exports have only grown for all.

3.3.1.4.1 Import intra and extra EU

The imports intra EU are commercial exchange happening with origin and destination within European borders.

In Table 3, it is shown how France is importing more than everyone, followed by Italy and Spain with the same order of magnitude, while Hungary, Slovenia and Croatia are moving at a

Table 3 - Imports intra EU by Countries 2010-2016 [mln €]

Zone	2010	2016	%Variation
Spain	145.622,3	173.879,3	19,4%
France	315.589,7	358.791,2	13,7%
Italy	202.870,4	223.337,0	10,1%
Slovenia	16.477,6	19.567,2	18,8%
Hungary	9.109,6	15.225,2	67,1%
Croatia	45.251,7	65.896,0	45,6%

lower order of magnitude than the first three. From the last column in the table aside, it is also possible to see how imports from other MS is growing less than the European average (22,5%) for four out of six Countries within the Corridor. To notice also that, although Croatia and Hungary have a lower volume of imports coming from MS, they grew by 67,1% and 45,6% respectively, which are rates largely greater than the European average in the same period.

Corridor Countries	734.921,3	856.695,9	16,6%
Europe	2.486.923,3	3.045.710,2	22,5%

The imports extra EU are commercial exchanges happening with origin outside EU and destination within a MS of EU.

In the last column of Table 4 is possible to see how Italy, Croatia and Hungary have decreased their imports extra EU by 12,3%, 24,2% and 11% respectively. Instead, Spain and France import extra EU have increased by 6,1% and 6,2% respectively even if less than the European average of 11,6%. Lastly, Slovenia is the only Country which imports extra EU grew by 28,6% more than the European average.

Table 4 - Imports extra EU by Countries 2010-2016 [mln €]

Zone	2010	2016	%Variation
Spain	101.051,5	107.177,5	6,1%
France	145.351,6	154.308,4	6,2%
Italy	164.519,4	144.288,8	-12,3%
Slovenia	6.242,0	8.030,3	28,6%
Hungary	6.027,4	4.566,0	-24,2%
Croatia	21.262,5	18.932,9	-11,0%
Corridor Countries	444.454,4	437.303,9	-1,6%
Europe	1.529.088,9	1.706.614,5	11,6%

Figure 12 shows the growing import intra EU with value in millions of Euros for all Countries between the years 2010 and 2016 while

Figure 11 shows the decreasing tendency on Imports extra EU for almost every Country, especially after the 2011 crisis, although the 2010-2016 variation could still be positive as described before.

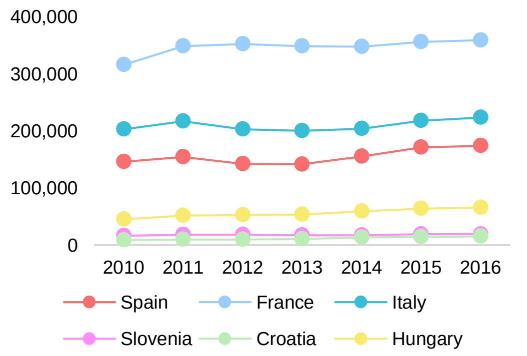


Figure 10 - Imports intra EU by Countries 2010-2016 [mln €]

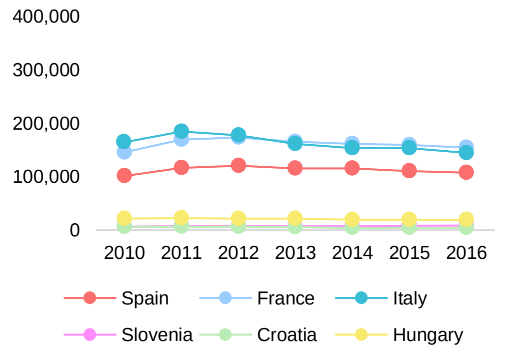


Figure 11 - Imports extra EU by Countries 2010-2016 [mln]

3.3.1.4.2 Export intra and extra EU

Exports intra EU are commercial exchanges happening with origin and destination within EU.

It is possible to see in Table 5 that France, although still being the grater exporter within European borders, is the one which has grown less (11,8%) between the period 2010-2016. Secondly, Italy exports intra EU grew 19,4%,

Table 5 - Exports intra EU by Countries 2010-2016 [mln €]

Zone	2010	2016	%Variation
Spain	131.996,4	175.042,7	32,6%
France	240.934,2	269.293,2	11,8%
Italy	195.522,7	233.412,9	19,4%
Slovenia	17.089,0	22.407,8	31,1%
Hungary	5.439,3	8.182,9	50,4%
Croatia	56.469,4	74.950,4	32,7%
Corridor area	647.451,0	783.289,9	21,0%

Europe	2.557.480,4	3.115.574,6	21,8%

under the 21,8% European average. Lastly, growing above the average are Slovenia, Spain, Croatia and Hungary with 31,1% 32,6%, 32,7% and 50,4% respectively. Overall, the Corridor area grew a bit less than European average,

Exports extra EU are commercial exchanges happening with origin within EU and destination outside of them.

It is possible to see in

Table 6 the Countries where the exports extra EU have grown less than the European average of 28,9%, these are Hungary, France and Croatia with 24,3%, 19,2% and 10,1%, respectively. Differently, the Countries with a growth greater than the European average are Italy, Spain and Slovenia with 29,6%, 45,2% and 48,5% respectively.

Table 6 - Exports extra EU by Countries 2010-2016 [mln €]

Zone	2010	2016	%Variation
Spain	59.915,5	86.998,6	45,2%
France	154.153,0	183.782,6	19,2%
Italy	141.884,6	183.856,0	29,6%
Slovenia	4.937,8	7.334,6	48,5%
Hungary	3.466,0	4.306,6	24,3%
Croatia	15.554,9	17.122,8	10,1%
Corridor area	379.911,8	483.401,2	27,2%
Europe	1.353.954,3	1.745.289,1	28,9%

Notice in Figure 12 and Figure 13 that, although the Country’s exports intra EU have evolved differently, all of them have an increasing tendency.

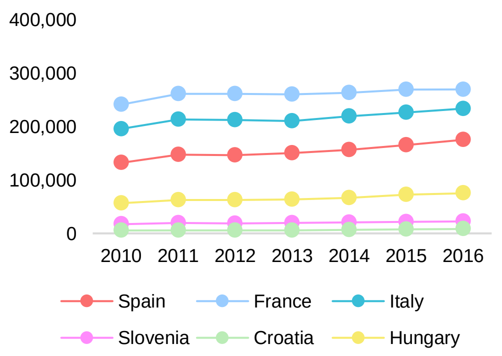


Figure 12 - Exports intra EU by Countries 2010-2016 [mln €]

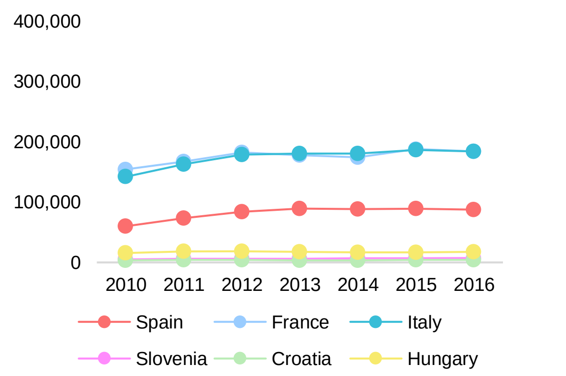


Figure 13 - Exports extra EU by Countries 2010-2016 [mln €]

3.3.1.5 Focus: Socio-economic context in 2019

Although the base-year of the analysis is set for 2016, it is important to also consider the current socio-economic context of the Corridor. With this purpose, a specific focus on the main economics driver has been carried out for 2019, the last year for which socio-economic statistics are available.

Firstly, the population on the area of the Corridor in 2019 was 90.660.280 residents, which means it rose by 0,5% in the second period (2016-2019) thus with a rate slightly lower than that recorded between 2010 and 2016 (around 0,6% every 3 years). Comparing within the second period at EU level where the growth was 0,6%, it grew slightly below. This highlights that during the years 2010-2019 the percentage of residents within regions inside the Corridor, relatively to European level, remained unvaried at 17,7%.

Concerning the active population, during the 2016-2019 period it grew in average by 1,2%, which is higher than the 1,0% growth recorded during the first period, reaching 48.460.000 residents between 15 and 74 years old in 2019. Comparing it against the EU rates between 2016 and 2019, the recorded growth was the same.

Regarding the employment rate in the period 2016-2019, on average it increased 3,4% in the area of the Corridor. This is very similar to the 3,7% increase but recorded in the longer period 2010-2016. Comparing it with the two increments recorded at EU level, which are 2,6% in the first period and 2,8% in the second one, it is clear how the job markets within the Corridor's areas are growing faster. Despite that, on average, the Corridor reached 72,1% of employment rate in 2019, which is slightly lower compared to the 73,9% at EU level.

Table 7 – Population, active population and employment rate per aggregated Corridor's Country (Source: Elaborations on Eurostat data)

Zone	Population [#]		Active population ['000]		Employment rate	
	2019	%Variation 2016-2019	2019	%Variation 2016-2019	2019	± Variation 2016-2019
Spain	32.453.580	1,4%	19.534	1,5%	68,6	4,4
France	14.530.677	1,1%	8.505	0,5%	70,0	1,0
Italy	27.746.113	0,0%	12.929	1,4%	73,1	2,0
Slovenia	2.080.908	0,8%	1.026	3,4%	76,6	6,3
Hungary	9.772.756	-0,6%	4.672	1,9%	75,1	3,9
Croatia	4.076.246	-2,7%	1.794	-1,8%	66,2	5,2
Corridor area	90.660.280	0,5%	48.460	1,2%	72,1	3,4
Europe	513.471.676	0,6%	247.689	1,2%	73,9	2,8

Concerning the Gross Domestic Product in the period 2016-2018[2], it rose 6,8% compared to the 7,5% of the first period which is sharper annually speaking. At the same time, the GDP at EU level has deaccelerated from a cumulative growth of 16,7% in the period 2010-2016 to a growth of 6,2% during the 2016-2018 years.

Regarding the Gross Value Added in the areas of the Corridor in the 2016-2018[3], period the cumulative growth was 6,6%, making it climb up to 2.260 billion of Euro, which is sharper than the cumulative growth (6,7%) recorded in the period 2010-2016. Comparing it at EU level, between 2016-2018 the cumulative growth was 9,8% which is sharper than the 16,2% of the 2010-2016 period. In fact, annually speaking, it is 4,8% and 2,7% per annum respectively.

Table 8 – GDP and GVA per aggregated Corridor's zone (Source: Elaborations on Eurostat data)

Zone	GDP [mln €]		GVA [mln €]	
	2018	%Variation 2016-2018	2018	%Variation 2016-2018
Spain	840.919	8,1%	761.020	7,8%
France	469.600	5,6%	417.281	5,3%
Italy	988.165	4,7%	886.876	4,6%
Slovenia	45.755	13,3%	39.839	14,0%
Hungary	133.782	16,1%	112.914	15,7%
Croatia	51.625	10,7%	42.448	9,9%
Corridor area	2.529.846	6,8%	2.260.377	6,6%
Europe	15.907.594	6,2%	14.712.866	9,8%

Lastly, the international trade (Imports and Exports) is shown below sorted based whether origins and destinations are part of the European Union or not.

Extra EU, the Country with the highest variation in imports and exports is Slovenia, whereas within EU the Country having highest variation in imports and exports is Croatia (all positive).

In terms of volumes, France, Italy and Spain have larger international trade reaching three-digit tones than Slovenia, Croatia and Hungary which move two-digit tons in their movements.

3.3.1.5.1 Import and Exports Extra-EU (million Euro)

In Figure 14 it is shown that Slovenian exports outside EU have more than doubled (115,5%) during 2010-2019 period, followed by Spain which grew 67%; comparison was also made with EU 28 which grew 50% during the same period. Volume speaking, Italy and France are the leaders with similar volumes followed by Spain with half of the previous ones.

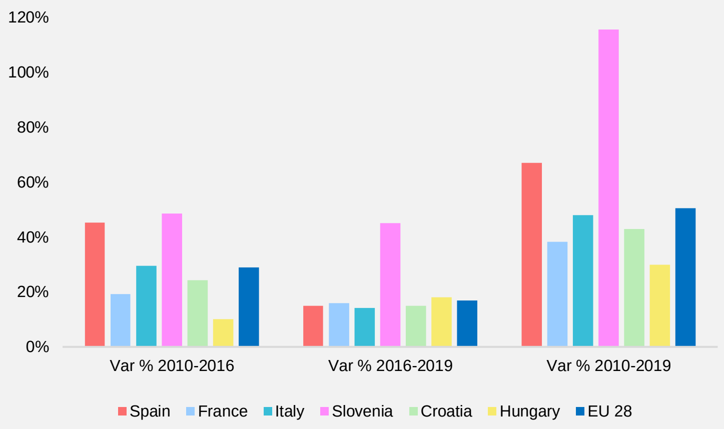


Figure 14 - Exports variation extra EU 2010-2019

In Figure 15 it is shown, that during 2010-2019 period, Slovenian imports from outside EU have more than doubled (+131,4%) and Spain grew by 37% whereas Croatian imports decreased by 15,9%; comparison is also made with EU 28 which grew 34,5% during the same period. Volume speaking, France, Italy and Spain are the leaders importing similar volumes.

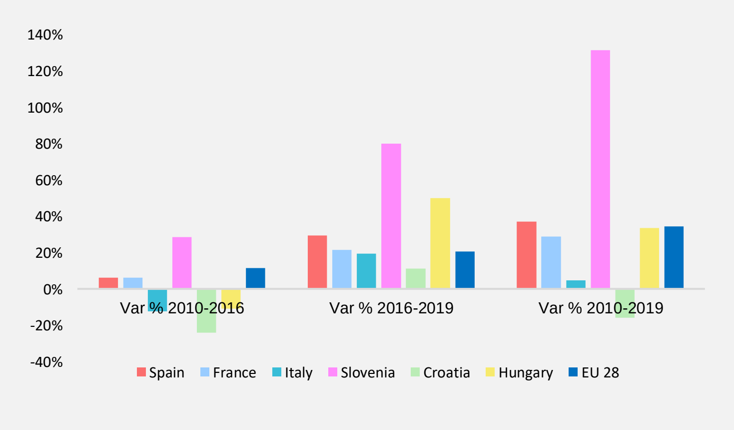


Figure 15 - Imports variation extra EU 2010-2019

[2] GDP data not available at NUTS 3 for 2019.
[3] GVA data not available at NUTS 3 for 2019.

3.3.1.5.2 Import and Exports Intra-EU (million Euro)

From Figure 16 it can be noted how Croatian exports within EU have been growing by 91% followed by Slovenia, Hungary and Spain with 73%, 60% and 50% respectively in the 2010-2019 period. Comparison was also made with EU 28 which grew by 40% during the same period. In terms of volume France and Italy lead having similar volumes, followed by Spain.

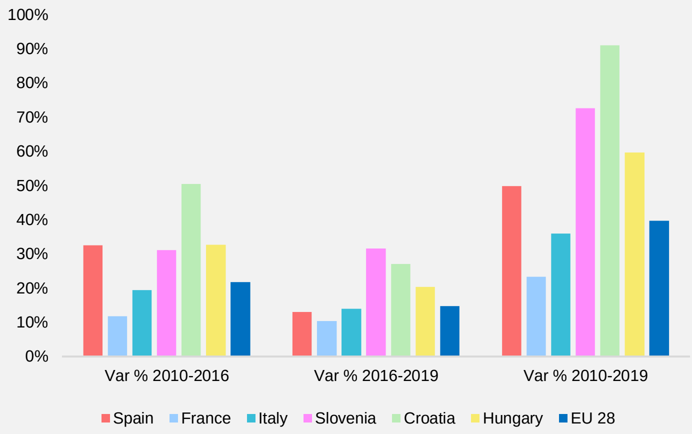


Figure 16 - Export variation intra EU 2010-2019

From Figure 17 it can be noted that the growth of Croatia imports within EU have more than doubled growing 121%, followed by Hungary and Slovenia with 74% and 51% respectively during the period 2010-2019. Comparison was also made with EU 28 which grew by 41% during the same period. In terms of volumes France leads followed by Italy and Spain, which have similar volumes.

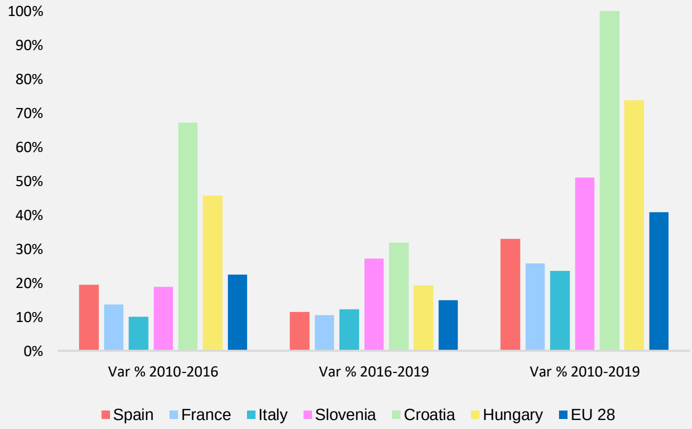


Figure 17 - Imports variation intra EU 2010-2019

3.3.1.6

3.3.2 Analysis of the current transport market along the Corridor

3.3.2.1 Global international freight flows in the Corridor's market area

Having defined the Corridor's market area in terms of international Origin-Destinations concerned (see methodology chapter), the traffic volumes in 2016 for each O-D and mode (road, rail, short sea) have been estimated in the following way:

- for rail and road, the 2010 Etisplus matrices were considered as starting database. Then:
  - a first growth rate between 2010 and 2016 has been calculated based on Eurostat transport data, at Country level or NUTS 2 level depending on data availability
  - traffic volumes at borders have been corrected to fit data from observatories and infrastructure managers at border crossings
  - traffic structure at NUTS 2 x NUTS 2 level has been refined and adapted to also fit O-D data from Infrastructure managers where available
- for the short sea mode, Eurostat data – available at port x maritime region level – were considered, statistically treated and confronted to supply data (in particular, in terms of number of Ro-Ro services available) to estimate a port x port matrix.

According to the estimations that were possible implementing the above-mentioned methodology with the available data, the international freight flows in the Corridor's market area for 2016 are the following:

Table 9 - Global volumes for 2016, market area

MTons 2016	Intern	Exchange	Transit	Total
Rail	6,4	12,0	2,7	21,1
Road	36,3	83,0	24,7	144,0
Short Sea	7,7	12,3	-	20,0
Total	**50,3**	**107,2**	**27,4**	**185,1**
% rail share	12,7	11,2	9,9	11,4
% evolution since 2010 - rail	-8,3	12,8	0,2	3,9
% evolution since 2010 - road	17,6	14,3	5,8	13,5

Comparing the above data, it can be observed that around 185 million tons of international freight were transferred through the Corridor's market area in 2016. Almost 78% of these goods were transported by road, 11% by rail and 11% by short sea. It can be noted that rail and short sea traffic represent similar volumes in the Corridor market area.

The reasons of this relatively low share of rail traffic – in comparison with other international flows in Europe, in particular between Benelux or Germany and northern Italy – are threefold:

- the competitiveness of short sea traffic, which is quite specific to this Corridor
- the structure of the traffic: industrial density of North-Western Europe and strong traffic of the ports of the North range support, for example, the organization of frequent services of combined transport. Even if there are important industrial nodes and ports along the Mediterranean Rail Freight Corridor, flows tend to be more diffused than in the north-south direction
- bottlenecks related to transport policy and infrastructure: congestion in main nodes, lack of interoperability (the main problem being the track gauge change with Spain) and insufficient performances on some sections. This explains in great part the low rail market shares but transport policies and organizational issues within railways undertakings can also be invoked

The exchange flows represent almost 58% of the total volume in the market area, meaning that, the majority of the goods are exchanged between a region of the Corridor and a region outside of the Corridor (Catalunya – north-western Germany, Northern France – Lombardia, etc). These flows use parts of the RFC but also other corridors and railways in Europe. The intern traffic, which uses the Mediterranean RFC's infrastructure on a major part of its routes, represents 27% of the total, whereas transit flows counts for 15%. Rail share decrees whether the volumes remain internal to the Corridor, are in exchange or transiting it, respectively from 13% to 11% and 10%.

Analysis at Country x Country level

The tables below present the freight volumes of the market area (in 1000 tons/year) exchanged by road, rail and short sea between the Countries of the Corridor, and other European Countries at a more aggregated level.

Table 10 - 2016 Freight transport demand in the Corridor's market area, by mode and by Country (bi-directional flows, 1000 tons/year)

Road										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		27.071	9.697	251	90	318	312	1.204	11.865	50.808
France			30.556	643	272	740	1.084	177	415	33.887
Italy				6.708	3.771	10.109	2.923	1.118	5.644	30.273
Slovenia					4.333	6.957	439	933		12.662
Croatia						6.408	711	1.862	4.117	13.098
Hungary							467		68	534
South-Eastern Europe									2.760	2.760
Total		27.071	40.253	7.602	8.467	24.531	5.936	5.294	24.868	144.022

Rail										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		296	128	0	0	6	1	33	1.891	2.355
France			3.688	24	5	17	54	1	100	3.889
Italy				266	958	1.897	399	117	4.064	7.701
Slovenia					311	2.034	123	170		2.638
Croatia						1.814	149	466	1.132	3.561
Hungary							130		24	154
South-Eastern Europe									811	811
Total		296	3.816	290	1.274	5.768	856	787	8.022	21.109

Short sea										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		3.739	9.847	266	77					13.929
France			3.636	0	3					3.639
Italy				1.920	445					2.365
Slovenia					76					76
Croatia										
Hungary										
South-Eastern Europe										
Total		3.739	13.483	2.186	601					20.009

All modes

Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		31.106	19.672	517	167	324	313	1.237	13.756	67.092
France			37.880	667	280	757	1.138	178	515	41.415
Italy				8.894	5.174	12.006	3.322	1.235	9.708	40.339
Slovenia					4.720	8.991	562	1.103	0	15.376
Croatia						8.222	860	2.328	5.249	16.659
Hungary							597	0	92	688
South-Eastern Europe								0	3.571	3.571
Total		31.106	57.552	10.078	10.342	30.299	6.792	6.081	32.890	185.140

% rail share										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		1%	1%	0%	0%	2%	0%	3%	14%	4%
France			10%	4%	2%	2%	5%	1%	19%	9%
Italy				3%	19%	16%	12%	9%	42%	19%
Slovenia					7%	23%	22%	15%		17%
Croatia						22%	17%	20%	22%	21%
Hungary							22%		26%	22%
South-Eastern Europe									23%	23%
Total		1%	7%	3%	12%	19%	13%	13%	24%	11%

% short sea share										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		12%	50%	51%	46%					21%
France			10%	0%	1%					9%
Italy				22%	9%					6%
Slovenia					2%					0%
Croatia										
Hungary										
South-Eastern Europe										
Total		12%	23%	22%	6%					11%

Not surprisingly, total freight between Spain, France and Italy represent the most important volumes in the market area. Nevertheless, flows on the eastern part of the Corridor have experienced a significantly quicker growth in the recent years. The flows with "Eastern Europe" include O-D pairs linking with Russia and Ukraine, while "South Eastern Europe" include Countries of the Balkan region and Turkey. Nevertheless, flows with these Countries, according to the Etisplus database and the definition of the market area of the RFC (flows crossing at least one terrestrial border between Corridor Countries) are quite low (about 200 000 tons/year with Ukraine and Russia and 50 000 tons/year with Turkey).

Rail share for goods exchanged with Spain is near to zero, due to the gauge issue. The only exception is for flows between Spain and Germany, which have a 14% rail share, connected to very specific transport for the automobile industry and length of the journey compensate for the additional cost of the gauge change. Rail share is higher than average on the eastern part of the Corridor, especially for flows with Hungary. It can also be noted a high rail share (42%) for the flows between Benelux (in particular, ports of the North Sea) and Italy, as mentioned before.

Maritime transport accounts for more than 50% of the flows between Spain and Italy, but also between Spain and Slovenia or Croatia.

The analysis of flows by direction – as reported on the table hereunder for rail and road – highlights some dissymmetry.

Table 11 - 2016 Freight transport demand in the Corridor's market area, by mode and by Country (mono-directional flows, 1000 tons/year)

Road										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		14.512	4.833	133	90	155	175	685	6.623	27.206
France	12.560		14.799	206	155	376	890	61	172	29.219
Italy	4.864	15.757		2.498	1.967	3.813	1.739	714	3.519	34.871
Slovenia	117	437	4.210		1.571	3.977	189	502		11.003
Croatia	0	117	1.804	2.762		2.455	246	782	1.605	9.771
Hungary	162	364	6.296	2.980	3.952		467		68	14.289
South-Eastern Europe	137	194	1.184	250	465				1.232	3.462
North-Eastern Europe	519	117	405	431	1.080					2.551
Western Europe	5.242	243	2.125	0	2.512		1.528			11.650
Total	23.601	31.741	35.656	9.260	11.792	10.776	5.234	2.744	13.219	144.022

Rail										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		86	59	0	0	3	1	16	967	1.132
France	210		2.716	9	0	2	38	0	21	2.996
Italy	69	972		49	39	262	79	60	2.478	4.008
Slovenia	0	15	217		65	1.269	89	79		1.734
Croatia	0	5	919	247		1.107	81	200	490	3.049
Hungary	3	14	1.635	765	707		67		24	3.215
South-Eastern Europe	1	16	320	34	68	64			259	762
North-Eastern Europe	16	1	57	91	458					623
Western Europe	923	80	1.586	0	449		552			3.590
Total	1.222	1.189	7.509	1.195	1.786	2.707	907	355	4.239	21.109

While road traffic between Countries is relatively equivalent by direction, rail traffic is more dissymmetric. For example, France's export by rail to Spain and Italy is superior to its rail import from these two Countries and Hungary exports more by rail to Italy than the other way around.

Analysis at NUTS 2 x NUTS 2 level

Freight flows for 2016 in the market area are detailed in this section at regional (NUTS 2) level. The figures below show the 30 main Origin-Destination pairs for road, rail and short sea freight in the market area.

As far as road freight is concerned some regions located in the Corridor such as Cataluña or Lombardia are noticeable for being strong traffic generators of the Corridor. In addition, some important flows of relatively short distance between Central Croatia, western regions of Hungary and Slovenia can be noted.

Generally speaking, intern traffic by road (between regions belonging to the Corridor) is significant.

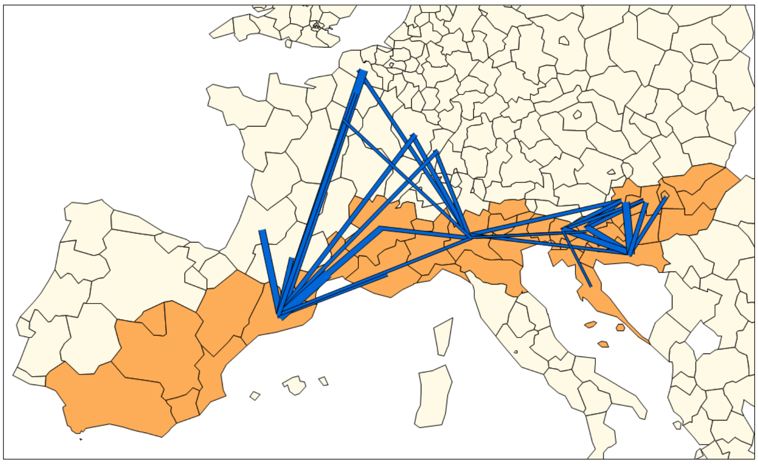


Figure 18 - 2016 Main road freight flows at NUTS 2 level with corridor regions

Table 12 - 2016 Main road freight flows at NUTS 2 level with Corridor region (1000 tons/year)

Origin	Destination	2016 Traffic
Cataluña	Languedoc-Roussillon	2.566
Cataluña	Nord-Pas de Calais	2.260
Kontinentalna Hrvatska	Nyugat-Dunantul	2.056
Cataluña	Aquitaine	2.000
Cataluña	Rhône-Alpes	1.683
Kontinentalna Hrvatska	Vzhodna Slovenija	1.652
Kontinentalna Hrvatska	Zahodna Slovenija	1.650
Nyugat-Dunantul	Vzhodna Slovenija	1.388
Kontinentalna Hrvatska	Kozep-Dunantul	1.329
Cataluña	Ile-de-France	1.322
Lorraine	Lombardia	1.298
Cataluña	Lorraine	1.268
Cataluña	Midi-Pyrénées	1.249
Cataluña	Provence-Alpes-Côte d'Azur	1.208
Nord-Pas de Calais	Lombardia	1.165
Rhône-Alpes	Lombardia	1.163
Nyugat-Dunantul	Zahodna Slovenija	1.109
Cataluña	Alsace	1.059
Alsace	Lombardia	1.057

Figure 19 shows the same analysis for rail freight.

Unlike for road, rail freight flows between regions of the Corridor are low, except for some relations with Hungarian regions. The main flows are in exchange, between Catalunya and Ruhr Region in Germany or between Benelux and Piemonte.

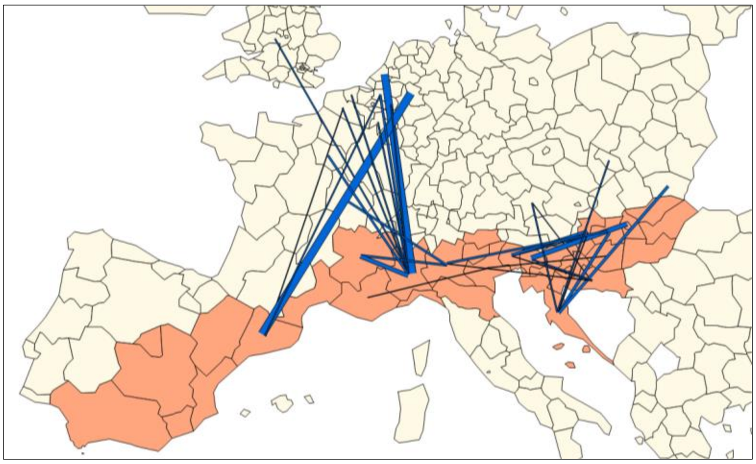


Figure 19 - 2016 Main rail freight flows at NUTS 2 level with corridor regions

Table 13 - 2016 Main rail freight flows at NUTS 2 level with Corridor regions (1000 tons/year)

Origin	Destination	2016 Traffic
Düsseldorf	Cataluña	1.359
Piemonte	Zuid-Holland	1.222
Budapest	Zahodna Slovenija	835
Rhône-Alpes	Piemonte	630
Jadranska Hrvatska	Vychodne Slovensko	481
Nyugat-Dunantul	Friuli-Venezia Giulia	430
Jadranska Hrvatska	Kozep-Dunantul	424
Rhône-Alpes	Lombardia	387

Prov. Antwerpen	Piemonte	380
Ile-de-France	Piemonte	371
Kozep-Dunantul	Lombardia	297
Bourgogne	Lombardia	290
Prov. Antwerpen	Cataluña	283
Prov. Limburg (BE)	Piemonte	273
Nord-Pas de Calais	Piemonte	254
Prov. Namur	Piemonte	233
Moravskoslezsko	Jadranska Hrvatska	209
Piemonte	Herefordshire, Worcestershire	196

For short sea traffic, Figure 20 shows the main Origin-Destination pairs for short sea freight in the Corridor's market area.

Indicatively, port to port traffic has been distributed to the NUTS 2 neighbouring regions considering their GDP and distance to port (Table 14).

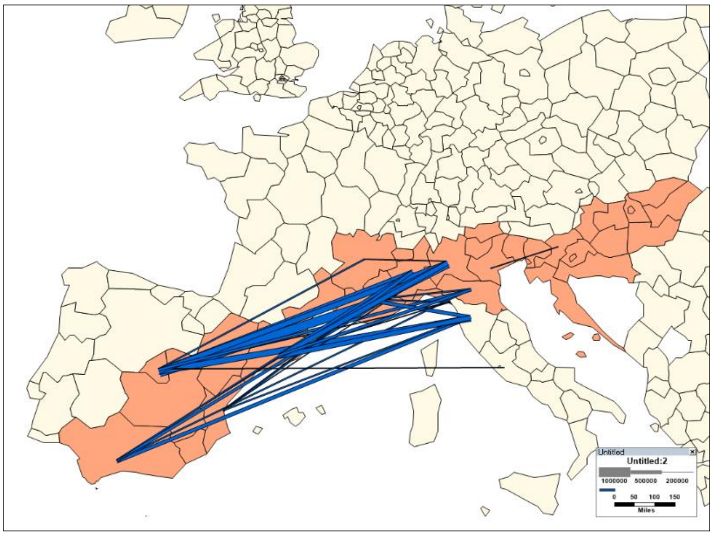


Figure 20 - 2016 Main short sea freight flows at NUTS 2 level with Corridor regions

Table 14 - 2016 Main short-sea freight flows at NUTS 2 level with Corridor regions (1000 tons/year)

Origin	Destination	2016 Traffic
Comunidad de Madrid	Provence-Alpes-Côte d'Azur	934 238
Provence-Alpes-Côte d'Azur	Lombardia	785 007
Comunidad de Madrid	Toscana	683 058
Comunidad de Madrid	Lombardia	627 731
Catalunya	Toscana	605 512
Catalunya	Lombardia	574 479
Catalunya	Provence-Alpes-Côte d'Azur	531 519
Provence-Alpes-Côte d'Azur	Piemonte	484 626
Andalucia	Toscana	461 518
Comunidad de Madrid	Piemonte	458 745
Provence-Alpes-Côte d'Azur	Toscana	451 765
Andalucia	Lombardia	439 478
Comunidad de Madrid	Emilia-Romagna	436 719
Catalunya	Piemonte	416 035
Catalunya	Emilia-Romagna	392 766
Comunitat Valenciana	Provence-Alpes-Côte d'Azur	372 102
Andalucia	Piemonte	317 939
Provence-Alpes-Côte d'Azur	Liguria	317 408

The analysis shows that the Corridor is the backbone of an important international freight demand between regions of southern Europe, but that this demand is at present time mostly realized through road transport (except for flows between the Adriatic ports of Koper and Rijeka and Hungary). Short sea traffic is also an important mode between Spain, Italy and southern France.

3.3.2.2 Focus: Freight traffic at cross-border sections of the Corridor

This section presents a specific analysis carried out for each cross-border point of the Corridor:

- **ES/FR border**

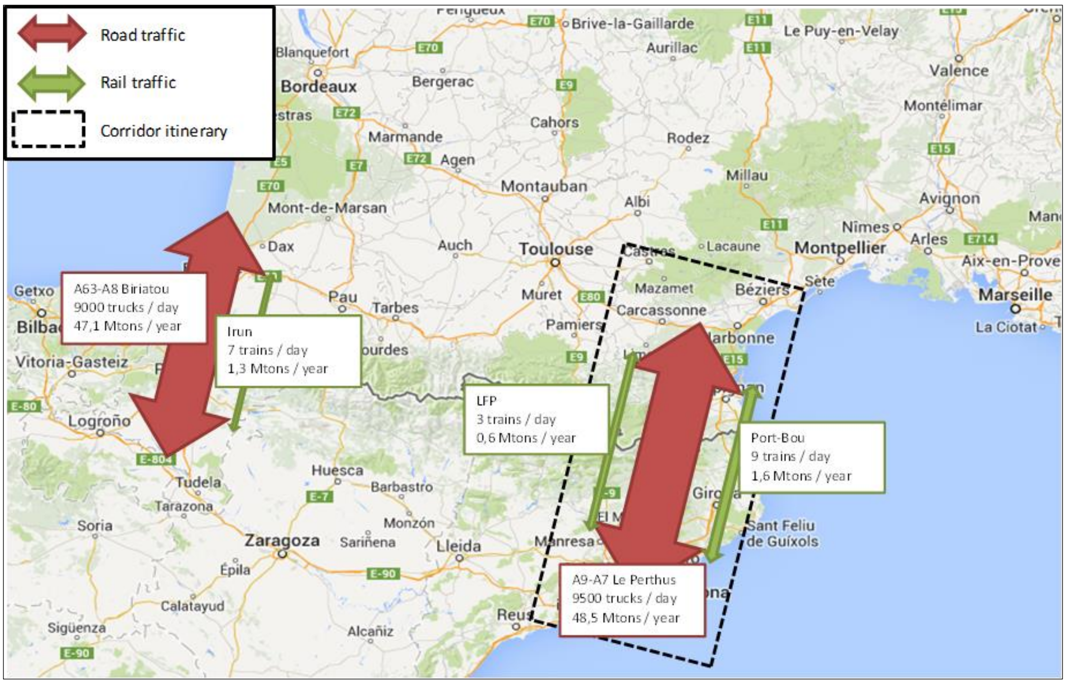


Figure 21 - Cross-border traffic at ES – FR border

Freight traffic at the Pyrenean crossings is characterized by a very low rail share due to track gauge change at the border. Some goods are transported by road in Spain and are transferred on rail in France, since they cross the border on the road, they are identified as road traffic. Also noteworthy is the similarity of volumes on the two main crossings, on the Atlantic side and on the Mediterranean side. Central crossings can be neglected as they have insignificant freight traffic (trucks are forbidden in most of them).

Focusing on the Mediterranean RFC side of the border-crossing, it can be noted that the motorway (A9-A7) has a very strong freight traffic with over 9.500 trucks/day (3 million/year) for 48,5 million tons of goods. This traffic has grown by +19% since 2010 (+3% per annum in average).

Almost half of the Trans Pyrenean freight road traffic is constituted by flows between France and Spain while the two other main flows are Spain – Germany and Spain – Italy.

In 2016, rail traffic at Port-Bou border was 1,4 million tons. This traffic is above all constituted of an important flow of automobiles and parts thereof between Spain and Germany (1,4 Mtons/year) which counts for 55% of the traffic and between Spain and France which counts for 30%, the rest 15% is mainly traffic between Spain and other Countries. The rail share between Spain and France increased from 3,8% in 2010 to 4,5% in 2016.

The Linea Figueras Perpignan (LFP) is the UIC gauge line between France and Spain, opened to traffic since 2011 and connected since 2013. In 2016, the freight traffic on this line was about 0,6 million tons, representing 3 trains per day in yearly average. The lack of continuous UIC connections until the main loading/unloading points in Spain has made the development of freight traffic on this line slower than expected. Nevertheless, this new line contributed to a beginning of modal shift. While traffic at Port-Bou remained stable between 2010 and 2016, the LFP contributed to a global rail traffic growth of +43% over this period on this side of the French-Spain border.

- **FR/IT border**

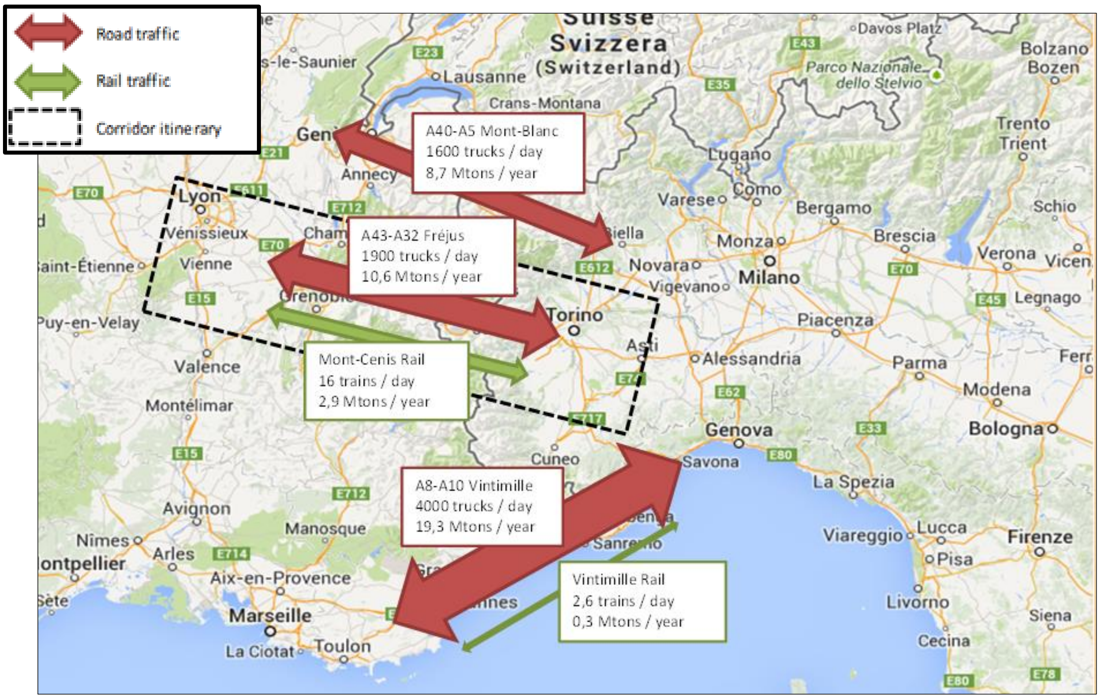


Figure 22 - Cross-border traffic at FR – IT border

In 2016, almost 39 million tons of road freight crossed the French-Italian border. The main road crossing is the motorway on the coast with about 3.700 trucks/day of international freight on this very congested axis, in particular around Nice. Half of the road traffic at the border is passing there (19 Mtons). In particular, 95% of the road traffic between the Iberian Peninsula and Italy.

Rail freight traffic on the coastline is on the contrary very weak, with only 0,3 million tons in 2016. This line is indeed not very efficient for freight traffic, being very busy with regional trains and having many single-track sections on the Italian side.

At the border points of northern Alps (Mont/Blanc Frejus tunnel for road and Mont-Cenis for rail), total traffic in 2016 was about 22 million tons/year, from which 19 million on the road tunnel. Road freight traffic at Frejus and Mont-Blanc tunnels represents 85% of French-Italian exchanges, the rest being mainly traffic between Benelux and Italy or UK and Italy.

Rail traffic at the Mont-Cenis was about 3 million tons in 2016, 100% French-Italian ODs. About 0,5 million tons of this traffic is done with the Aiton-Orbassano rolling motorway (4 to 5 trains per day and per direction). The rail share between France and Italy decreased from 10,7% in 2010 to 7,7% in 2016.

It is also important to note that a significant part of the French-Italian rail freight traffic is passing through Switzerland (estimated 2 million tons of rail traffic), as well as the major parts of rail flows between Benelux or UK and Italy.

Since 2010, the rail traffic at Modane (Mont-Cenis tunnel) kept decreasing slowly, despite the development of the rolling motorway. This demonstrates the lack of competitiveness of this line for the moment, with severe ramps, limited train length and weight and need for multiple locomotives. Over the same period, road traffic has increased at Ventimiglia (+9%) while remaining stable in the alpine tunnels.

- **IT/SI – SI/HR border**

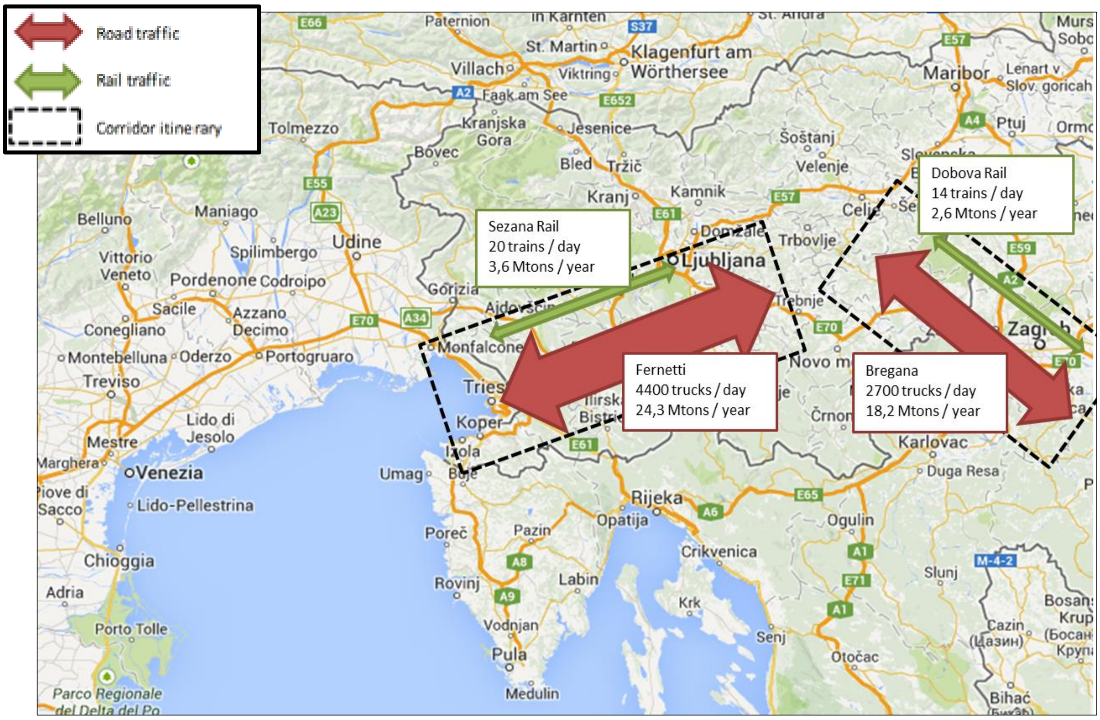


Figure 23 - Cross-border traffic at IT – SI and SI - HR borders

In 2016, freight road traffic between Villa Opicina (near Trieste) and the Slovenian border was 24 million tons. The Croatian-Slovenian border of Bregana has a road traffic of 18 million tons, with probably a lot of transit traffic (e.g., traffic between central / north-western Europe and Romania, Bulgaria, Balkans area, Greece or Turkey). Globally these traffics have grown rapidly between 2010 and 2016 (+15% and +14% respectively according to Eurostat data).

Rail traffic which has been growing since 2010 with similar trends as road traffic, at the Italian-Slovenian border (Villa Opicina – Sežana) is 3,6 million tons per year, from which 80% pass through Slovenia, divided in 60% towards Hungary and 20% to Croatia. The rail share between Italy and Slovenia decreased from 15,2% in 2010 to 14,5% in 2016.

Whereas in the Slovenian-Croatian border the rail traffic, which also have been growing since 2010 with similar trends as road, account up to 2,6 million tons per year from which 35% pass through Croatia to reach Hungary. The rail share between Slovenia and Croatia decreased from 24,1% in 2010 to 21,7% in 2016.

- **SI/HU – HR/HU border**

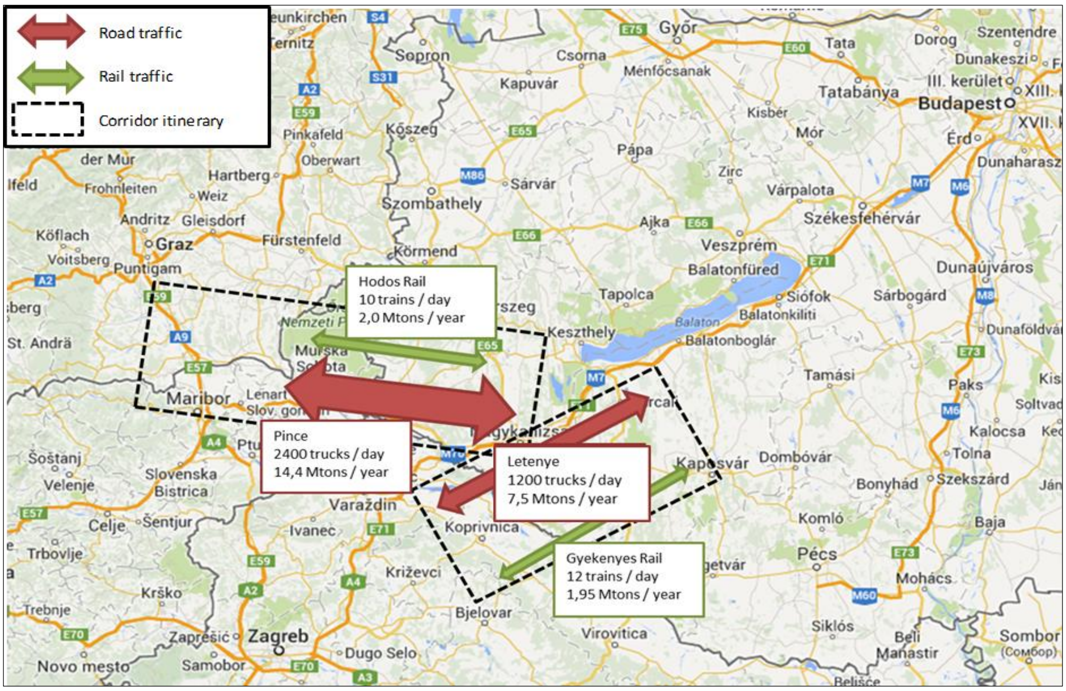


Figure 24 - Cross-border traffic at HU – SI and HU - HR borders

In 2016, about 19 million tons of road freight was observed near the Hungarian-Slovenian border at Pince. 7,5 million tons of road freight were also observed near Letenye at the Hungarian-Croatian border. At Pince, traffic has grown by 30% since 2010, according to Eurostat data, growth is slower at Letenye (+10% since 2010).

The Rail traffic was about 3 million tons at the Slovenian-Hungarian border at Hodoš and also almost 2,7 million tons at the Hungarian-Croatian border at Koprivnica / Gyékényes. It can be noted that almost 25% of the rail freight traffic at Gyékényes has origin in Italy and 65% in Slovenia at the port of Koper whereas the 60% of the destinations are Budapest. The rail share between Slovenia and Hungary decreased from 17% in 2010 to 14% in 2016 as well as between Croatia and Hungary from 28,5% to 26% during the same period. The decrease of the rail share might be explained by the evolution of the industrial context of these Countries, passing from a dominant heavy industry (with massive outputs for rail transport) to an economy with more light industry and services.

3.3.2.3 Traffic flows on the Corridor network

After describing the volume of international traffic in relation with the Corridor, in terms of Origin-Destinations and cross-border, an analysis of the total traffic flows on the existing Corridor infrastructure is presented in the following section.

General overview by mode

The following figures describe volumes of freight transport (in number of HGV) and passengers transport (number of cars) circulating in the existing sections of most relevant infrastructures of the Corridor. These data have been gathered for the TENTec information system provided by the European Commission and refers to 2016.

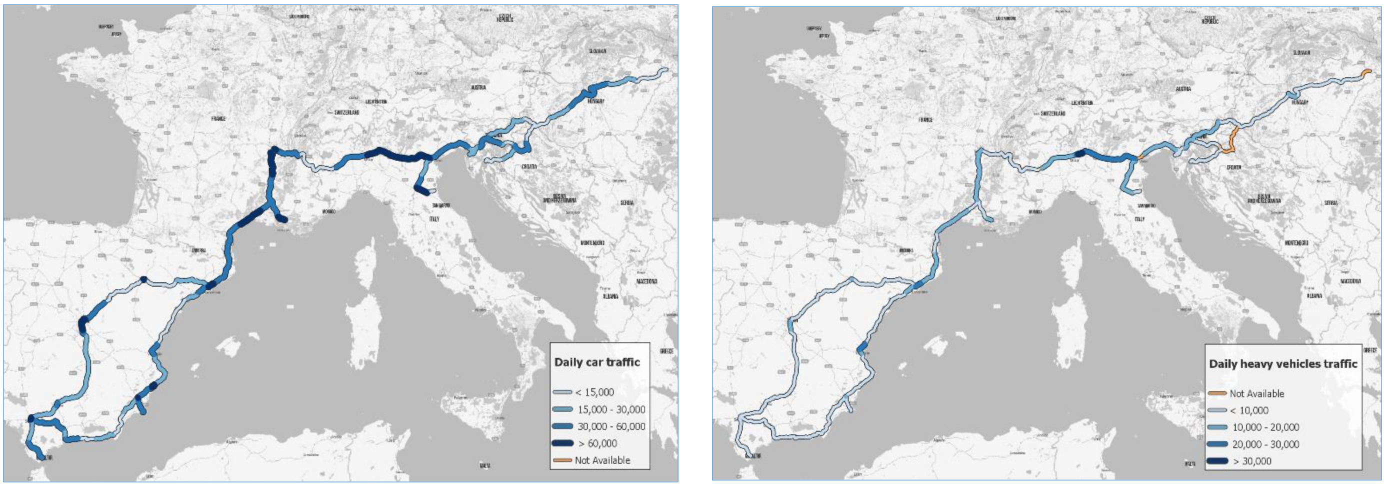


Figure 25 - Annual road traffic on the Corridor in daily number of vehicles

Apart from important local traffic around major nodes, Figure 25 shows that long sections of Corridor road infrastructure have continuous heavy freight traffic, from Barcelona to Lyon and from Torino to Maribor.

This main road axis links major population and industrial centres and supports both long-distance national and international traffic. The relatively low traffic link between France and Italy on the map (Frejus tunnel) is due to the fact that two other major roads connecting France and Italy are located outside the Corridor: the coast motorway at Ventimiglia and the Mont-Blanc tunnel. These itineraries must be considered in the analysis (as we do in our cross-border focus above) and show that freight road transport between France and Italy has overall important volumes.

Globally, the busiest road sections are located in the Rhône valley, in Cataluña as well as in the North of Italy.

For rail transport circulation, maps are the following.

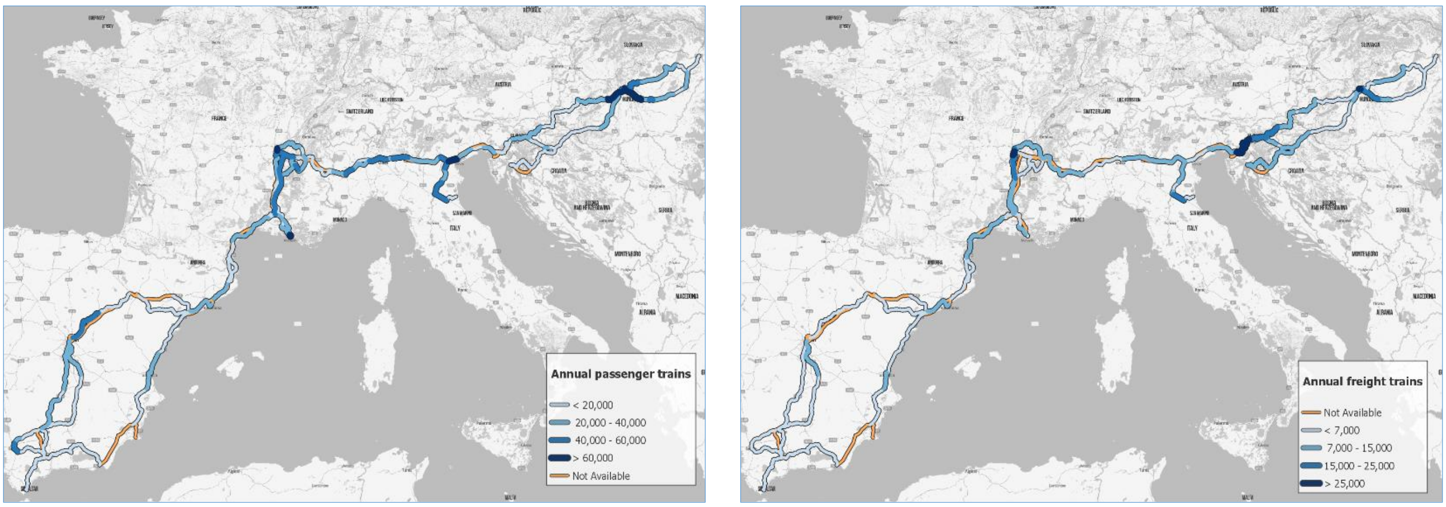


Figure 26 - Annual rail traffic on the Corridor in daily number of trains

3.3.2.4 Flows with seaports of the Corridor

In addition, a focus is also reported on maritime traffic. The ports situated along the Med RFC are an important source of major international flows on the Corridor, using the infrastructure linking seaports to their hinterland. Ports represent the main gateway for the regions of the Corridor to exchange goods with both non-European Countries, and European Countries.

The study of maritime freight transport in relation with the Corridor is focused on 14 major Sea ports of the Mediterranean coast, including ports of Savona, Genova and La Spezia which are not formally part of the Med RFC but are also relevant for the analysis.

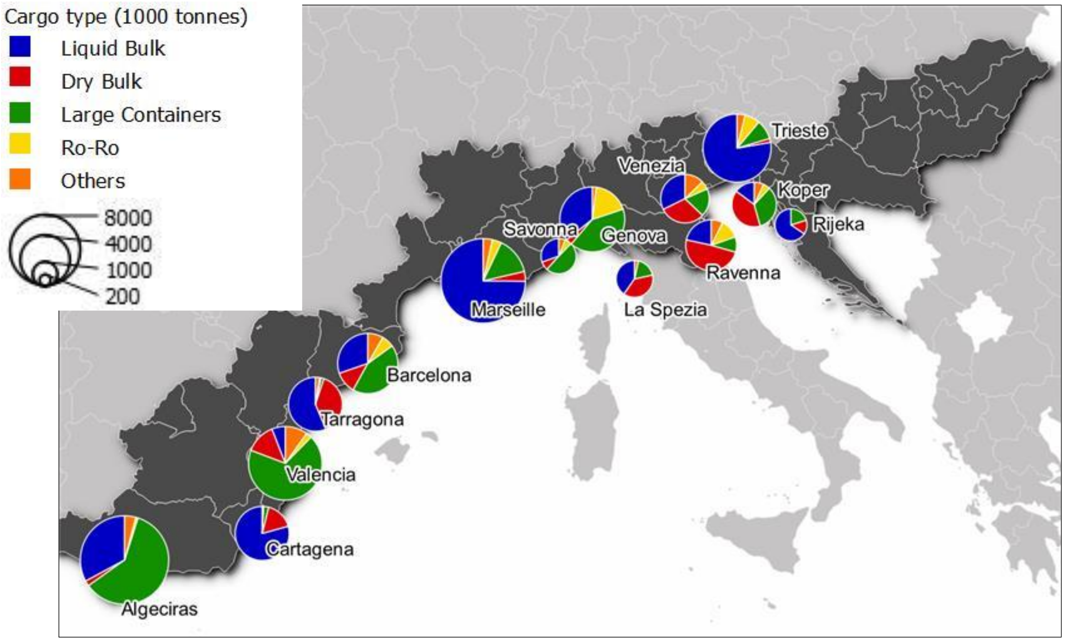


Figure 27 - Total traffic of the ports along the RFC, by type of goods (Sources: Eurostat, Port of Rijeka Authority)

The total volume of commodities passing through these ports represented 500 million tons in 2016, according to Eurostat data[4], from which around 25% was intra-EU traffic and 75%was intercontinental traffic.

The table below gives the detail of total flows by type of freight for each of these ports in 2016.

Table 15 - Total traffic of the ports along the RFC, by type of goods (Sources: Eurostat, port of Rijeka)
**Ports not belonging to the Med RFC*

Port	Containers	Liquid bulk	Dry bulk	Ro-Ro, others	Total
Algeciras	50.370	27.464	1.620	4.110	83.424
Cartagena	971	25.027	5.323	233	31.546
Valencia	43.874	3.806	2.477	7.937	58.104
Tarragona	651	20.274	9.070	1.178	31.158
Barcelona	16.385	11.519	4.435	5.721	39.103
Marseille	9.480	49.400	12.958	4.641	76.427
Venezia	4.442	7.697	8.554	4.371	25.217
Trieste	4.535	37.912	905	5.423	49.312
Koper	7.720	3.414	7.295	2.739	21.172
Rijeka	2.249	7.325	1.595	0	11.159
Savona*	388	7.909	2.075	3.191	13.511

[4] For purposes of homogeneity, we use Eurostat data to present the ports' traffic (except for Rijeka, for which Eurostat data is incomplete). Port authorities' own traffic data are sometimes higher than Eurostat data, because they can include the weight of containers and some local or fishing traffic.

Genova*	18.845	16.262	1.417	9.052	45.048
La Spezia*	12.818	862	816	72	14.568
Total	**172.728**	**218.871**	**58.540**	**48.668**	**499.749**

This traffic is growing significantly since 2010: in average, the global flows of these ports have increased by +18% (+2,7% per annum). This growth is even greater for container traffic, +34% over the period, which means an average annual growth rate of 5% p.a.

The various ports along the Corridor have different traffic structure. Some ports have a major container traffic and a high rate of transhipment of goods (Algeciras and Valencia for example), being used as transfer platform between intercontinental ships and short sea feeding ships but given their size they also have significant volumes of goods transferred to their hinterland. Barcelona and Genova are also important container ports, but with less transhipment.

Other ports are pre-eminently liquid bulk ports (Cartagena, Tarragona, Marseille, Trieste, Rijeka) and other have diversified kind of traffics.

Globally, out of the 500 million tons traffic of these ports, around 230 million tons (once excluded transhipment and pipe transport) are transiting by road or rail between the port and their final origin or destination in Europe. The rail share over this volume is around 15%, meaning that around 35 million tons are transferred from and to these ports by rail, mainly using the RFC's infrastructure.

3.3.2.5 Recent trends until 2019

Having presented an overview of the transport flows in the RFC's market area for 2016 and trends between 2010 and 2016, it is important to understand, where data are available, what are the more recent trends in traffic evolution, until 2019.

In this analysis, several specificities of the year 2019 have to been taken into account:

- long interruptions of rail traffic at Modane (July) and between Beziers and Perpignan (October – December) due to infrastructure damage caused by extreme weather events
- a long strike on the rail network in France (November – December)

Keeping these specificities in mind, the following recent trends can be observed:

- on the ES-FR border, freight traffic through the LFP network line has grown significantly despite the traffic interruption on the French side. In particular, a new rolling motorway service between Barcelona and Luxembourg has been launched increasing by 17% the traffic on LFP network. On the contrary, the rail traffic at Port-Bou has suffered a lot for the traffic interruption (-34%)
- on the FR-IT border, 2019 data shows a slight decrease of the rail traffic at Modane (-2%) with respect to 2016. At Ventimiglia, traffic has more than doubled, going from 0,3 to 0,7 million tons. It is important to note that 2019 traffic at Modane is higher than 2018, so there seems to be a new dynamic that could have been more important without strikes and traffic interruption
- road traffic is growing at all FR-IT border points: +9% at Fréjus and Mont-Blanc tunnels, +8% at Ventimiglia in 2019 with respect to 2016
- On the eastern part of the corridor, according to Eurostat data, rail traffic is growing sharply (between 25% and 60%) and the road traffic around +10% between Italy and Slovenia, +5% between Hungary and Slovenia, and stable elsewhere

Port traffic is still growing with the same trends as in 2010-2016. In 2019, traffic of all considered ports has reached 550 million tons (+10% since 2016) and container traffic has increased by 18% since the same year.

3.4 Projections

The results of the analysis of the current transport market along the Corridor, in terms of defining the Origin-Destination pairs of the international traffic in 2016, was preliminary to the forecasting exercise, which is manly composed by two steps:

- create a growth matrix for global demand by Country per Country relation and type of goods
- define a modal shift matrix in order to estimate the new potential market share for rail considering the complete achievement of the Corridor's objectives

Considering the above steps, the future scenarios configuration is based on two drivers: the macroeconomic evolution of the Countries included in the Corridor's market area and the transport cost evolution in terms of infrastructure improvements as well as policies development.

The following sections go through the descriptions of each driver, presenting three different alternatives of possible evolution, later combined in five scenarios to be simulated.

Considering the period of great uncertainty as never seen before, the study aims at considering the most recent sources in terms of macro-economic trends as well transport cost evolution and combines them in different scenario's configurations to provide as accurate forecast as possible.

3.4.1 Macroeconomic evolution

The macroeconomic evolution determines the global demand at future time horizons; therefore, growth coefficients have been obtained by using econometric formulations linking freight demand and Gross Domestic Product (GDP) growth.

The GDP forecast has been performed for each Country included in the market area of the Corridor, considering the exogenous factor of the effects of COVID-19 pandemic to the years after the financial crisis. As detailed below, for the GDP forecast, three time periods have been considered to project the growth rate: short, medium and long term.

Aggregated results for the Corridor market area – weighted on the traffic exchanged by those Countries – are shown in Table 16 while results for each single Country are reported in annex I.

*Table 16 - GDP variation at Corridor market area**

	2020	2021	2022	2023	2024	2025-2030
Worst-case	-10,7%	6,0%	0,5%	0,7%	1,1%	1,1%
Trend	-9,7%	6,5%	0,97%	1,25%	1,55%	1,3%
Best-case	-8,7%	7,0%	1,5%	1,7%	2,1%	1,4%

** Weighted data for Corridor Market area, specific projections were considered for each Country based on the same sources and methodology*

Short term

The years 2020 and 2021 have been considered as short term. The period is directly affected by the COVID-19 pandemic and characterized by a strong decrease – in terms of GDP – in 2020, followed by a recovery in 2021 that, although it is affected by an upset effect, does not lead to reach the GDP values of 2019.

In this term, the *EC Summer forecast 2020* has been consulted for the GDP forecast of EU-28 Countries, while for non-EU Countries – included in the Corridor market area – the *International Monetary Fund (IMF)* was considered for the GDP coefficient growth.

Finally, in order to take into consideration, the uncertainty of the period, a sensitivity analysis has been performed to define - beyond the baseline (trend case) - a worst- and best-case alternatives (±1% for 2020 and ±0,50% for 2021).

Medium term

The years 2022, 2023 and 2024 have been considered as medium-term period. In this case, the GDP projections were computed assuming for each Country included in the Corridor's market area a similar recovery to the post-financial crisis which affected Europe in 2008, carrying most of the economies into a recession until 2012, defined as overturn year for EU-28 economies.

The Compound Annual Growth Rate (CAGR) – based on Eurostat database – have been calculated for each Country of the Corridor's market area in the period 2012-2015 for the first medium term year, 2012-206 for the second medium term year, and 2012-2017 for the last medium-term year.

Finally, as for the short-term period, to define the worst- and best-case alternatives a sensitivity analysis has been performed considering a ±0,5% variation.

Long term

The period 2025-2030 is considered as long term. In this period the GDP projections have been assumed to growth with the coefficients estimated before the COVID-19 pandemic.

The period forecasts have been based on the *2018 Ageing Report - "Underlying Assumptions & Projection Methodologies"* and – as performed for the short and the medium-term periods – a sensitivity analysis has been implemented to define the worst- and best-case alternatives considering a ±0,5% variation.

The presented projection's methodology has been applied to the EU-28 GDP in order to visualize the forecasts computed assumptions and the related GDP growth in the three different investigated alternatives.

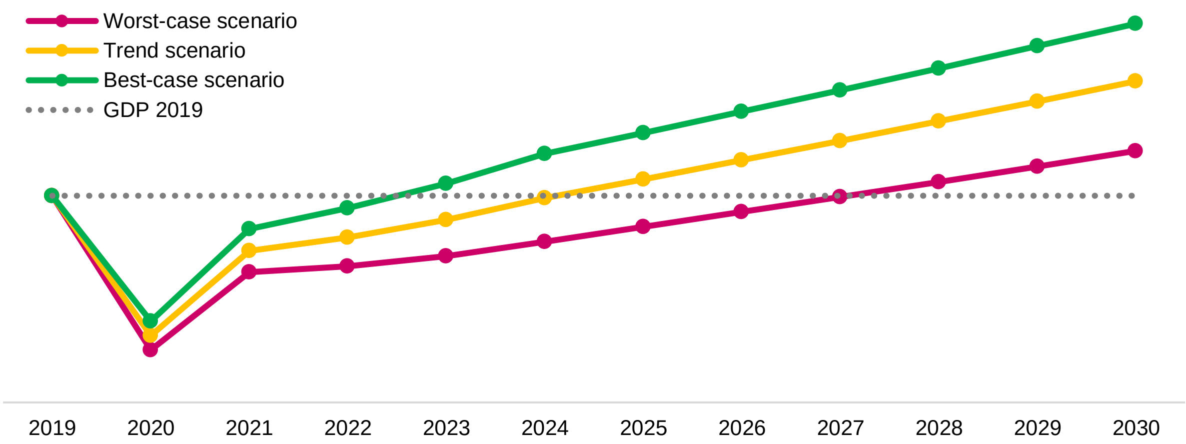


Figure 28 – EU-28 aggregated GDP forecast (2019 baseline year)

3.4.2 Transport cost evolution

The transport cost evolution has been considered as main driver for the modal shift estimations.

Based on the evolutions of costs, travel time and reliability by mode – connected to infrastructure improvements and transport policies – a logit modal split model derives the estimated modal shift.

Expected evolutions of rail transport costs until 2030

For the rail transport mode, the assumptions related to the evolution of transport costs are based on Corridor studies, stakeholders' consultation – specially focused on the infrastructure managers – and specific list of projects as, for examples, the official Mediterranean Core Network Corridor project list and the RFC implementation plan.

In this context, analysing the above-mentioned sources, the main parameters have been identified as fundamental to facilitate rail flows and, consequently, to variate the transport costs:

- improved interoperability and efficiency, in particular in terms of ERTMS deployment
- generalized increase of the 740m train length, detailed at Country level
- Lyon-Turin construction, in terms of shorter length and softer slope (-1 €/tonne)
- UIC gauge implementation in Spain, in particular for the connection of generators and platforms (-3 to -4 €/ tonne)
- Koper – Divača construction, in terms of doubling of capacity and shorter distance (-40%)
- specific time savings for main projects on the Corridor (especially line speed improvement in Slovenian sections as in the case Trieste – Divaca, Koper – Divaca and Ljubjana – Zidani most)

These assumptions result in a significant cost decreases of the rail transport. For example, cost of the rail transport decreases by 25% for a Marseille – Milano trip, and by almost 35-40% for a trip between Barcelona and Torino[5], including cost related to the suppression of the track gauge change at the Spanish border.

Such an improvement of the rail competitiveness is what can be expected if the Corridor will be fully implemented by 2030, and if the appropriate services will be created on the upgraded and standardized infrastructure (in particular, efficient combined transport and rolling motorways).

The full implementation of the Corridor means that:

- the Corridor's infrastructure has to be in compliance with TEN-T standards
- the main capacity bottlenecks have to be solved
- the appropriate services should be able to run on the Corridor in an efficient way

Expected evolutions of road transport costs until 2030

In the case of road transport, the evolution on road costs is mainly based on the following parameters:

- increase of fuel costs, in terms of fuel pricing according to EU reference scenario 2016, considering a delay of 5 years due to recent evolution and the COVID-19 crisis
- increase of tolls or implementation of kilometric taxes for trucks (like in Switzerland or Germany)

Expected evolutions of short sea transport costs and competitiveness until 2030

According to the last version of the "Motorways of the Sea detailed implementation plan", two kinds of investments are expected for short-sea and ro-ro services on Mediterranean ports:

- investments to move to cleaner fuels (LNG, Hydrogen, etc.) and new ships
- investments on port infrastructure in order to use bigger ships, improve the frequency of services and improve the access to the ports

[5] For combined transport, these cost reductions apply to the « rail » part of the global cost, road approach costs evolving similarly to road cost

The first kind of investments would probably raise the price of the short-sea services, but a significative part of these investments will be covered by EU and national funds and will also improve the environmental image of this mode in the future. The second kind should increase the number of services and competitiveness of the mode.

Putting aside the improvements on rail costs in a first step, this should globally lead to stable prices of short sea services and a small improvement of the short sea market share over road, due to the service improvement for MoS and also depending on the evolution of road cost in the scenarios considered.

Then, based on this improved market share for short sea, applying the rail cost reduction will generate some modal shift from short sea to rail, but this is a rather limited effect, considering that short sea is competing primarily with road and on O-D relations where rail is not prevailing.

Considering the above-mentioned assumptions related to the evolution of travel costs distinguishing by transport mode, three possible transport evolution's alternatives have been considered as shown in Table 17.

Table 17 - Transport Cost Evolution until 2030

	ERTMS improvements	Train length to 740m	Lyon – Turin, Koper – Divaca and other main projects	Spanish gauge (%of completion)	Road costs	Short sea costs
Worst-case	-5%	-5% to -20% (status 2025)		30%	~ stable	~ stable
Trend	-7%	-5% to -20% (status 2030)	Projects will be implemented	60%	+13%	~ stable
Best-case	-9%	-15% to -20% (full implementation)		100%	+17%	~ stable

The best-case scenario considers full implementation of TEN-T standards, including UIC Gauge or dual gauge on all the RFC Mediterranean lines in Spain and full 740m train length everywhere.

The trend and worst-case scenarios consider more cautious assumptions on these two items, but also on interoperability improvements and on road cost evolution. Specific assumptions on UIC gauge in Spain have been validated with ADIF while for train length, assumptions are based on the RFC report of 2018[6], which give precise data on the actual status and expected status in 2025 and 2030 by Corridor section. Based on available information, specific assumptions by Country x Country have been implemented, considering a maximum 20% cost reduction when passing from 500m to 750m max length, according to rail operating costs structure. When the expected increase of train length is lower, the level of cost reduction is diminished accordingly.

Tables in Annex II detail the assumptions on cost and travel time reductions for each scenario, by Country x Country relation.

3.4.3 Forecast scenarios

Combining the three alternatives of assumptions for each driver detailed above, and not considering the extreme combination, five different scenarios have been simulated:

- **Scenarios 1, 2,3,** considering the trend macro-economic case combined with all transport costs evolution assumptions (worst, trend and best cases)
- **Scenario 4,** considering the trend transport costs evolution case combined with worst-case macro-economic evolution assumption

[6] Report on Identified train length priority intervention according to Transport Market Study and Corridor Customer needs (Final report of the analysis on train length) available at: https://cip.rne.eu/apex/download_my_file?in_document_id=8798

- **Scenario 5,** considering the trend transport costs evolution case combined with best-case macro-economic evolution assumption

Table 18 - Scenarios configuration

Transport costs evolution	Macro-economic evolution		
	Worst-case	**Trend**	**Best-case**
Worst-case	-	2	-
Trend	4	1	5
Best-case	-	3	-

3.5 Results

The Forecasting exercise has been based on the 5 different scenarios mentioned in the previous chapter and the estimation of traffic at 2030 has been performed using the global demand growth model (with GDP evolution) and the modal shift model.

All estimations are computed applying evolutions calculated with the transport models to the 2016 observed modal matrices.

3.5.1 Results for Scenario 1

The scenario is composed considering the trend macro-economic case combined with the trend transport cost evolution case.

The results for scenario 1 in 2030 at global level are presented below, following a recall of the 2016 volumes for easy comparison.

Table 19 - Global volumes for 2016 and 2030 – scenario 1, market area

MTons 2016	Intern	Exchange	Transit	Total
Rail	6,4	12,0	2,7	**21,1**
Road	36,3	83,0	24,7	**144,0**
Short Sea	7,7	12,3	-	**20,0**
Total	**50,3**	**107,2**	**27,4**	**185,1**
% rail share	12,7%	11,2%	9,9%	**11,4%**

MTons 2030 – Sc 1	Intern	Exchange	Transit	Total
Rail	14,1	33,8	7,4	**55,2**
Road	40,1	84,1	28,6	**152,9**
Short Sea	9,4	15,3	0,0	**24,7**
Total	**63,5**	**133,3**	**36,0**	**232,8**
% rail share	22,1%	25,4%	20,4%	**23,7%**
% evolution since 2016 - total	26,2%	24,1%	31,3%	25,7%
% evolution since 2016 - rail	119,7%	181,7%	171,0%	161,5%

In this scenario, global demand for all modes in the Corridor's market area evolves from 185 million tons in 2016 to 233 million tons in 2030, corresponding to a growth of +25,7% or +1,7% per year in average.

Over the same period, rail traffic volumes would be multiplied by a 2,6 factor, growing from 21 to 55 million tons, with a rail share at 23,7% vs. 11,4% in 2016. Road share drops from 78% to 66%, while the market share for short sea remains stable. In fact, short sea gains some traffic over road and loses some over rail, and the two effects are more or less balanced.

The strong evolution of rail share in this scenario is linked to the assumptions made on the evolution of road costs (+13%) and implementation of rail improvements (UIC gauge in Spain on 60% of the corridor, ERTMS, Lyon-Turin and other projects, etc.). It is noteworthy that growth of rail traffic is higher for exchange and transit traffic than for intern traffic. This is linked to the kind of goods and distances on these kinds of O-Ds, that are more easily switched to rail.

The table below details rail traffic volumes and rail share by Country x Country relation.

Table 20 - Rail traffic volumes and rail share by Country x Country relation – scenario 1

Rail traffic – Ktons in 2030 – Sc 1										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		27.071	9.697	251	90	318	352	1.857	13.187	52.823
France			30.556	643	272	740	1.084	177	415	33.887
Italy				6.708	3.771	10.109	3.782	2.066	5.644	32.080
Slovenia					4.333	6.957	439	3.019	0	14.748
Croatia						6.408	711	1.862	4.117	13.098
Hungary							467	0	68	535
South-Eastern Europe									2.760	2.760
Total		27.071	40.253	7.602	8.466	24.532	6.835	8.981	26.191	149.931

% rail share in 2030 – Sc 1										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		21%	16%	13%	10%	16%	9%	13%	35%	22%
France			24%	20%	18%	10%	7%	11%	31%	23%
Italy				13%	28%	23%	15%	15%	53%	26%
Slovenia					15%	33%	31%			26%
Croatia						28%	0%	29%	44%	33%
Hungary									42%	13%
South-Eastern Europe									29%	29%
Total		21%	21%	13%	21%	26%	13%	16%	40%	24%

Rail share increase (% points) between 2016 and 2030 Sc 1										
Zone	**Spain**	**France**	**Italy**	**Slovenia**	**Croatia**	**Hungary**	**South-Eastern Europe**	**North-Eastern Europe**	**Western Europe**	**Total**
Spain		20%	15%	13%	10%	14%	9%	12%	21%	18%
France			14%	16%	16%	8%	2%	10%	12%	13%
Italy				10%	10%	7%	5%	10%	11%	7%
Slovenia					8%	10%	9%			9%
Croatia						6%	0%	9%	23%	13%
Hungary									16%	8%
South-Eastern Europe									6%	6%
Total		20%	15%	11%	9%	7%	5%	8%	16%	13%

It can be noted form the above table that rail share for relations with Spain, which is very low today, could reach levels between 10% and 20% depending on the partner Country, and even 35% for long-distance relations with north-western Europe (Benelux, Germany etc). This is principally the effect of 740m train length and UIC Gauge implementation in Spain. All other relations are also increasing their rail share, from 5 to 20 points according to the relation considered. In particular, traffic between France and Italy, Slovenia, Croatia benefit from Lyon-Turin and gain around 15% market share (without considering specific rolling motorway services, which could increase this share even more).

3.5.2 Results for Scenario 2

The scenario is composed considering the trend macro-economic case combined with the worst transport cost evolution case, being based on the same GDP assumptions as scenario 1 but on more conservative assumptions regarding modal shift.

The results for scenario 2 in 2030 at global level are presented below.

Table 21 - Global volumes for 2030 – scenario 2, market area

MTons 2030 – Sc 2	Intern	Exchange	Transit	Total
Rail	10,1	23,5	5,3	**38,8**
Road	44,6	95,4	31,0	**171,0**
Short Sea	8,7	14,3	0,0	**23,0**
Total	**63,4**	**133,1**	**36,3**	**232,8**
% rail share	15,9%	17,6%	14,5%	**16,7%**
% evolution since 2016 - total	25,9%	24,0%	32,3%	**25,7%**
% evolution since 2016 - rail	57,4%	95,9%	93,6%	**83,9%**

In this scenario, global demand for all modes in the Corridor's market area evolves as in scenario 1, due to the same GDP assumptions: from 185 million tons in 2016 to 233 million tons in 2030, corresponding to a growth of +25,7% or +1,7% per year in average.

Over the same period, rail traffic volumes would be multiplied by a 1,8 factor, growing from 21 to 39 million tons, with a rail share at 16,7% vs. 11,4% in 2016. Road share drops from 78% to 72%, while the market share for short sea remains stable.

The evolution of rail share in this scenario is still positive but weaker than in scenario 1, due to the stable road costs and the conservative assumptions on the implementation of rail improvements.

The table below details rail traffic volumes and rail share by Country x Country relation.

Table 22 - Rail traffic volumes and rail share by Country x Country relation – scenario 2

Rail traffic – Ktons in 2030 – Sc 2										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		3.513	2.339	36	10	55	27	211	3.811	10.002
France			7.588	114	19	87	93	9	139	8.049
Italy				916	1.260	3.826	684	232	4.984	11.902
Slovenia					552	3.121	187	0		3.860
Croatia						2.520	0	609	1.750	4.879
Hungary									83	83
South-Eastern Europe									1.459	1.459
Total		3.513	9.927	1.066	1.841	9.609	991	1.061	12.226	40.234

% rail share in 2030 – Sc 2										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		10%	10%	8%	5%	8%	4%	7%	24%	13%
France			18%	9%	6%	5%	4%	3%	21%	16%
Italy				7%	22%	18%	11%	8%	45%	20%
Slovenia					10%	26%	25%	0%		20%
Croatia						24%		22%	29%	25%
Hungary									31%	9%
South-Eastern Europe									24%	24%
Total		10%	15%	8%	15%	21%	9%	10%	31%	17%

Rail share increase (% points) between 2016 and 2030 Sc 2

Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		9%	9%	8%	5%	6%	3%	5%	10%	9%
France			8%	6%	4%	3%	-1%	3%	2%	7%
Italy				4%	4%	3%	2%	3%	3%	2%
Slovenia					3%	4%	3%	0%	0%	3%
Croatia						2%		2%	7%	5%
Hungary									5%	5%
South-Eastern Europe									1%	1%
Total		9%	8%	5%	3%	2%	2%	2%	6%	6%

It can be noted form the table above that rail share for relations with Spain have limited gains with respect to scenario 1 due to a more limited proportion of UIC gauge implementation in Spain (30% vs. 60% in scenario 1). All other relations have definitively more limited rail share gains, underlining the weight of the evolution of road cost (+13% in scenario 1, stable here).

3.5.3 Results for Scenario 3

The scenario is composed considering the trend macro-economic case combined with the best transport cost evolution case, being based on the same GDP assumptions as scenario 1 but on more optimistic assumptions regarding modal shift, considering in particular full implementation of UIC gauge in Spain and train length to 740 on the whole Corridor.

The results for scenario 3 in 2030 at global level are presented below.

Table 23 - Global volumes for 2030 – scenario 3, market area

MTons 2030 – Sc 3	Intern	Exchange	Transit	Total
Rail	16,5	39,3	8,3	**64,1**
Road	37,4	78,2	27,5	**143,1**
Short Sea	9,7	15,9	0,0	**25,6**
Total	**63,6**	**133,3**	**35,9**	**232,8**
% rail share	26,0%	29,5%	23,2%	**27,6%**
% evolution since 2016 - total	26,4%	24,2%	30,7%	**25,7%**
% evolution since 2016 - rail	158,1%	227,7%	206,2%	**203,8%**

Again, in this scenario, global demand for all modes in the Corridor's market area evolves as in scenario 1, due to the same GDP assumptions: from 185 million tons in 2016 to 233 million tons in 2030, corresponding to a growth of +25,7% or +1,7% per year in average.

Over the same period, rail traffic volumes would be multiplied by a 3,0 factor, growing from 21 to 64 million tons, with a rail share at 27,6% vs. 11,4% in 2016. Road share drops from 78% to 62%, while the market share for short sea remains stable.

The evolution of rail share in this scenario is 4 points higher than in scenario 1, due to the increase of road costs (+17% vs. +13% in scenario 1) and the optimistic assumptions on the implementation of rail improvements (UIC gauge in Spain at 100% vs. 60% in scenario 1, 740m train length everywhere).

The table below details rail traffic volumes and rail share by Country x Country relation.

Table 24 - Rail traffic volumes and rail share by Country x Country relation – scenario 3

Rail traffic – Ktons in 2030 – Sc 3										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		9.174	4.498	87	37	195	116	747	6.292	21.146
France			11.211	307	84	269	238	50	226	12.385
Italy				1.899	1.765	5.647	1.059	552	6.187	17.109
Slovenia					1.018	4.600	273	0		5.891
Croatia						3.278	0	775	3.142	7.195
Hungary									126	126
South-Eastern Europe									1.857	1.857
Total		9.174	15.709	2.293	2.904	13.989	1.686	2.124	17.830	65.709

% rail share in 2030 – Sc 3

Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		26%	19%	19%	21%	28%	16%	24%	40%	27%
France			26%	25%	26%	15%	10%	17%	34%	25%
Italy				15%	31%	27%	17%	19%	56%	29%
Slovenia					18%	39%	37%	0%		30%
Croatia						31%		33%	51%	38%
Hungary									47%	14%
South-Eastern Europe									31%	31%
Total		26%	24%	16%	24%	31%	16%	22%	45%	28%

Rail share increase (% points) between 2016 and 2030 Sc 3										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		25%	19%	19%	21%	26%	15%	22%	26%	23%
France			16%	21%	24%	13%	5%	17%	15%	15%
Italy				12%	13%	11%	8%	13%	14%	11%
Slovenia					11%	16%	15%	0%	0%	14%
Croatia						9%		13%	30%	17%
Hungary									21%	10%
South-Eastern Europe									8%	8%
Total		25%	17%	13%	12%	12%	8%	13%	20%	17%

It can be noted form the above table that rail share for relations with Spain, which is very low today, could reach levels between 16% and 28% depending on the partner Country, and even 40% for long-distance relations with north-western Europe (Benelux, Germany etc). All other relations are also increasing their rail share, from 5 to 25 points according to the relation considered. In particular, traffic between France and Italy, Slovenia, Croatia benefit from Lyon-Turin and gain 16 to 24 %points of market share (without considering specific rolling motorway services, which could increase this share even more).

Globally, results of rail share increase in scenario 3 are higher than in scenario 1 because of full implementation of 740m train length, UIC Gauge in Spain, and a higher evolution of road costs (+17% vs. +13% in scenario 1).

3.5.4 Results for Scenario 4

The scenario is composed considering the worst macro-economic case combined with the trend transport cost evolution case, being based on more conservative GDP assumptions and on same assumptions regarding modal shift than scenario 1

The results for scenario 4 in 2030 at global level are presented below.

Table 25 - Global volumes for 2030 – scenario 4, market area

MTons 2030 – Sc 4	Intern	Exchange	Transit	Total
Rail	13,1	31,6	6,8	**51,5**
Road	37,3	78,0	25,8	**141,1**
Short Sea	8,7	14,2	0,0	**22,9**
Total	59,2	123,7	32,6	**215,5**
% rail share	22,2%	25,5%	20,8%	**23,9%**
% evolution since 2016 - total	17,5%	15,2%	19,0%	**16,4%**
% evolution since 2016 - rail	105,1%	163,1%	150,3%	**143,9%**

In this scenario, global demand for all modes in the Corridor's market area evolves slower than in scenario 1, 2 and 3 due to the conservative GDP assumptions: from 185 million tons in 2016 to 215 million tons in 2030, corresponding to a growth of +16,4% or +1,1% per year in average.

Over the same period, rail traffic volumes would be multiplied by a 2,4 factor, growing from 21 to 51 million tons, with a rail share at 23,9% vs. 11,4% in 2016. Road share drops from 78% to 66%, while the market share for short sea remains stable.

The evolution of rail share in this scenario is similar to scenario 1, due to the same assumptions regarding road costs and implementation of rail improvements.

The table below details rail traffic volumes and rail share by Country x Country relation.

Table 26 - Rail traffic volumes and rail share by Country x Country relation – scenario 4

Rail traffic – Ktons in 2030 – Sc 4										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		6.978	3.495	53	18	92	58	365	5.217	16.276
France			9.624	210	55	152	140	27	191	10.399
Italy				1.413	1.541	4.079	771	409	5.470	13.683
Slovenia					833	3.702	221	0		4.756
Croatia						2.786	0	689	2.601	6.076
Hungary									89	89
South-Eastern Europe									1.512	1.512
Total		6.978	13.119	1.676	2.447	10.811	1.190	1.490	15.080	52.791

% rail share in 2030 – Sc 4										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		21%	16%	13%	10%	16%	9%	13%	34%	22%
France			24%	20%	18%	10%	7%	11%	32%	23%
Italy				13%	28%	23%	15%	15%	53%	26%
Slovenia					15%	33%	31%	0%		26%
Croatia						28%		29%	44%	33%
Hungary									42%	11%
South-Eastern Europe									29%	29%
Total		21%	21%	13%	21%	26%	13%	16%	40%	24%

Rail share increase (% points) between 2016 and 2030 Sc 4

Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		20%	16%	13%	10%	14%	9%	11%	21%	18%
France			14%	16%	16%	8%	2%	10%	12%	13%
Italy				10%	10%	7%	5%	10%	11%	8%
Slovenia					9%	10%	9%	0%	0%	9%
Croatia						6%		9%	23%	13%
Hungary									16%	7%
South-Eastern Europe									6%	6%
Total		20%	15%	11%	9%	7%	5%	8%	16%	13%

Rail share results of this scenario are very similar to the ones of scenario 1 but apply on smaller volumes of global market due to the more conservative GDP assumption.

3.5.5 Results for Scenario 5

The scenario is composed considering the best macro-economic case combined with the trend transport cost evolution case, being based on more optimistic GDP assumptions and on same assumptions regarding modal shift than scenario 1

The results for scenario 5 in 2030 at global level are presented below.

Table 27 - Global volumes for 2030 – scenario 5, market area

MTons 2030 – Sc 5	Intern	Exchange	Transit	Total
Rail	14,8	35,7	7,8	**58,4**
Road	42,5	89,5	31,1	**163,0**
Short Sea	10,0	16,4	0,0	**26,3**
Total	**67,3**	**141,5**	**38,9**	**247,7**
% rail share	22,1%	25,2%	20,2%	**23,6%**
% evolution since 2016 - total	33,7%	31,8%	41,8%	**33,8%**
% evolution since 2016 - rail	132,0%	197,8%	188,9%	**176,7%**

In this scenario, global demand for all modes in the Corridor's market area evolves faster than in scenario 1, 2 and 3 due to the optimistic GDP assumptions: from 185 million tons in 2016 to 248 million tons in 2030, corresponding to a growth of +33,8% or +2,1% per year in average.

Over the same period, rail traffic volumes would be multiplied by a 2,8 factor, growing from 21 to 58 million tons, with a rail share at 23,6% vs. 11,4% in 2016. Road share drops from 78% to 66%, while the market share for short sea remains stable.

The evolution of rail share in this scenario is similar to scenario 1, due to the same assumptions regarding road costs and implementation of rail improvements.

The table below details rail traffic volumes and rail share by Country x Country relation.

Table 28 - Rail traffic volumes and rail share by Country x Country relation – scenario 5

Rail traffic – Ktons in 2030 – Sc 5										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		7.456	4.044	65	19	125	76	460	5.682	17.927
France			10.975	275	59	210	193	34	218	11.964
Italy				1.737	1.662	5.399	972	484	6.124	16.378
Slovenia					900	4.050	239	0		5.189
Croatia						3.030	0	750	2.810	6.590
Hungary									134	134
South-Eastern Europe									1.924	1.924
Total		7.456	15.019	2.077	2.640	12.814	1.480	1.728	16.892	60.106

% rail share in 2030 – Sc 5										
Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		21%	16%	13%	10%	16%	9%	13%	34%	22%
France			24%	20%	18%	10%	7%	11%	32%	22%
Italy				13%	28%	23%	15%	15%	53%	25%
Slovenia					15%	33%	31%	0%		26%
Croatia						28%		29%	44%	33%
Hungary									42%	14%
South-Eastern Europe									29%	29%
Total		21%	21%	13%	21%	26%	13%	16%	40%	24%

Rail share increase (% points) between 2016 and 2030 Sc 5

Zone	Spain	France	Italy	Slovenia	Croatia	Hungary	South-Eastern Europe	North-Eastern Europe	Western Europe	Total
Spain		20%	16%	13%	10%	14%	9%	11%	21%	18%
France			14%	16%	16%	8%	2%	10%	12%	13%
Italy				10%	10%	7%	5%	10%	11%	7%
Slovenia					9%	10%	9%	0%	0%	9%
Croatia						6%		9%	23%	13%
Hungary									16%	10%
South-Eastern Europe									6%	6%
Total		20%	15%	11%	9%	7%	5%	8%	16%	13%

Rail share results of this scenario are very similar to the ones of scenario 1 but apply on higher volumes of global market due to the more conservative GDP assumption.

3.5.6 Quick scenario comparison

Tables hereunder present a comparison of all scenarios with reference to scenario 1, which is the most "central" one.

Table 29 compares scenarios 2 and 3 which are different from scenario 1 for the modal shift assumptions.

Table 29 – Comparisons of scenarios – scenario 2 and 3 with scenario 1

MTons 2030 – Sc 1	Intern	Exchange	Transit	Total
Rail	14,1	33,8	7,4	**55,2**
Road	40,1	84,1	28,6	**152,9**
Short Sea	9,4	15,3	0,0	**24,7**
Total	**63,5**	**133,3**	**36,0**	**232,8**
% rail share	22,1%	25,4%	20,4%	**23,7%**

MTons 2030 Diff Sc 2 – Sc 1	Intern	Exchange	Transit	Total
Rail	-4,0	-10,3	-2,1	-16,4
Road	4,5	11,2	2,4	18,1
Short Sea	-0,6	-1,1	0,0	-1,7
Total	-0,2	-0,1	0,3	0,0
% rail share	-6,2%	-7,8%	-5,9%	-7,0%
% difference – rail	-28,4%	-30,5%	-28,4%	-29,7%
% difference – all modes	-0,2%	-0,2%	0,8%	0,0%

MTons 2030 Diff Sc 3– Sc 1	Intern	Exchange	Transit	Total
Rail	2,5	5,5	1,0	8,9
Road	-2,7	-6,0	-1,1	-9,8
Short Sea	0,3	0,5	0,0	0,9
Total	0,1	0,1	-0,1	0,0
% rail share	3,9%	4,1%	2,8%	3,9%
% difference – rail	17,0%	16,3%	12,2%	16,1%
% difference – all modes	0,2%	0,0%	-0,3%	0,0%

Global demand traffic volumes are equal in these 3 scenarios that rely on the same assumption for GDP evolution. Rail traffic volumes in the Med RFC's market area are 30% lower in scenario 2 than in scenario 1, while scenario 3 is 16% higher than scenario 1. Difference between scenario 2 and 3 is high because it considers very different assumptions both in terms of road cost evolution (stable in scenario 1 vs. -13% scenario 3) and rail improvements. As a matter of fact, the evolution of road costs counts for about 70% of the difference between scenario 1 and scenario 2. Between scenario 1 and 3, there are still differences in rail improvements but the difference in road costs is lower (-17% scenario 1 vs. -13% scenario 3), resulting in a smaller difference in results-

Table 30 compares scenarios 4 and 5 which are different from scenario 1 regarding GDP evolution assumptions.

Table 30 – Comparisons of scenarios – scenario 4 and 5 with scenario 1

MTons 2030 – Sc 1	Intern	Exchange	Transit	Total
Rail	14,1	33,8	7,4	**55,2**
Road	40,1	84,1	28,6	**152,9**
Short Sea	9,4	15,3	0,0	**24,7**
Total	**63,5**	**133,3**	**36,0**	**232,8**
% rail share	22,1%	25,4%	20,4%	**23,7%**

MTons 2030 Diff Sc 4 – Sc 1	Intern	Exchange	Transit	Total
Rail	-0,9	-2,2	-0,6	-3,7
Road	-2,8	-6,2	-2,8	-11,8
Short Sea	-0,7	-1,1	0,0	-1,8
Total	-4,4	-9,5	-3,4	-17,3
% rail share	0,1%	0,1%	0,4%	0,2%
% difference – rail	-7,1%	-6,5%	-8,1%	-6,7%
% difference – all modes	-6,8%	-7,2%	-9,4%	-7,4%

MTons 2030 Diff Sc 5 – Sc 1	Intern	Exchange	Transit	Total
Rail	0,8	1,9	0,5	3,2
Road	2,4	5,3	2,4	10,1
Short Sea	0,6	1,0	0,0	1,6
Total	3,8	8,3	2,9	14,9
% rail share	0,0%	-0,2%	-0,2%	-0,1%
% difference – rail	5,0%	5,6%	5,4%	5,8%
% difference – all modes	6,0%	6,2%	8,1%	6,4%

Global demand traffic volumes are different in these 3 scenarios due to the different assumptions for GDP evolution: global traffic volumes in the Med RFC's market area are 7,4% lower in scenario 4 than in scenario 1, while scenario 5 is 6,4% higher than scenario 1. Differences are higher for transit traffic than for intern or exchange traffic, because this traffic includes Countries of north-eastern and south-eastern Europe with higher traffic elasticities to GDP than western Europe. Also, differences for rail traffic volumes, although based on the same cost evolution assumptions in these three scenarios, are slightly lower than the differences for global demand. This reflects the fact that rail has higher market shares for categories of goods with low GDP elasticity.

Finally, the main results of the 5 scenarios can be summarized in the following table, giving for each scenario:

- the total demand in million tons/year (with average annual growth from 2016)
- the demand for rail in million tons / year (with rail share)

Table 31 – Main results for 2030 scenarios

Scenario	Total demand [tons/year]	Avg. annual growth [%]	Total demand [tons/year]	Rail share [%]
2016	**185**	**-**	**21**	**11**
1 – 2030	**233**	**+1,7**	**55**	**24**
2 – 2030	233	+1,7	39	17
3 – 2030	233	+1,7	64	28
4 – 2030	216	+1,1	52	24
5 – 2030	248	+2,1	59	24

3.5.7 Comparison of the results with the previous RFC transport market study

As mentioned in the methodology chapter, the methodologies and assumptions made for the two studies are quite different, which makes the comparison exercise difficult. Nevertheless, the following elements can be outlined.

3.5.7.1 Base year data

Given the definitions of "catchment area" and "market area" – that are more restrictive in the new study – the volume of goods considered in the present study as potentially interested by the RFC is lower than the volume considered in the previous study. Table 32 presents the comparison of base year volumes for road and rail together (the previous study didn't consider short sea).

Table 32 – Comparison of base year volumes for road and rail

Rail + road (MTons)	2013 TMS	Present TMS
Reference yar	**2010**	**2016**
Catchment area / intern traffic	60,2	42,6
Market area / total	233,2	165,1

The difference in the catchment area or intern traffic is explained by the zones considered, which included adjacent zones to the NUTS 2 zones of the Corridor in the 2013 TMS. For the market area, the difference is probably mainly linked with the consideration of the whole border FR-ES in the previous study, whereas only the eastern part of it is now integrated. The volume of goods crossing the western ES-FR border is close to 50 Mtons/year. Other sources of differences are to be found in the definition of potential paths on the Corridor for a given O-D pair.

For rail volumes – detailed only for the 2015 forecast in the previous study – the figures are reported in Table 33.

Table 33 – Comparison of 2015/2016 volumes for rail

Rail (MTons)	2013 TMS	Present TMS
Reference yar	**2015**	**2016**
Catchment area / intern traffic	10,7	6,4
Market area / total	30,1	21,1

The differences on rail traffic are also explained by the definitions of market and catchment area, but rail shares over total volumes (rail + road) are similar in both studies.

3.5.7.2 2030 Forecast

Given the differences on base year volumes, the predicted annual growth of the traffic in the two studies were compared. For road + rail volumes, the projected growths are reported in Table 34.

Table 34 – Comparison of rail + road predicted annual growth

Rail + Road	Volumes [MTon]		Average annual growth [%]					
	2013 TMS (base year)	Present TMS (base year)	2013 TMS (worst-case)	Present TMS (Scen. 4)	2013 TMS (regular)	Present TMS (Scen. 1)	2013 TMS (best-case)	Present TMS (Scen. 5)
Reference yar	2010	2016	2010-2030	2016-2030	2010-2030	2016-2030	2010-2030	2016-2030
Catchment area / intern traffic	60,2	42,6	0,9	1,1	1,9	1,5	2,8	1,9
Market area / total	233,2	165,1	1,2	1,0	2,2	1,5	3,4	1,9

For the regular/trend scenarios (scenario 1 for the present study), projected annual growth of international freight traffic demand on the market area of the Corridor was higher in the previous study (2.2% per year vs 1.5% per year). This is not surprising, given that EU official assumptions of GDP evolution at the time of the previous study were more optimistic than the present ones. This difference is even bigger given the impact of the COVID-19 crisis considered in the present study.

Worst-case and best-case scenarios of the 2013 TMS considered major differences in GDP evolution (±30%) with respect to the regular scenario. Therefore, these scenarios' results diverged more than in the present study. It is noteworthy than growth rates for both worst cases in terms of GDP are similar in both studies.

Globally, results seem consistent given the GDP assumptions made, meaning that traffic elasticity to GDP is quite similar in both studies.

For modal split results, it is important to note that the assumptions of the 2013 TMS did not consider any change in rail or road cost and time with respect to 2010 in the regular scenario. Therefore, we compare it to the worst-case scenario of the present TMS in terms of rail cost evolution (scenario 2), which is the closest even if it already includes some rail improvements.

Table 35 – Comparison of rail predicted annual growth

Rail	Volumes [MTon]		Average annual growth [%]				Δ [%]	
	2013 TMS	Present TMS	2013 TMS (base-case)	Present TMS (Scen. 2)	2013 TMS (+20% road cost)	Present TMS (Scen. 1)	Δ(+20% road cost – base)	Δ(Scen. 2 – Scen. 1)
Reference yar	2015	2016	2010-2030	2016-2030	2010-2030	2016-2030	2010-2030	2016-2030
Catchment area / intern traffic	10,7	6,4	1,5	2,9	1,9	5,2	6,9	43,6
Market area / total	30,1	21,1	1,6	3,9	1,7	6,2	2,7	42,3

Not surprisingly, projected rail traffic growth is higher in the present TMS, even considering the worst-case scenario for modal shift. A sensitivity test was performed in the previous study, considering a 20% increase in road cost. This can be more or less compared to our trend scenario, where road costs are increased by 13% and rail costs and travel times are further reduced. Results show that the previous model was much less sensitive to road cost increase than the present model. It is also important to note that in the 2013 TMS study, the modal split model was applied only to the intern (catchment area) O-D pairs.

3.6 Conclusions and recommendations

The market area of the Mediterranean Rail Freight Corridor represented in 2016 a global traffic volume of international freight transport by all modes of 185 million tons. 78% of this traffic used road, 11% rail (21 million tons) and 11% short sea services, which have a significant role on this Corridor. 58% of the traffic represents exchanges between regions belonging to the Corridor and other regions.

The RFC links major industrial regions and serves also as access lines for the main Mediterranean ports. The international freight traffic in the Corridor's market area is dynamic, with strong growth from 2010 to 2016, recovering from the 2008-2009 financial crisis. According to the analysis of trends to 2019, the traffic seems to be growing also over the 2016-2019 period. The ports situated along the Corridor, which handle about 500 M tons per year, have also a dynamic traffic growth, especially for containers.

The rail share for international freight transport in the Med RFC market area is quite low compared to other long-distance flows across Europe, especially in the north-south direction. Moreover, rail share seems to have slightly decreased in the recent period. This low rail share can be explained by traffic structure, competitiveness of short sea, but above all by the remaining technical bottlenecks on rail infrastructure such as the track gauge difference with Spain, border crossings with severe ramps across the Alps, train length limitations, lack of interoperability etc.

Forecasting the potential traffic along the Med RFC in 2030 is particularly difficult given the great uncertainties surrounding the economic effects of the COVID-19 crisis, the implementation of rail projects and TEN-T standards along the Corridor and the measures that could be taken in favour of modal shift to rail as its GHG-emissions are lower than road.

Nevertheless, the forecasting exercise that has been developed in this study gives a possible range of what could be the international rail traffic demand in the Corridor's market area by 2030, according to five different scenarios combining assumptions on GDP evolution and assumptions on rail/road cost evolutions. Starting from 21 million tons in 2016, the rail demand could vary between 38 and 64 million tons in 2030, and rail share between 16% and 28%. This range is wide, but gives an idea about the main drivers of rail traffic growth:

- modal shift assumptions play a more important role in the expected growth of rail traffic volume than GDP evolution, at least for the scenarios tested in the present TMS. This means that the key elements to boost the rail traffic growth of the Med RFC are in the hands of the various stakeholders of the Corridor
- full implementation of TEN-T standards and Med RFC's projects has a very strong impact on the potential rail modal share along the Corridor, especially the implementation of UIC or dual gauge in Spain and the adaptation to 740m train length on all the RFC lines. Of course, adapted services and sufficient capacity by relieving the main bottlenecks, especially in major urban areas, are needed to fulfil this potential
- evolution of road costs is also an important driver to improve the rail share

4 List of Measures

Since the corridor has already been implemented, the subchapters 4.1 – 4.6 are not applicable for updates. The state of play and further developments regarding concrete measures and procedures is included in Section 4 of the CID.

4.1 Coordination of Planned Temporary Capacity Restrictions

4.1.1 Background

Independent Temporary Capacity Restrictions Working Group (TCRs WG) was established to focus on the tasks connected with capacity restrictions planning, coordinating and publishing. TCRs WG meets 2 times per year. All WG members confirm the purpose to improve the TCRs planning and coordinating process along on RFC MED taking into account the related RNE guidelines as well. Some specifities will remain in the RFC MED information procedure of TCRs which were requested by our business clients during the TAG/RAG meetings.

4.1.2 Legal framework

TCRs WG processes are based especially on Article 12 "Coordination of works" of the European Regulation No 913/2010 giving the responsibility for TCRs coordination and publication to RFC Management Board.

Additionally, the European Union recognised the need for common rules to enhance the competitiveness of the railways, thus, the revised Annex VII (recast in 2017) of the Directive 2012/34/EU obliges the IMs to involve known and potential applicants, main operators of service facilities, terminals and other IMs affected by a TCR already at an early stage.

The harmonised implementation of the legislation is also a clear business demand, therefore, the elaboration of the currently applicable "Guidelines for Coordination / Publication of Planned Temporary Capacity Restrictions for the European Railway Network" version 3.0 (known as TCR Guidelines) became essential. The document "Procedures for Temporary Capacity Restriction Management" (hereafter TCR Handbook, approved by the RNE General Assembly on 7 December 2021) defines how to handle each step of the TCR management process both to ensure smooth and reliable TCR planning, coordination and publishing according to the deadlines set in Annex VII of the Directive 2012/34/EU.

The Handbook has been designed also to cover RFC processes and thus replace all previous RNE/RFC guidelines covering this subject, such as "Guidelines for Coordination / Publication of Planned Temporary Capacity Restrictions for the European Railway Network" version 3.0.

So, the Handbook is considered to be a main legal basis for TCRs WG activities. TCRs WG members fully respect these Guidelines and follow them for securing proper environment for coordination of TCRs.

4.1.3 Tasks of the TCRs WG

The TCR WG is coordinated by C-OSS Leader, and it assists the C-OSS in the coordination of works. The TCR Coordinator facilitates and stimulates, when necessary, coordination of TCRs, together with the members by:

- promoting and coordinating of works along the corridor aiming at minimizing traffic disruptions
- enhancing the necessity for IMs to harmonise TCRs for customers
- steering the coordination process according the RNE Handbook
- ensuring the process of measure and quality evaluation of TCRs Coordination and Publication

- following the output of bilateral meetings taking place along the corridor
- developing the environment for publication of unplanned (not within the scope of RNE TCR guideline) and extraordinary capacity restrictions to avoid train delays and other undesirable circumstances
- supporting the development of a TCR coordination and planning process to improve rail freight traffic
- cooperating with C-OSS to improve the quality of train path allocation
- triggering additional harmonisation of TCRs, when necessary
- ensuring common publication of TCRs twice a year on Mediterranean website
- ensuring the link between RNE TCR group and all IMs of the corridor and especially in following the development of RNE TCR Tool

Based on the regular up-date of the information on TCRs the first conclusion is that there are lot of works, which will be executed by the IMs in the coming years on corridor lines. The GA will monitor the situation and will make efforts to harmonize the coordination of the works according to the RNE rulebook.

The TCR WG enforces to start bilateral or trilateral coordination in those cases, where this is appropriate by the RNE rules. Good coordination of TCR can positively influence the service level and quality on RFC MED. TCR is an important topic for the business partners, publication and coordination on time can facilitate the related procedures for all concerned partners.

4.1.4 Coordination and Publication of planned Temporary Capacity Restrictions

In line with Article 12 of the Regulation, the Management Board of the freight corridor shall coordinate and ensure in one place the publication of planned Temporary Capacity Restrictions (TCRs) that could impact the capacity on each Rail Freight Corridor. TCRs are necessary to keep the infrastructure and its equipment in operational condition and to allow changes to the infrastructure necessary to cover market needs. According to the current legal framework (see 4.4.2), in case of international traffic, these capacity restrictions have to be coordinated by IMs among neighbouring countries.

All information on the coordination of planned temporary capacity restrictions can be found in Section 4, Chapter 4.4 of the CID.

4.2 Corridor One Stop Shop

According to Article 13 of the Regulation, the GA of the Corridor has established a C-OSS. The tasks of the C-OSS are conducted in a non-discriminatory way, and it maintains confidentiality regarding applicants.

C-OSS Leader coordinates the C-OSS WG, and it assists the C-OSS in the coordination of the path requests and in the construction of the PaPs (Pre-arranged Paths). Moreover, it is in charge of the following tasks:

- Analysis of current traffics and possible developments
- Coordination of Pap offers before each publication (annual and Reserve Capacity)
- Analysis, definition and follow up of new products and projects along the Corridor (Short Term products, Timetable Redesign, feasibility studies...)
- Providing National figures enabling the assessment of the corridor activity in comparison with the whole traffic and contributing to KPI calculations
- Proposing corridor objectives regarding Corridor's products
- Review and Update Corridor Information Document Section 4

All information on the Corridor One Stop Shop can be found in Corridor Information Document Section 4, Chapter 4.2.

4.3 Capacity Allocation Principles

The decision on the allocation of PaPs and RC on the Rail Freight Corridor is taken by the C-OSS on behalf of the IMs/ABs concerned. As regards feeder and/or outflow paths, the allocation decision is made by the relevant IMs/ABs and communicated to the applicant by the C-OSS. Consistent path construction containing the feeder and/or outflow sections and the corridor-related path section has to be ensured.

All information on capacity allocation can be found in Section 4, Chapter 4.3 of the CID.

4.4 Applicants

In the context of a Rail Freight Corridor, an 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 commercial interest in procuring infrastructure capacity for rail freight.

Applicants shall accept the general terms and conditions of the Rail Freight Corridor in PCS before placing their requests.

All information on applicants can be found in Section 4, Chapter 4.3.2 of the Corridor Information Document.

4.5 Traffic Management

In line with Article 16 of Regulation, the GA of the freight corridor has put in place procedures for coordinating traffic management along the freight corridor.

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

Having regard the impact of the COVID-19 in 2020 and 2021, RFC MED Traffic Management could maintain the smooth train run on the whole Corridor among 6 member states. Thanks to the close cooperation of the stakeholders the unexpected challenges of the pandemic helped us to strengthen the reliable usage of the corridor lines.

In case of disturbances, IMs work together with the RUs concerned and neighbouring IMs in order to limit the impact as far as possible, to provide possible alternative routes for the traffic and to reduce the negative impact occurred on the network. Detailed description is under sub-chapter 4.6.

National IMs coordinate international traffic with neighbouring countries on a bilateral level. In this manner they ensure that all traffic on the network is managed in the most optimal way.

All information on traffic management can be found in Section 4, Chapter 4.5 of the CID.

4.6 Traffic Management in the Event of Disturbance

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

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

Since 2021 communication between stakeholders in case of international disruptions is also supported by RNE TIS Incident Management tool. The communication procedure and the available tools are described in Section 4. Chapter 4.5.3 of CID Book.

All information on traffic management in the event of disturbance can be found in Section 4, Chapter 4.5.3 of the CID, including the International Contingency Management.

4.6.1 International Contingency Management (ICM)

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

In the ICM Handbook there is a detailed description about solutions to support the concerned dispatchers in case of big incidents. RNE, as the honest broker, will continuously update this document, which is the basic document for RFCs in Europe. All related information is registered in a digital archive, in CMS. The IM members of RFC MED TPM Coordination provided the data to set up the rerouting overview and operational scenario. The GA of RFC MED approves the document year after year, which is available on the corridor website. The Excel file consists of all the parameters of the available alternative routes if there is a disruption with a forecasted impact on the affected section of more than three calendar days or a disruption with high impact on international traffic.

The available rerouting overview is considered as the first step and it could be developed in the future. If the costumers need more information for such cases, the TPM Coordination is the responsible body on RFC MED to discuss the proposals and working out a solution to provide it. The efficiency of the rerouting overview rises since the existing plans of RUs are partly incorporated into the document, which is being continuously reviewed and updated. RFC MED takes this ICM as a living document and each year the TPM group revise the data and the content of the rerouting scenarios. These useful re-routing scenarios have already been applied in operation.

In May 2020, the revision of the ICM Handbook was started by collecting input. Six task forces were working intensively to prepare the new proposal, integrating the experiences gained during real interruptions and fine-tuning the ICM processes and procedures to facilitate their implementation. This significant step forward has been reached by applying the new rule for mandatory usage of the TIS Incident Management Tool which promises a more effective contingency management Europe wide. The primary focus of the project team was the handling of freight trains in case of contingencies; however, the handbook can also be applied for passenger trains. The process was optimised by making some parts optional in order to simplify implementation and make it more effective. Besides the mentioned changes, new capacity and path coordination procedures were added and updated to better allocate capacity based on a consensual agreement and following the RNE Path Alteration process. The new allocation principles based on the RU's share during the last 30 days prior to interruption were prepared as the distribution-key of last resort. The IMs are not bound to apply these allocation principles if a better and acceptable result can be reached without them.

This Handbook complements the national incident management of the individual European infrastructure managers and the requirements of the OPE TSI (Commission Regulation 2019/773 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system) and other regulations referring to incident management as defined in this document.

The revised ICM Handbook was approved by the General Assembly of RNE on 19 May 2021, effective from January 2022. The capacity allocation related procedures will be effective from timetable period 2024, as these procedures must be first published in the Network Statements.

4.7 Quality Evaluation

Quality of service on the freight corridor is a comparable indicator (set of indicators) to those of the other modes of transport. Service quality is evaluated as a performance. Performance is measured with Performance Indicators. These indicators are the tools to monitor the performance of a service provider. What regards the international rail freight services the obligation is based on the provisions of Article 19 of the Regulation.

4.7.1 Performance Monitoring Report

RFC Mediterranean publishes its Annual Report on its website. The report is based on the RNE Guidelines on the Key Performance Indicators of the Rail Freight Corridors:

https://rne.eu/wp-content/uploads/RNE_Guidelines_KPIs_of_RFCs.pdf

It provides recommendations for using a set of KPIs commonly applicable to all RFCs.

More information on KPIs and objectives can be found in chapter 5 of the Implementation Plan.

5 Objectives and performance of the corridor

5.1 Objectives of the Corridor

The objectives of Mediterranean RFC are in line with the Sustainable and Smart Mobility Strategy of the European Commission. Free movement of goods across the (internal) borders is a fundamental and basic aim of a Single European Rail Market, as a part of a Single European Transport Area. Improving connectivity and access to the internal market for all regions of the Med RFC catchment area is a pivotal intention based on an efficient and interconnected multimodal transport system, for freight, together with supporting the idea to increase the rail freight traffic by 50% by 2030.

For Boosting rail freight, Mediterranean RFC will:
- ➢ strengthen the cross-border coordination among the stakeholders
- ➢ perform a better overall management of the rail freight corridor for the benefit of the customers
- ➢ support to bridge the missing links to multimodal terminals and establish an end-to-end approach

Selected objectives have been defined, expressed as KPIs with target values and deadlines.

Capacity Objectives

- ➢ **Annual growth of 5% of the Volume of Offered Capacity**
- ➢ **Annual growth of 5% of the Volume of Requested Capacity**

With a collection and presentation of overall days spent with modernisation or upgrading on tracks/section.
- ➢ **Maintain a stable ratio of the Capacity Allocated by the C-OSS and the Total Allocated Capacity, as number of trains per border (7 border points)**

Punctuality Objective

- ➢ **Achieve 50% punctuality at destination (RFC Exit) with max. delay ≤ 30 minutes, by December 2026**

5.2 Performance of the corridor

The performance of the corridor is monitored with different KPIs, which are harmonised (commonly applicable) with all Rail Freight Corridors, based on the RNE Guidelines on the Key Performance Indicators of the Rail Freight Corridors:
https://rne.eu/wp-content/uploads/2022/10/RFC6-June-2022.pdf

The KPIs are monitoring different aspects of RFC performance:

- ➢ Capacity Management KPIs
- ➢ Operations KPIs
- ➢ Market Development KPIs

Capacity management KPIs monitor the performance of the Mediterranean RFC in constructing, allocating and selling the capacity of the Corridor, in terms of:

- Volume of offered capacity (PaPs)
- Volume of requested capacity (PaPs)

- Volume of requests (PaPs)
- Number of conflicts (PaPs)
- Volume of pre-booked capacity (PaPs)
- Volume of offered capacity (RC)
- Volume of requested capacity (RC)
- Volume of requests (RC)
- Average planned speed of PaPs

Operations KPIs monitor the performance of the traffic running along Mediterranean RFC in terms of punctuality and volume of traffic:

- Punctuality at origin
- Punctuality at destination
- Overall number of trains on the RFC

Market development KPIs monitor the capability of the Mediterranean RFC in meeting the market demands in terms of:

- Overall number of trains per border
- Ratio of the capacity allocated by the C-OSS and the total allocated Capacity

Publication of the results
The results of the performance monitoring (KPIs) together with the Performance Report (under Article 19.2 of the Freight Regulation) are published once a year:

- on the web site of Mediterranean RFC, at: https://www.medrfc.eu/wp-content/uploads/2022/06/med_corridor_2021.pdf
- Transparent, harmonised sharing of KPIs is one of the requirements of the sector towards the RFCs under Priority 9 of the Rotterdam Sector Statement. Therefore, the RFCs also make available on RNE's website a joint and harmonised overview of the figures of their commonly applicable KPIs. Under the below link, the figures are summarised both per RFC showing the evolution of their performance over the years and per year displaying an overview of the commonly applicable KPIs of all RFCs for the year concerned at: https://rne.eu/wp-content/uploads/2022/10/RFC6-June-2022.pdf

  The harmonised KPIs are also available in Annex 2.
- Besides, the RFCs publish KPIs figures on an annual basis via the Customer Information Platform (CIP) at: https://cip.rne.eu/apex/f?p=212:65::::::

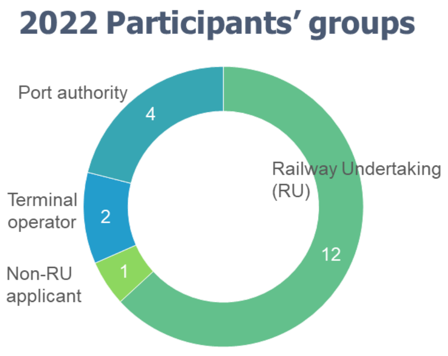
Train Performance Management (TPM)
The TPM activity is coordinated by a Train Performance Management Working Group set up in order to establish a permanent body for the coordination and exchange of TPM issues among RUs, Terminals and IMs on Med RFC. Detailed information about this activity can be found in Section 4, Chapter 4.6 of Corridor Information Document (CID).

5.3 User Satisfaction Survey

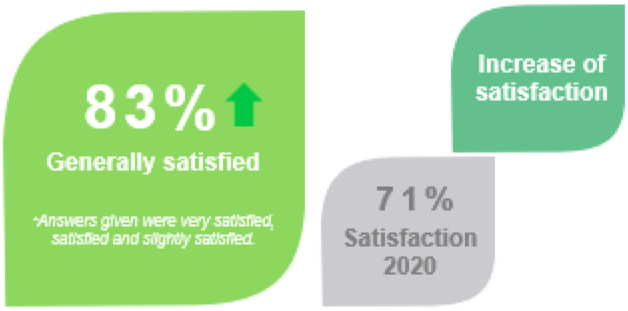
In line with art 19.3 of the Regulation 913/2010 a User Satisfaction Survey shall be conducted annually to assess the satisfaction of the users with the Rail Freight Corridor services and products. The results of the survey shall be published once a year. The Rail Freight Corridor Network, in cooperation with RailNetEurope (RNE) developed in 2020 a new common survey using an online platform, which makes it easier for the users to give their feedback. In 2022, all the Rail Freight Corridors operating in Europe (11) participated in the survey, so that the users operating on different corridors, are addressed by a single common questionnaire, avoiding survey duplication, and achieving comparable results. For the USS 2022, the Mediterranean RFC invited 21 users, either applicants of Rail freight corridor capacity or terminals/Port authorities interested by the corridor activities. Overall, 19 full evaluations have been received.

Among these 19 respondents, 16 have been invited by the RFC, with a response rate of 80% among invitees and a response rate of 90% overall.

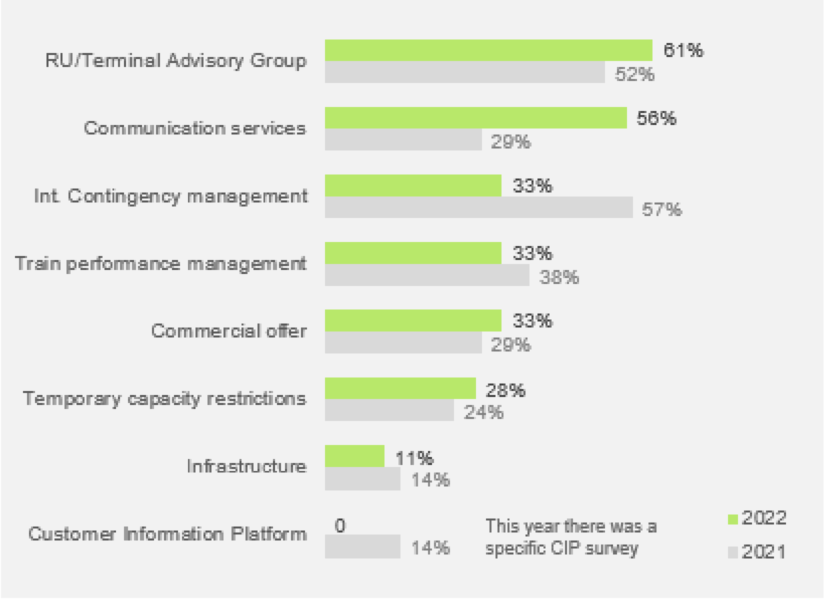
Participants' groups for 2022:



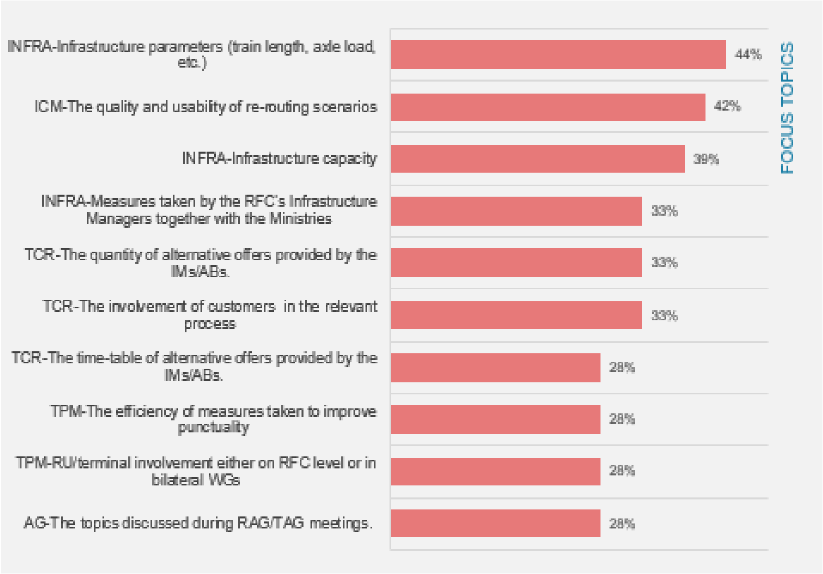
Overall Customer Satisfaction 2022:



Most satisfying activities:



Activities for which improvements are needed:



The results are normally commented during Advisory Group meetings, and they are publicly available on different platforms:

- website at: https://www.medrfc.eu/wp-content/uploads/2022/12/rfc_uss_2022_final-medrfc-report_publication21122022.pdf
- CIP at: https://cip.rne.eu/apex/download_my_file?in_document_id=12142

6 Investment Plan

This Investment Plan is an updated version of the genuine one, agreed in early 2013. Now, as Mediterranean RFC was extended to Croatia (effective 10th November 2016), it includes that of HŽI.
The description of the plan is split by nature of projects.

Nature of the projects:

- Renewal of tracks
- The renewal of signalling system
- The renewal of tunnel, bridge etc.
- The electrification
- The creation of siding, passing tracks, extra tracks
- The creation of a new structure (line, bridge, tunnel, leapfrog)
- Adjustment of the gauge
- The enhancement in signalling (especially ERTMS that will constitute a specific issue)
- The track enhancement
- The level crossings
- The noise reduction
- Other projects

This nature of projects has been split according to the following categories: renewal, enhancement and development. Renewal of projects includes the renewal of tracks, signalling system, tunnels, bridges and other elements. Enhancement investments consider projects related with the adjustment of gauges, the track enhancement, noise reduction, level crossings etc. Finally, in the development projects are included all new lines projected, electrification, creation of sidings, passing tracks or new structures.

Benefits of the projects

Each project may have one or several benefits amongst these main benefits:

- Bottleneck relief in order to make the infrastructure more available
- Safety/security
- Environment in order to comply with national laws but also to make the projects more acceptable
- Higher speed to increase competitiveness, especially regarding the road transportation
- Interoperability to also increase competitiveness
- Punctuality improvement, as provided by the surveys made for the TMS. It is one of the key points
- Maintenance of performance: especially the renewal of tracks is essential to maintain the performance. If not, the performance will become worst

6.1 Capacity Management Plan

The Capacity Management Plan includes the management of capacity for freight trains, considering improvements of technical parameters, axle load, permitted train lengths, etc.

Capacity Management in the overlapping sections

The Capacity management plan has been drafted taking into account the **overlapping sections** as identified in chapter 2.2. of this document. The Corridor members checked the coherence of the information included in capacity plan with the same information provided for other corridors sharing the same overlapping sections.

- (OS-RFC 4) Algeciras – Madrid
- (OS-RFC 2) Marseille – Lyon
- (OS-RFC 5) Trieste/Koper – Ljubljana – Pragersko
- (OS-RFC 10) Ljubljana – Zidani Most – Zagreb
- (OS-RFC 11) Koper – Ljubljana – Pragersko – Hodos – Zalaszentivan
- (OS-RFC 7) Gyor – Budapest – Szolnok – Szajol
- (OS-RFC 9) Gyor – Budapest – Szolnok – Szajol

Capacity Management Plan 2030


TRAIN LENGTH 2030:
750 m
650 m
625 m
600 m
597 m
575 m
570 m
525 m
550 m
500 m
450 m
360 m
350 m
N/A
RFC 1 PRINCIPAL ROUTE
FRANCE
SPAIN
ITALY
SLOVENIA
CROATIA
HUNGARY
Paris
Roma
Záhony
Miskolc
Nyíregyháza
Székesfehérvár
Budapest
Boba
Érd
Pusztaszabolcs
Hodoš
Zalaszentiván
Nagykanizsa
Pragersko
Gyékényes
Zidani Most
Murakeresztúr
Ljubljana
Trieste
Divača
Zagreb
Koper
Rijeka
Treviso
Vicenza
Venezia
Padova
Verona
Milano
Novara
Torino
Modane
Tortona
Ambérieu
Culoz
Lyon
Valence
Nîmes
Avignon
Miramas
Montpellier
Marseille
Fos Viguerat
Portbou
Figueres Vilafant
Figueres
Zaragoza
Barcelona
Tarragona
Madrid
Castellón
Valencia
Alcázar de San Juan
Alicante
Murcia
Lorca
Cartagena
Córdoba
Almería
Algeciras
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AXLE LOAD 2030:
22,5 T/axle
21,0 T/axle
20,0 T/axle
N/A
RFC 1 PRINCIPAL ROUTE
FRANCE
SPAIN
ITALY
SLOVENIA
CROATIA
HUNGARY
Paris
Roma
Záhony
Miskolc
Nyíregyháza
Székesfehérvár
Budapest
Boba
Érd
Hodoš
Zalaszentiván
Nagykanizsa
Pragersko
Gyékényes
Zidani Most
Murakeresztúr
Ljubljana
Trieste
Divača
Zagreb
Koper
Rijeka
Treviso
Vicenza
Venezia
Padova
Verona
Milano
Novara
Torino
Modane
Tortona
Ambérieu
Culoz
Lyon
Valence
Nîmes
Avignon
Miramas
Montpellier
Marseille
Fos Viguerat
Portbou
Figueres Vilafant
Figueres
Zaragoza
Barcelona
Tarragona
Madrid
Castellón
Valencia
Alcázar de San Juan
Alicante
Murcia
Córdoba
Moreda
Lorca
Cartagena
Bobadilla
Granada
Almería
Algeciras
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6.2 List of Projects

The list of projects includes all Projects foreseen for development of infrastructure along Mediterranean RFC together with its financial requirements and resources.

List of projects in the overlapping sections

The list of projects has been drafted taking into account the **overlapping sections** (where it is relevant) as identified in chapter 2.2. of this document. The Corridor members checked the coherence of the information included in the list of projects with the same information provided for other corridors sharing the same overlapping sections. The projects in the Overlapping sections are identified with this symbol under the country's symbol: OS-N (Number of Corridor having the section in common).

Spain

List of projects											
N°	Country	Region (if required)	Railway section	Nature of Projects		Benefits for RFC 6	Start date of the works	End date of the works	Actual step (% Completion)	Estimation of the costs in M€	
1	SP		Castellon - Valencia	UIC gauge upgrade in Castellon Station on Mediterranean Corridor	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	2020	December 2022	Scheduled for the end of 2022 (97%)	11,00	
2	SP		Castellon - Valencia	New line, double track UIC gauge in Mediterranean Corridor	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	APROX 2026	APROX 2032	Planned	1.170,00	
3	SP		Castellon - Valencia	Valencia Node railway connection. Pass-through station, north access by-pass tunnel and completion of the south access tunnel	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	APROX 2026	APROX 2032	Planned	2.039,00	A new railway station is included
4	SP		Almería - Huéneja - Dólar Almería - Granada	Almeria connection upgrade to UIC standard gauge	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	APROX 2027	2030	Planned	900 M€	
5	SP		La Encina - Alicante	La Encina - Alicante: Adaptation to TEN-T requirements (standard gauge, 750 m)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	2023	December 2025	Planned (Finished design phase)	160	
6	SP		Murcia Cargas - Almería	Murcia Cargas - Almería: New line compliant with TEN-T requirements	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	December 2025	45% (only infrastructure works)	2.000,00	

N°	Country	Region (if required)	Railway section	Nature of Projects		Benefits for RFC 6	Start date of the works	End date of the works	Actual step (% Completion)	Estimation of the costs in M€	
7	SP		Valencia - La Encina Node	Valencia - La Encina Node: Adaptation to TEN-T requirements (standard gauge, 750 m)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	April 2025	70%	541,00	
8	SP		Bif Calafat -Tarragona	Vilaseca Node - Calafat branch (Vandellós by-pass): New line compliant with TEN-T requirements	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	2025	100% (new branch)0% UIC gauge change	659,00	Since 2020 January new branch is running (now it has been awarded contract works for UIC gauge change)
9	SP		Castellbisbal- Vilaseca	Implementation of UIC gauge on Mediterranean Corridor. Section Castellbisbal- Nudo Vilaseca	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	11/2013	2024	75%	232,00	ERTMS works are not included
10	SP		Castellón - Valencia - Almussafes	Castellón - Valencia - Almussafes: Adaptation to TEN-T requirements (standard gauge, 750 m)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	December 2023	69%	313,00	
11	SP		Bif Calafat - Castellón	Calafat branch - Castellón: Adaptation to TEN-T requirements (standard gauge, 750 m)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	December 2024	15%	248,68	
12	SP		El Reguerón - Cartagena/Escombreras	El Reguerón - Cartagena/Escombreras: Adaptation to TEN-T requirements (standard gauge, 750 m, electrification)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	2028	5%	540	It is included rail works inside Port Authority Zone

N°	Country	Region (if required)	Railway section	Nature of Projects		Benefits for RFC 6	Start date of the works	End date of the works	Actual step (% Completion)	Estimation of the costs in M€	
13	SP		Madrid - Zaragoza - Barcelona - Portbou	Madrid - Zaragoza - Barcelona - Portbou (IB): Enlargement of train length to 740 m and upgrade of the line	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	01/2023	01/2026	0%	50,00	At the moment this project is detailed design phase
14	SP		Vicálvaro - San Fernando	Vicálvaro - San Fernando. Creation of sidings and extra tracks	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	12/2030	25%	40,00	
15	SP		Barcelona La Llagosta	Implementation of intermodality and UIC gauge in Barcelona La Llagosta Terminal and connection to the corridor.	Multimodal	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	12/2022	2025	0%	81,13	
16	SP		Murcia El Carmen - Murcia Cargas	Murcia El Carmen - Murcia Cargas: Adaptation to TEN-T requirements (standard gauge, electrification)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	December 2025	50%	158,80	It belongs to Nonduermas Sangonera section
17	SP		Barcelona Can Tunis Terminal	Developing and upgrading freight rail-road terminal in Barcelona Can Tunis Terminal	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	12/2014	December 2023	1st phase completed. Pending on 2nd to lay out UIC gauge on six tracks	7,7	
18	SP		ERTMS deployment on sections of the Mediterranean RFC in Spain	ERTMS deployment on sections of the Mediterranean corridor in Spain	Rail ERTMS	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	Phase 1 December 2021 Phase 2 December 2030	25%	84.17 M€. 350.08 M€.	To see other word file ERTMS

N°	Country	Region (if required)	Railway section	Nature of Projects		Benefits for RFC 6	Start date of the works	End date of the works	Actual step (% Completion)	Estimation of the costs in M€	
19	SP		Alicante - Port of Alicante branch (San Gabriel) - San Isidro:	Alicante - Port of Alicante branch (San Gabriel) - San Isidro: Adaptation to TEN-T requirements (standard gauge, 750 m, electrification)	Rail	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	01/2024	2027	Planned	566,00	It is considered as Torrellano new branch
20	SP (OS-RFC 4)		Madrid-Alcázar-Algeciras	Conventional rail line Madrid-Alcázar-Córdoba-Algeciras. Implementation of ERTMS	Rail ERTMS	Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	12/2030	28%		To see other word file ERTMS
21	SP (OS-RFC 4)		Madrid-Alcázar-Algeciras	Algeciras-Bobadilla. Conventional rail line. Interoperable side-tracks to allow train length 740m		Bottleneck relief Interoperability Capacity improvement Punctuality improvement	05/2015	2026	15%		
22	SP (OS-RFC 4)		Bobadilla -Algeciras	Bobadilla - Algeciras. Conventional rail line. Electrification 25KV AC		Bottleneck relief Interoperability Capacity improvement Punctuality improvement	2024	2026	Planned		It is still in preliminary design
23	SP (OS-RFC 4)		Algeciras – San Roque	Upgrading of the existing Bahia de Algeciras Port - San Roque RRT railway line (Implementation of Double track)		Bottleneck relief Interoperability Capacity improvement Punctuality improvement	01/2015	12/2030	Planned		
24	SP (OS-RFC 4)		Innovative technology for Automatic Standard/Iberian gauge changing system on tracks and freight wagons	Automatic Standard/Iberian gauge changing system on tracks and freight wagons		Bottleneck relief Interoperability Capacity improvement Punctuality improvement	-	2030	25%	4.63	
25	SP (OS-RFC 4)		Innovative technology for Automatic Standard/Iberian gauge changing system on tracks and freight wagons	Variable Gauge for Freight Transport		Bottleneck relief Interoperability Capacity improvement Punctuality improvement	-	2030	25%	2.28	

France

List of projects														
N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder1	Funder2	Funder3	Funder4	Comments
1	FR	SOUTH EAST	NARBONNE MARSEILLE	Infrastructure	Maintenance of performance	2020	2024	Study	10					SECURED
2	FR	SOUTH EAST	DIJON MARSEILLE	Infrastructure	Modernisation	2020	2024	Study	14					SECURED
3	FR	SOUTH EAST	LYON - AMBERIEU -	Infrastructure	Maintenance of performance	2020	2026	Study	11					SECURED
4	FR	SOUTH EAST	LYON -SAINT CLAIR - AMBERIEU	Infrastructure	Maintenance of performance	2020	2025	Study	11					SECURED
5	FR	SOUTH EAST	LYON - GRENAY	Infrastructure	Signalling	2025	2026	Preliminary Study	10					SECURED

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder1	Funder2	Funder3	Funder4	Comments
6	FR	SOUTH EAST	DIJON NIMES PORTBOU	Infrastructure	Maintenance of performance	2020	2026	Study	9					SECURED
7	FR	SOUTH EAST	LYON - AMBERIEU - MODANE	Infrastructure	Maintenance of performance	2020	2026		13					SECURED
8	FR	SOUTH EAST	NARBONNE MARSEILLE	Infrastructure	Maintenance of performance	2019	2025	Preliminary Study	16					SECURED
9	FR	SOUTH EAST	LYON - AMBERIEU - MODANE	Infrastructure	Maintenance of performance	2024	2025	Preliminary Study	17					Secured
10	FR	SOUTH EAST	DIJON MARSEILLE	Infrastructure	Maintenance of performance	2023	2025	Preliminary Study	18					Secured
11	FR	SOUTH EAST	ST JEAN DE MAURIENNE	Infrastructure	Maintenance of performance	2019	2025	Preliminary Study	18					Secured

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder1	Funder2	Funder3	Funder4	Comments
12	FR	SOUTH EAST	VIAS - SETE	Infrastructure	Maintenance of performance	2021	2024	Preliminary Study	19					Secured
13	FR	SOUTH EAST	REMOULINS	Infrastructure	Maintenance of performance	2021	2026	Preliminary Study	29					Secured
14	FR	SOUTH EAST	MOIRANS	Infrastructure	Maintenance of performance	2023	2025	Preliminary Study	31					Secured
15	FR	SOUTH EAST	LYON - AMBERIEU -	Infrastructure	Signaling enhancement	2019	2026	Preliminary Study	37					Secured
16	FR	SOUTH EAST	LYON - AMBERIEU - MODANE	Infrastructure	Signaling enhancement	2019	2026	Preliminary Study	37					Secured
17	FR	SOUTH EAST	LYON - AMBERIEU - MODANE	Infrastructure	Modernisation	2020	2026	Preliminary Study	45					Secured

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder1	Funder2	Funder3	Funder4	Comments
18	FR	SOUTH EAST	DIJON MARSEILLE	Infrastructure	Maintenance of performance	2020	2025	Study	49					Secured
19	FR	SOUTH EAST	BEAUCAIRE - NIMES	Infrastructure	Maintenance of performance	2019	2024	Study	73					Secured
20	FR	SOUTH EAST	NŒUD FERROVIAIRE LYONNAIS	Infrastructure	Maintenance of performance	2019	2024	Works phase	81					Secured
21	FR	SOUTH EAST	AVIGNON - MIRAMAS	Infrastructure	Maintenance of performance	2021	2025	Study	81					Secured
22	FR	SOUTH EAST	PERPIGNAN - CERBERE	Infrastructure	Maintenance of performance	2023	2028	Study	85					Secured
23	FR	SOUTH EAST	DIJON NIMES PORTBOU	Infrastructure	Maintenance of performance	2023	2027	Preliminary Study	93					Secured

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder1	Funder2	Funder3	Funder4	Comments
24	FR	SOUTH EAST	GRENOBLE	Infrastructure	Maintenance of performance	2023	2026	Preliminary Study	103					Secured
25	FR	SOUTH EAST	LYON - AMBERIEU - MODANE	Infrastructure	Maintenance of performance	2020	2025	Study	105					Secured
26	FR	SOUTH EAST	VILLEUNEUVE	Infrastructure	Maintenance of performance	2023	2029	Preliminary Study	110					Secured
27	FR	SOUTH EAST	DIJON MARSEILLE	Infrastructure	Maintenance of performance	2022	2025	Preliminary Study	234					Secured
28	FR	SOUTH EAST	GRENOBLE - VOREPPE	Infrastructure	Modernisation	2024	2026	Preliminary Study	503					Secured
29	FR	SOUTH EAST	LYON - AMBERIEU -	Infrastructure	Modernisation	2019	2026	Works phase	777					Secured

Italy

List of projects														
N°	**Country Country required)**	**Region (if required)**	**Railway section**	**Nature of Projects**	**Benefits for RFC 6**	**Start date of the works**	**End date of the works**	**Actual step**	**Estimation of the costs in M€**	**Financia l Status**	**Funder 2**	**Funder 3**	**Funder 4**	**Comments**
1	ITALY		TRIESTE PORT AREA	Infrastructure and technological enhancement	Capacity		31/12/2026	Work Phase	164	Planned	State			Railway works inside and outside the port area Upgrading of Trieste Campo Marzio station (PRG and ACC) and of the railway line "Linea di cintura" to Campo Marzio/Trieste Aquilinia. Intermodal integration. Upgrading Trieste Servola e Trieste Aquilinia (PRG ed ACC)
2	ITALY		VENICE PORT	Infrastructure and technological enhancement	Capacity		31/12/2030	Project Phase	21,7	Planned	State			The project includes the upgrading of the station of Venezia Marghera Scalo with the construction of new tracks for running trains with lenght of 740 m
3	ITALY		VERONA RRT	Infrastructure	Capacity/train length		31/12/2030	Project Phase	76,1	Planned	State	CEF		Upgrading of Verona Quadrante Europa transfer station in order to allow 750m train length and increase the current capacity and accessibility

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
4	ITALY		NOVARA NODE	Infrastructure and technological enhancement	Capacity/train length		1st phase - Scenario 2028 (forecast)	Project Phase	190,50	Planned	State			Phase 1a) Terminal Upgrading including the bypass of Novara C.le station by freight trains (connecting directly Vignale station), and upgrade intermodal terminal (Ro.La). Phase 1b) Completion of planned works in Vignale, Boschetto and "Novara Centrale" including General Regulatory Plan (PRG) and the Computerised Central Apparatus ("CCA") for controlling and managing all station plant (signals, points, level crossings): the intervention allows to increase the Novara Boschetto transfer station capacity, to upgrade Vignale in order to manage trains of 740m and to run trains in Novara Centrale in accordance with maximum safety requirements. Development of traffic management system Resolution of physical bottlenecks

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
5	ITALY		MILANO SMISTAMENTO RRT	Infrastructure and signalling	Capacity		31/12/2023	Work Phase	22	Secured	State			Transfer station upgrading interventions (signalling adjustment work in RFI station, demolitions and independences with the new Alptransit intermodal terminal realization, increasing train length up to 740 m).
6	ITALY		VERONA RRT	Infrastructure	Train length		31/12/2030	Preliminary Study	73,1	tbd				New freight terminal 750 m
7	ITALY		VERONA PORTA NUOVA	Infrastructure and technological development	Capacity		06/2025		127	Planned	State			Technological and infrastructural upgrading of the Verona Porta Nuova Station The planned interventions in Verona Porta Nuova station, both infrastructural and technological, shall allow an increase in the overall capacity of the Node, intermodal integration and an improvement in managerial efficiency. Resolution of physical bottleneck

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
8	ITALY (OS-RFC 5)		BRESCIA - VERONA	Infrastructure and technological development	Capacity		31/12/2028	Work Phase	3530	Planned	State			New HS line between Brescia and Verona
9	ITALY		VERONA - BIVIO VICENZA (HS)	Infrastructure and technological development	Capacity		Section Verona - Vicenza: scenario 2026 Nodo di Verona Est: scenario 2030 Attraversamento di Vicenza. Scenario 2026	Work Phase	3140	Secured	State			New HS section Verona - Bivio Vicenza (50km), it will run in parallelw to the conventional line and the A4 highway
10	ITALY		ATTRAVERSAMENTO VICENZA (HS)	Infrastructure and technological development	Capacity		2028	Preliminary Study	1075	Secured				New HS section (26 km), the intersection with the existing line will be realised through two interconnections in Vicenza and Padova. Resolution of physical bottleneck
11	ITALY		VICENZA – PADOVA (HS)	Infrastructure and technological development	Capacity		>2030	Preliminary Study	1316	tbd				New HS section (26 km), the intersection with the existing line will be realised through two interconnections in Vicenza and Padova. Resolution of physical bottleneck

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
12	ITALY		TORINO –PADOVA (CONVENTIONAL LINE)	Infrastructure / technological development	Capacity/train length		31/12/2024	Work Phase	850,84	Secured	State	Region	CEF	Technologic upgrade + Command system control upgrading and control for Conventional line Turin - Padova (Control centre in Milano Greco P., Torino Lingotto and Verona Porta Nuova) + upgrading to 740 m. for some stations. The planned intervention shall allow a higher level of plant automation with consequent improvement in managerial efficiency and the achievement of performance-related, quantitative and qualitative coherence, with all lines merging onto such section. Resolution of physical bottleneck
13	ITALY		VENICE NODE	Infrastructure	Capacity		11/03/2027	Project Phase	180	Planned	State	Region		Upgrade of the "Linea dei Bivi" in order to support freight traffic flows. Passing through Venice node and resolve physical interferences and bottlenecks.

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
14	ITALY		VENICE-TRIESTE (CONVENTIONAL LINE)	Infrastructure	Capacity		Technological Upgrading - scenario 2023/2025 Phase 1 - Scenario from 2025 (removal level crossing) Phase 2 - Scenario 2030 (variant between Mestre and Ronchi) Phase 3 - Scenario 2031 (Variant Ronchi-Aurisina)	Project Phase	1800	Planned	State	Region	CEF	Upgrading of Venezia-Trieste (speeding up of existing line)
15	ITALY		ALL CORRIDOR SECTIONS	Infrastructure	Train length		1st Phase - Scenario 2022 (forecast) 2nd Phase Scenario 2026 3rd Phase-Scenario After 2026(forecast)	Work Phase	47,90	Planned	State			Upgrade to 750 m.track lenght of some Mediterranean Corridor lines (Lines Torino - Trieste/Villa Opicina and alternative routes). Torino - Milano Verona - Padova - Venezia Venezia - Trieste Bologna - Padova Milano - Piacenza - Bologna Genova - Ventimiglia The project also includes the upgrading to 750 m-long tracks of the Bologna Interporto transfer station.

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
16	ITALY		TURIN NODE	Infrastructure	Capacity		31/01/2027	Works Phase	187	Planned	State			Technological upgrading of Torino Node and new rail link between Torino Porta Nuova and Torino Porta Susa. The project includes preliminary upgrading works of the Torino Orbassano terminal and PRG Torino Lingotto
17	ITALY		MILANO NODE	Infrastructure and technological development	Capacity		Upgrading nodo scenario 2023/2026 ACC Milano Certosa scenario 2026 ACC Gallarate scenario 2025 PRG Lambrate scenario 2025 ACC Milano Centrale 2026	Work Phase	424,30	Planned	State	CEF		Upgrading of the Node of Milano (including the PRG and ACC of Lambrate, Centrale, Porta Garibaldi, Certosa, Gallarate, upgrade of safety distance systems within the node)
18	ITALY		TORINO - MODANE; TORINO - NOVARA; MILANO - PIACENZA; MONFALCONE - TRIESTE; PADOVA - VENEZIA	ERTMS	Interoperability		31/12/2030	Project Phase	237	Planned				Technological Upgrade preparatory for ERTMS on some Mediterranean Corridor Sections except for those sections where are already projects for infrastructural and technological upgrading: Torino - Modane; Torino - Novara; Milano - Piacenza; Monfalcone - Trieste; Padova - Venezia

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
19	ITALY-SLOVENIA		ERTMS IMPLEMENTATION-MEDITERRANEAN CORRIDOR - FIRST PHASE - NOVARA - MILANO: MILANO - BRESCIA-VERONA -VICENZA - PADOVA - VENEZIA; VICENZA - TREVISO - PORTOGURARO - VILLA OPICINA/TRIESTE	ERTMSs	Interoperability		31/12/2023	Work Phase	116	Secured	State	CEF		Implementation of ERTMS on prioritary section of Mediterranean Corridor: Novara - Milano: Milano - Brescia- Verona -Vicenza - Padova - Venezia; Vicenza - Treviso - Portoguraro - Villa Opicina/Trieste
20	ITALY		ERTMS IMPLEMENTATION-MEDITERRANEAN CORRIDOR - COMPLETION PHASE - TORINO - MODANE; NODO DI TORINO; TORINO - NOVARA; BOLOGNA - PADOVA; NODO DI BOLOGNA; BOLOGNA - RAVENNA; VENEZIA – PORTOGRUARO,	ERTMS	Interoperability		31/12/2030	Project phase	137	Planned				Implementation of ERTMS on sections of Mediterranean Corridor (Other phases) The estimation of cost includes also the implementation along the section: Genova-Ventimiglia; Genova - La Spezia; Piacenza - Bologna
21	ITALY (OS-RFC 5)		TRIESTE-DIVAČA	Infrastructure and technological enhancement	Capacity		Dal 2024 per fasi	Project Phase	63,11	Secured	State	CEF		Upgrading of the railway line Trieste-Divača

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
22	ITALY		TORINO-ALESSANDRIA	Infrastructure	Gauge Upgrading		After 2024	Work Phase	62	Planned	State			Upgrading to Gauge P/C 80
23	ITALY		TORINO - ALESSANDRIA	Infrastructure	Train Length (Second Phase)		After 2024	Work Phase	28	Planned	State			Upgrading to Train Length 740 m (Asti Station)
24	ITALY		TORINO - ALESSANDRIA	Infrastructure and technological enhancement	Increasing Speed and Train Length (First Phase)		First Phase 2024	Work Phase	175	Planned	State			. The project aims to increase speed between Torino and Alessandria (Genova) with Technologic upgrade + Command system control upgrading and control + upgrading to 740 m. for some stations.
25	ITALY		BRESCIA FREIGHT STATION	Infrastructure	Capacity/train length		Dal 2024 per fasi	Project Phase	78	Secured	State			Upgrading of the Freight Station of Brescia, modification of the layout of the station allowing the circulation of trains with length of 740 m
26	ITALY		BUSSOLENO - AVIGLIANA	Infrastructure and technological enhancement	Capacity/train length/Gauge Upgrading/Interoperability		Upgrading conventional line section Bussoleno - Avigliana - Scenario 2027 (forecast) 1 phase national line section of the Torino-Lione project - Scenario >2030	Project Phase	1900,15	Planned	State	CEF		Connection of Torino belt to the new line Torino-Lione, priority interventions: line section Avigliana-Orbassano and Torino Orbassano marshalling yards (1^ phase) Upgrade existing conventional line (Bussoleno-Avigliana)

N°	Country Country required)	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Financial Status	Funder 2	Funder 3	Funder 4	Comments
27	ITALY		CERVIGNANO RRT	Infrastructure	Capacity/Train Lenght		12/2023	Project Phase	6,35	Secured				Improvement of the accessibility by railway to the Cervignano Core RRT (First Phase)
28	ITALY		PADOVA INTERPORTO	Infrastructure	Capacity		tbd	Project Phase	1 (Only design)	Secured	State			Railway link for direct connection between Padova Interporto RRT and Padova – Venice Line – Only Design

Slovenia

List of projects														
N°	**Country**	**Region (if required)**	**Railway section**	**Nature of Projects**	**Benefits for RFC 6**	**Start date of the works**	**End date of the works**	**Actual step**	**Estimation of the costs in M€**	**Funder 1**	**Funder 2**	**Funder 3**	**Funder 4**	**Comments**
1	SI (OS-RFC11)		Ormož - Hodoš	Creation of new structure (Automatic Block Signalling)	Capacity increase	2019	2023	Preparation for works	10					
2	SI (OS-RFC 5) (OS-RFC 11)		Ljubljana - Divača	Modernisation, upgrade of railway infrastructure (more energy for traction, signalling, longer station tracks, required speed). to meet the required TEN-T standards regarding interoperability.	Capacity increase & upgrade	2020	2030	in process	500					
3	SI (OS-RFC 5) (OS-RFC 11)		Divača - Sežana	Upgrading of existing structure, signalling safety devices (Automatic Block Signalling) and catenary system.	Capacity increase & upgrade	2021	2027	Not yet started	110					
4	SI (OS-RFC 5) (OS-RFC 11)		Divača – Koper	Construction of the second track Divača – Koper. An additional track on other route (shorter track) but not parallel, creation of new structure (line, tunnel, bridge, leapfrog) - 2TDK	Capacity increase	2017	2025	in process	1,200					

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder 1	Funder 2	Funder 3	Funder 4	Comments
5	SI (OS-RFC 5)		Zidani Most - Ljubljana	Modernisation, upgrade of railway infrastructure, Signalling, longer station tracks,	Capacity increase & upgrade	2019	2027	design phase	230					
6	SI		Dobova – Zidani Most	Modernisation, upgrade of railway infrastructure, Signalling, longer station tracks,	Capacity increase & upgrade	2019	2027	design phase	210					
7	SI		Ljubljana	Bypass route around Ljubljana	Bottleneck removal	2022	2050	Not yet started	??					
8	SI (OS-RFC 5)		Ljubljana	New section assuring direct connection and increase abilities of train station in Ljubljana (project called Tivoli Arch)	Bottleneck removal	2018	2023	Preparation for works	80					
9	SI (OS-RFC 5)		Ljubljana	Modernisation, upgrade of railway station Ljubljana Lack of capacity, longer station tracks, signalling… Emonika	Capacity increase & upgrade	2018	2026	Preparation for works	200					

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder 1	Funder 2	Funder 3	Funder 4	Comments
10	SI (OS-RFC 5)		Zidani Most - Celje	Zidani Most - Laško. Partially creation of new structure, upgrading of tracks, passing tracks, extra tracks and catenary system. Stations Rimske Toplice, Laško and Celje.	Capacity increase & upgrade	2017	2022	in process	282					
11	SI (OS-RFC 5)		Pragersko	Modernisation, upgrade of railway station Pragersko. Creation of siding, passing tracks, longer station tracks, catenary system, …	Capacity increase & upgrade	2017	2023	in process	63					
12	SI (OS-RFC 5)		Zidani Most - Šentilj	Upgrading signalling safety devices (from electronic technology on electronic) on section Zidani Most - Šentilj.	Upgrading SV	2018	2023	in process	70	SI	EU			
13	SI (OS-RFC 5)		Zidani Most- Ljubljana (up to and including station Laze)	Introduction of traffic remote control in RS (first phase)	Upgrading SV	2021	2025	design phase	137					

Croatia

List of projects														
N°	**Country**	**Region (if required)**	**Railway section**	**Nature of Projects**	**Benefits for RFC 6**	**Start date of the works**	**End date of the works**	**Actual step**	**Estimation of the costs in M€**	**Funder 1**	**Funder 2**	**Funder 3**	**Funder 4**	**Comments**
1	HR		Dugo Selo – Križevci	Construction of second track	Bottleneck relief	2016	2025	Works in progress	198	EU	State			
2	HR		Križevci – Koprivnica – State Border	Construction of second track	Bottleneck relief	2021	2025	Works in progress	300	EU	State			
3	HR		Zagreb ZK – Savski Marof	Reconstruction, renewal of tracks	Bottleneck relief	2020	2023	Works in progress	63		State			
4	HR		Zagreb ZK – Zagreb GK	Reconstruction, renewal of tracks	Bottleneck relief	2023	2025	Works in progress	27	EU	State			

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder 1	Funder 2	Funder 3	Funder 4	Comments
5	HR		Hrvatski Leskovac – Karlovac	Construction of second track	Bottleneck relief	2022	2026	Works in progress	315	EU	State			

Hungary

List of projects														
N°	**Country**	**Region (if required)**	**Railway section**	**Nature of Projects**	**Benefits for RFC 6**	**Start date of the works**	**End date of the works**	**Actual step**	**Estimation of the costs in M€**	**Funder 1**	**Funder 2**	**Funder 3**	**Funder 4**	**Comments**
1	HU		Szajol–Debrecen	ETCS L2 deployment	Interoperability	2019	2023	Under construction	37	EU	State			
2	HU		Budapest–Hatvan	New interlocking systems + ETCS L2 deployment	Interoperability Reliability	2018	2023	Under constuction	67	EU	State			
3	HU		Érd connecting line (Érd – Érd also)	New line	Reliability	2019	2023	Under construction	25	EU	State			
4	HU		Budapest–Miskolc–Nyíregyháza Püspökladány–Záhony Budapest–Gyékényes Székesfehérvár–Boba	GSM-R deployment	Interoperability	2018	2023	Under construction	168	EU	Sttae			
5	HU		Százhalombatta–Pusztaszabolcs	New interlocking systems + ETCS L2 deployment	Interoperability Reliability	2017	2023	Under construction	53	EU	State			

N°	Country	Region (if required)	Railway section	Nature of Projects	Benefits for RFC 6	Start date of the works	End date of the works	Actual step	Estimation of the costs in M€	Funder 1	Funder 2	Funder 3	Funder 4	Comments
6	HU		Zalaszentiván–Nagykanizsa	Reconstruction Electrification	Interoperability Bottleneck relief			Preparation		EU	State			
7	HU (OS-RFC 7) (OS-RFC 9) (OS-RFC 11)		Budapest traverse (Kelenföld–Kőbánya)	3rd track	Bottleneck relief			Preparation		EU	State			
8	HU (OS-RFC 7) (OS-RFC 9) (OS-RFC 11)		Budaepest–Budaörs	3rd and 4th track	Bottleneck relief			Planning	1.4	EU	State			
9	HU (OS-RFC 7) (OS-RFC 9) (OS-RFC 11)		Almásfüzitő–Komárom	Reconstruction	Bottleneck relief			Planning	1.4	EU	State			

6.3 Deployment Plan

The European Rail Traffic Management System (ERTMS) is a single European signalling system that ensures interoperability of the national railway systems, reducing the purchasing and maintenance costs of the signalling systems as well as increasing the speed of trains, the capacity of infrastructure and the level of safety in rail transport.

ERTMS comprises of the European Train Control System (ETCS), i.e., a cab-signalling system that incorporates automatic train protection, the Global System for Mobile communications for Railways (GSM-R) and operating rules.

Technical specifications for ETCS and GSM-R are published in the Control Command and Signalling (CCS) Technical Specification for Interoperability (TSI).

GSM-R provides voice communication for train drivers and signallers and provides data communication for ETCS. ERTMS and GSM-R rules are published in the Operation and Traffic Management TSI (OPE TSI).

The deployment plan related projects include all ERTMS Projects foreseen for development of infrastructure along Mediterranean Rail Freight Corridor.

Deployment plan related projects in the overlapping sections

The deployment plan related projects have been drafted taking into account the **overlapping sections** as identified in Chapter 2.2. of this document. The Corridor members checked the coherence of the information included in the list of projects with the same information provided for other corridors sharing the same overlapping sections.

ERTMS strategy along the corridor

Mediterranean RFC already complies with the interoperability criteria defined in Directive 2008/57/EC as far as loading gauge, axle load, train speed and train length are concerned. To comply with the control command technical specifications for interoperability, Mediterranean RFC is currently deploying ETCS (European Train Control System) on its lines.

ETCS strategy along the corridor

As an essential element of the strategy, the implementation of ETCS on Mediterranean RFC routes is one of the fundamental goals which led to the creation of the ERTMS Corridors, including the former Corridor D which has subsequently been renamed Mediterranean RFC. The creation of ERTMS corridors was itself inspired by the obligations set by the TSI CCS (Control Command System). This European train control-command system is designed to eventually replace national legacy systems, imposing specific equipment on engines running on several networks.

The ETCS specifications are drawn up under the aegis of the European Railway Agency (ERA), in collaboration with representatives of the railway sector such as EIM, CER and UNIFE. One of the main problems is building a system capable of adapting to networks whose braking and signalling philosophies and operating rules have been developed on national bases which are sometimes very different from one another.

Following a period of stabilization of the specifications, version 2.3.0d was made official and, until end of 2012, was the only version that could be implemented from both infrastructure / track and rolling stock perspectives.

At a technical level, ETCS level 1 uses a specific transmission mode, Eurobalises installed on tracks, to send information from track to on-board, while level 2 uses the GSM-R to exchange information bi-directionally between track and on-board. So far, level 1 has typically been superimposed on traditional national lateral signals, while level 2 was used for new lines.

Equipping the Corridor with ETCS depends on national projects incorporated into national ETCS deployment strategies. These projects did not start at the same time and each project has its own planning. The ETCS deployment realized through these national projects is not limited to corridor sections. Once ETCS is installed, the deactivation of national legacy systems has to be decided on a country per country basis.

- The LFP section is equipped only with ETCS. Trains using this infrastructure must be equipped with ETCS
- In France, the national KVB legacy system will be decommissioned at some point in the future. The date of the decommissioning is not yet determined
- In Slovenia, the mandatory use of ETCS on the Corridor is expected to be enforced 10 years after its installation in-track
- In Croatia, the project started in 2013, the Study of ERTMS implementation completed and HŽI plans to apply for the 3rd CEF Call Project of implementation of GSM-R on the whole Mediterranean corridor (FS, CBA, design and build). HŽI is waiting the approval from the Ministry. The plan for the implementation of 2023
- In Hungary, it is expected that use of ETCS will be made compulsory on the corridor lines. No date has been set yet

ERTMS deployment plans

The following deployment plans could be subject to changes and all information about planning and financing are without prejudice of each national deployment plan and European decision making.

The ERTMS deployment plan on Spanish part of Mediterranean Corridor and LFP

Mixed Traffic Line (Barcelona-Figueres-Perpignan (FR))

ERTMS Level 1.
- Section Perpignan – Figueres Vilafant LFP: delivery in service in February 2009.
- Section Figueres Vilafant – LFP: Put in service in December 2010.
- Section Bif. Mollet – Figueres: Put in service in December 2012.
- Section Barcelona Sants – Bif. Mollet Put in service in April 2013.

ERTMS Level 2.
- Section Barcelona Sants – Figueres Vilafant: Pending completion of the ERTMS L2 works.
- Section Figueres Vilafant – Perpignan (FR - LFP): Pending migration towards version 2.3.0d.

Conventional Line (Can Tunis – Castellbisbal – Nudo de Mollet – Bif. Gerona Mercaderies Villa Maya – Figueres Vilafant)

ERTMS Level 2.
- Section Can Tunis – Castellbisbal – Nudo de Mollet (double track with third rail): New contract including design + installation was awarded in June 2022. Place in service expected in 2024.

Conventional line (Castellbisbal – Bifurcación Vilaseca)

ERTMS Level 2.
- Works are ongoing in this double track with third rail section. Place in service expected in 2024.

Conventional Line (Bifurcación Vilaseca – L´Ametlla de Mar (Vandellós)

ERTMS Level 1.
- Section Bifurcación Vilaseca – L`Hospitalet de l`Infant: Put in service in January 2020.
- L`Hospitalet de l`Infant – L´Ametlla de Mar (double track, 1668 mm, quite short stretch): installed but in final test phase. Expected at the beginning of 2023.
- Gauge change works awarded. Place in service expected in 2024 or at the beginning of 2025

Conventional Line: Valencia – Castellón – L´Ametlla de Mar (Vandellós)

ERTMS Level 1.
- Valencia – Castellón section: double track with third rail section. Place in service expected in 2024.
- Castellón – L´Ametlla de Mar (Vandellós) section: gauge change Works awarded. Place in service expected in 2025.

Conventional Line (Valencia – La Encina)

ERTMS Level 2.
- Works are ongoing in this UIC double track section. Expected in service in 2025. Contract already awarded.

HSL for passengers and freight (Valencia – La Encina)

ERTMS Level 2.
- Contract already awarded.

HSL (La Encina-Monforte-Beniel)

ERTMS Level 2.

- In service between La Encina – Monforte – Beniel (but it is exclusive LAV up to San Isidro, between San Isidro and Murcia freight will also use it). Beniel - Murcia, in test phase. Place in service expected in 2022 Q4.

The expected final situation is shown below on the map:

The ERTMS deployment plan on French part of Mediterranean RFC

HSL for passengers and freight LFP (Figueres – Perpignan)
ERTMS Level 2.

- Already in service

HSL for passengers and freight (Nîmes – Montpellier)
ERTMS Level 1.

- V. 2.3.0d, over KVB (French control system class B). 60 km + several junctions with the French network. Operated by SNCF Réseau, maintained by OcVia.

Further deployments

- The present strategy on the conventional network is to deploy ETCS level 2 Baseline 3 while decommissioning lateral signalling and KVB. The French Implementation Plan is presently under revision and will be issued by 2023.

The ERTMS deployment plan on the Italian part of Mediterranean RFC

Rete Ferroviaria Italiana has started an ambitious network update that foresees the deployment of ERTMS system on all national railway infrastructure (around 16.800 km) according to the Baseline 3 Release 2 (SV 2.1). RFI proposal is described in the document "ERTMS accelerated plan" that will be implemented within 2036. The plan is partially financed with the fund foreseen by the National Recovery and Resilience Plan (NRRP) defined on the basis of the Next generation EU program (NGEU).

The strategy adopted for the definition of the ERTMS accelerated plan has been agreed with all the stakeholders and the new NIP (National Implementation Plan) will include the ERTMS deployment program identified.

Concerning the ERTMS deployment plan for the sections on the Italian network included in the alignment of the Mediterranean Corridor - RFC 6, the lines for which projects and construction contracts are already awarded and in construction phase are indicated in the following table:

Line	RFC/CNC	Level of ERTMS	SV
Novara – Milano- Verona - Vicenza – Padova – Mestre	RFC6 principal route/CNC Mediterranean	Level 2	2.1
Vicenza – Castelfranco V. – Portogruaro	RFC6 Alternative route (OS-RFC 5)	Level 1 with Radio Infill	2.1
Portogruaro – Bivio d'Aurisina – Villa Opicina/Trieste	RFC6 principal route/CNC Mediterranean (OS-RFC 5)	Level 1 with Radio Infill	2.1

Concerning the other lines to be equipped, the scheduling is indicated in the following table:

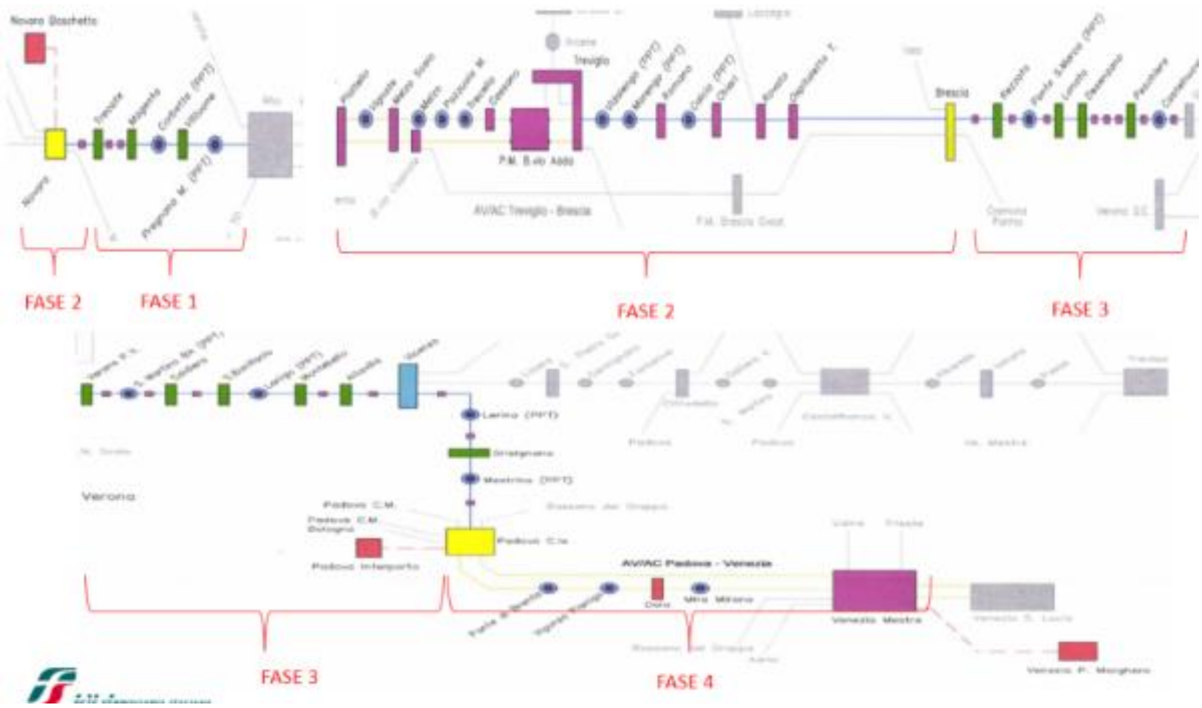
Anno Piano ERTMS - REV.P per PNRR	Linea da piano	KM Piano
2026	MODANE FOURNEAUX - QUADRIVIO ZAPPATA (Tratta Modane Fourneaux - Avignan	81,81
2030	MODANE FOURNEAUX - QUADRIVIO ZAPPATA (Avignana - Quadrivio Zappata)	21,55
2025	TORINO (e) - SETTIMO - NOVARA (Chivasso - Novara)	71,35
2030	TORINO (e) - SETTIMO - NOVARA (Nodo di Torino - Chivasso)	28,39
2031	TORINO PORTA NUOVA - ALESSANDRIA	90,08
2029	ALESSANDRIA - TORTONA	21,92
2022	DEV.ESTR. NOVARA LATO MILANO - MILANO PORTA GARIBALDI (fino a RHO)	47,46
2023	MILANO LAMBRATE - MILANO SMISTAMENTO	3,78
2024	MILANO SMISTAMENTO - PIOLTELLO-LIMITO	4,73
2022	PIOLTELLO - BRESCIA	70,53
2022	BRESCIA - VICENZA	116,30
2022	VICENZA - PADOVA	30,27
2031	VICENZA - TREVISO CENTRALE	60,06
2023	PADOVA - VENEZIA MESTRE	28,50
2027	PORTOGRUARO - VENEZIA MESTRE	59,34
2035	TREVISO CENTRALE - PORTOGRUARO-CAORLE	52,46
2034	PORTOGRUARO - CERVIGNANO - TRIESTE	85,66
2029	BIVIO D'AURISINA - VILLA OPICINA - CONFINE DI STATO ITA-SLO (LATO SEZANA)	15,62

The solution with Level 1 ERTMS is only transitory pending the migration of the stations and the sections to multi station computer based Interlockings (IXL) and therefore to ERTMS Level 2.

The ERTMS Baseline implemented Trackside will be the Baseline 3 (SRS 3.6.0, Release 2 Annex A TSI CCS) because it offers better performance, and it is particularly suitable for the freight traffic. (to take advantage from the optimised functionality specified for the freight traffic, as train categories, the Infill by Radio, etc.).

Focus on Construction on-going phase

Novara – Milano- Verona - Vicenza – Padova – Mestre state of the art



The construction of the ERTMS / ETCS system on the Novara - Padua - Venice section is currently divided into the phases listed below:

- **Phase 1:** Novara (e) - Rho (e) section, with RBC1 activation and related Backup at Milano Graco Pirelli PC;
- **Phase 2:** Pioltello (i) - Brescia (e), over RBC1, in Pioltello(i) – Sommacampagna(e) over RBC2 (sito a Milano Greco Pirelli);
- **Phase 3:** Brescia (e) - Sommacampagna (e) and Verona (e) - Vicenza (e) - Padua (e), over RBC2 at PC Verona P.N., Verona P.N. (e) – Padova(i) over RBC3 located at PC Verona P.N;
- **Phase 4:** Padua (i) - Venice Mestre (i) + Novara + Vicenza (ERTMS L1) +Brescia.

Phase 1 Novara - Rho was activated in June 2021 with the simultaneous activation of RBC # 1 located at the Greco Pirelli Central Place in Milan, on this line was already in operation the ACCM Module 6, Hitachi. The implementation of ERTMS / ETCS L2 took place following the reconfiguration of the ACCM / SCCM systems on the section.

According to Commitment Plan the following application contract of AQ (Framework Agreement) of maintenance n. 49/2020 with Hitachi was signed:

- C.A. 284/2020 for SCMT reconfiguration
- C.A. 409/2020 for AG development e 1^AS of V424a interface of ACCM Module 6
- C.A. 147/2021 for SCCM reconfiguration for the purposes of the interface con RBCs signed

The second activation step will concern **Phase 3** and in particular the **Brescia - Padua** section with the simultaneous construction of the RBC # 2 located at the Central Place in Verona P.N.; on these line was already in operation the ACCM Module 4 Hitachi. For this step, the authorization for place in service request by RFI to the NSA is expected in 2023. As regards the reconfiguration of the pre-existing IXL

systems, the Reconfiguration Application Contract for Multistation IXLs (ACCM)/SCCM has been stipulated. Test runs for Phase 3 will begin in 2023.
The section is in part over control of DOIT Verona (from Brescia to Vicenza) and in part of DOIT Venezia (from Vicenza to Padua).

On the line insist two projects of infrastructural and technological upgrade related to the realization of Brescia – Verona – Bivio Vicenza (AV/AC) line:

- Brescia Est (Bivio Rezzato) – Verona (1° lotto funzionale della Brescia-Verona AV/AC);
- Verona – Bivio Vicenza.

The scheduled activities from 2023 are ran test on the section Brescia – Sommacampagna, these tests will allow the tuning of the new version of Generic Application of SST SDT ERTMS L2 and of ACCM. This test followed by test of Specific Application on section Verona- Vicenza and Vicenza- Padua.

The third activation step will concern **Phase 2** of the Project and in particular the section from **Pioltello(i) to Brescia(e**); on this line was already in operation the ACCM Module 3 Hitachi. As far as the RBC is concerned, the reconfiguration of the RBC # 1 already located at the Central Place of Milan Greco Pirelli will take place. For this step, the authorization for place in service request by RFI to the NSA is expected in June 2023. The section is all over control of DOIT MI. Today on this line insist an infrastructural upgrade project:

- Realization of 'last mile' on the station of Melzo Scalo.

The section Pioltello (i) - Brescia(i) is characterized by some new element compared to that we have realized to Novara-Rho [Phase 1] e Brescia – Padova [Phase 3]:

1. Level Transition point conditioned by itinerary;
2. Presence of PP-ACC (technology of Bombardier) managed by PCM of ACCM Module 3
3. Handover on Brescia station.

The reconfiguration activities, necessary of ERTMS L2 implementation, involve two different contractors:

- Bombardier (BTI) for PP-ACC and SCMT for installation and section except Bivio Casirate and Brescia
- Hitachi for PP-ACC e SCMT of Bivio Casirate and Brescia, ACCM Module 3 and SCCM

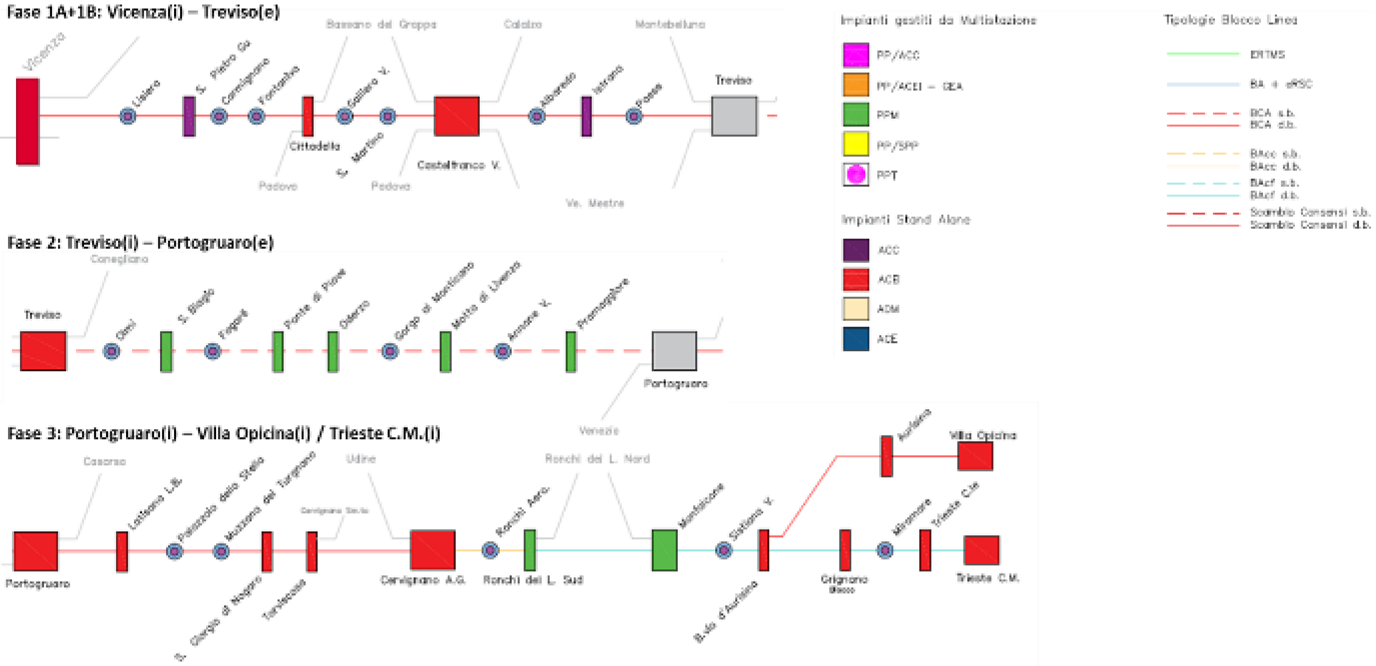
The fourth activation step will concern **Phase 4** of the Project and in particular the section that goes from **Padua to Venice Mestre** with the simultaneous construction of RBC # 3 located at the Venezia Mestre Central Place. The implementation of ACCM from Padua to Venice Mestre as an extension of the ACCM Node of Venice will be necessary and preparatory for the activation. As far as the RBC is concerned, the reconfiguration of the RBC # 1 already located at the Central Place of Milan Greco Pirelli will take place and the reconfiguration of the RBC # 2 located at the Central Place of Verona PN to implement both the L1 <- level transitions > L2 in Vicenza and the Hand Over function between RBC # 1 and RBC # 2 in Brescia and the Hand Over function between RBC # 2 and RBC # 3 in Padova.
The section is totally over control of DOIT Verona; today isn't present an ACCM: the strategy of realization of ERTMS L2 expect the realization of ACCM such an extension of the ACCM Venezia with PCM of Venezia Mestre.

The exercise program expect the realization of ACCM over historic line and AV/AC confirming the inclusion on ACCM Venezia Mestra- Venezia Santa Lucia, with two communication P/D at Dolo.
The activation of ERTMS / ETCS L2 will require the upgrade of the Relay IXL in Novara, which will be transformed into Computer base IXL; as for the other phases, the ACCM will be reconfigured as well to be linked with RBC

For this step, the Authorization for place in service request by RFI to the NSA scheduled for December 2023.

Moreover, RFI's objective is also to put into service on the Novara - Rho section the first commercial application of ERTMS / ETCS Level 2 with virtual balise functionality created using satellite technology. The Aln668-1919 vehicle is being adapted for the test campaign; before these, a campaign to measure satellite coverage from Novara to Rho is planned. Activation is expected in 2023.

Vicenza – Villa Opicina – Trieste C.le/Trieste C.M. state of the art



The planned activities are those indicated in the table below:

Track	Activity	Interlocking	ETCS Level	BL	Request for Commissioning	COMM
Activity 1: Vicenza-Treviso	ERTMS equipment + SCMT.	Upgrading Electronic IXL	L1 + RI (RIU-M)	3	**10/2022 (under costruction)**	03/2023
Activity 2: Treviso-Portogruaro	ERTMS equipment + SCMT.	Upgrading IXL multistation	L1 + RI (RIU-M)	3	**04/2023**	09/2023
Activity 3: Portogruaro-Villa Opicina/ Trieste	ERTMS equipment + SCMT.	Upgrading IXL multistation	L1 + RI (RIU-M)	3	**09/2023**	12/2023

The construction of the ERTMS / ETCS system with multi-station Radio Infill technology (RIU-M) on the Vicenza - Villa Opicina - Trieste C. le / Trieste C.M. section is currently divided into the phases listed below:

- Activity 1: Vicenza (i) -Treviso (e);
- Activity 2: Treviso (i) - Portogruaro (e);
- Activity 3: Portogruaro (i) - Villa Opicina (i) / Trieste C.M. (i).

The first activation step will concern Activity 1: The Executive Design was completed (functional design, application design and construction design). The installation of the RIU-M was also completed, with the RIU located at the Central Place in Venice Mestre. The Class B upgrade, preparatory to ETCS implementation, has been place in service in April 2022. The ETCS tests on track began in May 2022.

The reconfiguration of the ACCs of San Pietro in Gù and Istrana will also be carried out by the year 2023. RFI expects to perform the Authorization for place in service request (AMIS) to the NSA by mid-2023.

For activity 1, the trial test take place by 4-13 May 2022 with a train ALn608-1920 from Cittadella to Treviso.

Other run tests on field for Activity 1 were carried out in June and September 2022.

For Activity 2, the AMIS request will be forwarded to the NSA by September 2023. The implementation of ERTMS / ETCS will require a preliminary reconfiguration of the ACCM between S. Biagio and Pramaggiore, for which the application contract with the supplier must be signed by RFI IXL.

For Activity 3, the AMIS request will be forwarded to the NSA by December 2023. The implementation of ERTMS / ETCS will require a preliminary reconfiguration of the ACCM between Monfalcone and Ronchi for which the application contract with the IXL supplier (which has already sent its technical report in this regard).

Milan Node HD ERTMS

The Milan node, Rho – Pioltello, with the HD ERTMS project, provides the following interventions:

- Adjustment of PP-ACC of Rho;
- Realization of PP-ACC in Milano Certosa (activation scheduled for the second part of 2025);
- Activation of PP-ACC of PM Turro;
- Reconfiguration of new PP-ACC in Milano Lambrate;
- Adjustment of block sections and of Bivio Lambro, scheduled for first part of 2024.

The ERTMS deployment plan on Slovenian part of Mediterranean RFC

Slovenian part of ERTMS deployment on Mediterranean RFC originates back to »Deployment of ERTMS/ETCS on Corridor D«, for which the European Commission approved funding for the TEN-T co-financing in the Republic of Slovenia.

Mixed conventional line (Ljubljana – Sežana – border ITA)

The trackside deployment of the ETCS requested Level 1 with version 2.3.0d, overlaid with existing INDUSI I60 national signalling system. The transition period of 10 years will allow using ETCS level 1 and/or INDUSI I60 indifferently.

- Section Ljubljana – Pivka in operation from Q2 2017
- Section Pivka – Sežana – border ITA in operation from Q2 2017

Mixed conventional line (Divača - Koper)

The trackside deployment of the ETCS requested Level 1 with version 2.3.0d, overlaid with existing INDUSI I60 national signalling system. The transition period of 10 years will allow using ETCS level 1 and/or INDUSI I60 indifferently.

- Section Divača - Koper in operation from Q2 2017

Mixed conventional line (border CRO – Zidani Most – Ljubljana)

The trackside deployment of the ETCS requested Level 1 with version 2.3.0d, overlaid with existing INDUSI I60 national signalling system. The transition period of 10 years will allow using ETCS level 1 and/or INDUSI I60 indifferently.

- Section Zidani Most - Ljubljana is in operation from Q2 2017

Deployment of ERTMS/ETCS (Level 1, baseline 3-set 2 overlaid existing INDUSI I60 national signalling system), online section (Zidani Most – Dobova – border HR) for which the European Commission approved funding for the CEF co-financing in the Republic of Slovenia with the agreement no. INEA/CEF/TRAN/M2015/1125663 for action no. 2015-SI-TM-0111-W.

- Section border CRO – Dobova – Zidani Most in test operation all the works were completed, and NSA issued operating permit in Q4 2020 (section is still in test operation)

Mixed conventional line (Zidani Most - Pragersko – border HU)

The trackside deployment of the ETCS requested Level 1 with version 2.3.0d, overlaid with existing INDUSI I60 national signalling system. The transition period of 10 years will allow using ETCS level 1 and/or INDUSI I60 indifferently.

- Section Zidani Most – Pragersko in operation from Q2 2017
- Section Pragersko – Murska Sobota in operation from Q2 2017
- Section Murska Sobota – Hodoš – border HUN in operation from Q2 2017

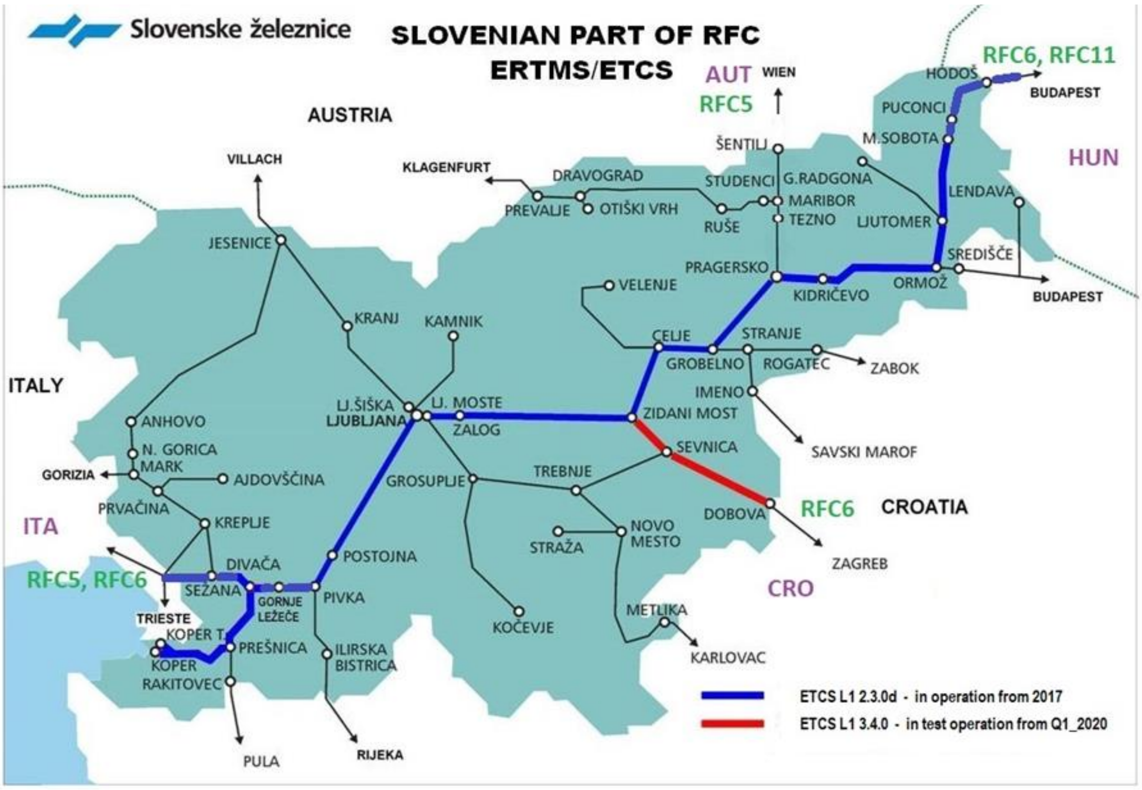
Plans till end of 2026:

1) Bilateral meetings with RFI, MAV (2013/2014 both bilateral ERTMS working Groups were established) and HŽI (Bilateral working Group SŽ-I /HŽI was established in 2018)

The main activities which to be carried out:

- Coordination for establishing technical and traffic/operational rules on border section.
- Preparation of Test cases from both parties which have to be put together in a single document.
- Processing and entering ETCS on-board data.
- Execution of test runs with locomotive equipped with appropriate on-board ETCS equipment.

2) Construction of a **new railway connection** between Divača and Koper (called 2TDK), which will also be equipped with ETCS Level 1, baseline 3-set 2. The project is expected to be completed in Q4 2026.



GSM-R:

All sections of the Mediterranean RFC are equipped with GSM-R. The system is in operation from Q4 2017.

The ERTMS deployment plan on Croatian part of Mediterranean RFC

ETCS

In Croatia, it is expected that use of ETCS Level 1 will be implemented on a section line Dugo Selo – Križevci in 2026, Križevci – SB by the end of 2026, and on a section line Hrvatski Leskovac – Karlovac by 2027.

GSM-R

For now, at the corridor there is no GSM-R. HŽI plans implementation of GSM-R on the whole Mediterranean corridor in 2030.

The ERTMS deployment plan on Hungarian part of Mediterranean RFC

ETCS L2 and GSM-R installation are ongoing or under preparation on some section of the corridor (detailed in following parts).

Section [border to Slovenia]–Őriszentpéter–Boba (102 km)

The rail link between Slovenia and Hungary was established in 2000, when a new rail line was built to cover the 19 km long gap along the Hungarian side of the border.

The 19 km long section connected to the border was built between 1998 and 2000. The remaining 83 km long part has been reconstructed and significantly upgraded from a former branch line. Following the upgrading the line now has electronic interlocking installed on its whole length.

ETCS level 1 system was equipped on the line in 2004. ETCS level 2 has been installed on the whole length of the line, i.e., the old level 1 section has also been upgraded. Level 1 TSS - as fall-back system - remains on section Zalacséb - Salomvár - Hodoš, however, this section has also level 2. Őriszentpéter - Hodoš section remains pure level 1, because of SZ installs level ETCS Level 1 and this section is used as a GSM-R radio communication "entry section".

This section served as ETCS L2 pilot section (supplier: Thales).

ETCS L2 is available for commercial service from 12 December 2021.

Section Boba–Celldömölk–Győr (82 km) (alternative)

The line is single track with the exception of a 10 km long section, allowed speed is 100 km/h. Freight flows are split at Boba between this section and the direct line to Budapest.

Reconstruction of the line has not been commenced yet. Subsequently, only four out of eleven interlocking systems on the line are capable of providing standardised interfaces for ETCS. Installing ETCS under the present technical circumstances would require to virtually rebuilding the system in case of a future track reconstruction.

Trains can therefore run without a requirement for on-board train control equipment of any type, and basic interoperability remains maintained. GSM-R is already in operation.

Section Győr–Kelenföld (alternative)

This section is a common part of RFC 6, RFC 7 and RFC9. GSM-R and ETCS level 1 is already in operation. Upgrading the ETCS level 1 has been executed.

ETCS L1 is in commercial service.

Section Boba – Székesfehérvár (excl.)

The rail link between Boba and Székesfehérvár is 114 km long. 90% percent of the stations are equipped with Domino55 relay interlocking system. Two branch stations are electro-mechanical with light signals. One station is a former Russian-style interlocking, another one is a Domino67 system.

Now largest part of freight traffic coming from Slovenia is rolled on this section.

GSM-R is in second part GSM-R installation phase, up to 2023.

Székesfehérvár station (node)

Székesfehérvár is a large station (with 6 directions, including two double-track connections). The old electro-mechanical and relay interlocking has been recently replaced by Elektra electronic one; the project contained an RBC connected to the interlocking system, only for Székesfehérvár. Of course, RBC is active if the line towards Budapest has active ERTMS/ETCS L2, too. Low-cost EVM (legacy) remains.

ETCS L2 is available for commercial service.

Székesfehérvár (excl.) – Kelenföld (excl.)

This line is a 63 km long rail link. Its recent reconstruction finished in 2014. All (6) stations with SIMIS IS electronic interlocking. ETCS L2 was part of the signalling reconstruction. This section serves as ETCS L2 pilot section (supplier: Siemens).

Now largest part of freight traffic coming from Slovenia is rolled on this section.

ETCS L2 is available for commercial service. EVM (legacy ATP) remains parallel with ETCS L2.

Kelenföld, Ferencváros and Kőbánya-Kispest (large nodes in Budapest area)

(OS-RFC 7) This section is a common part of RFC6, RFC7 and RFC9.

ETCS L2 is available for commercial service between Kelenföld and Ferencváros. Adjacent sections towards Kőbánya-Kispest to be equipped at later stage, when connecting sections towards Monor become interoperable.

Kőbánya-Kispest (excl.) – Szajol (incl.)

99 km long rail link. Its reconstruction happened recently. Its middle-sized stations are equipped with relay (Domino55 and Domino70) and electronic (Elektra 1/2, SIMIS IS) interlocking. Two RBCs will be in duty. Normal EVM (legacy ATP) remain parallel with ETCS L2.

Szolnok is a large station with independent marshalling yard (m.y. is out of operation). Marshalling activity is in station area is active. Now Domino70 is in operation, but it will be replaced by an electronic/relay one. Independent RBC is planned for Szolnok. The line section is 10 km long.

Some block sections and a small station (equipped with a Domino55 system) between Szolnok and Szajol. ETCS L2 is part of the finished ETCS installation.

(OS-RFC 7) This section is a common part of RFC6 and RFC7.

Szajol is the branch station between RFC6 and RFC7. Equipped with SIMIS IS electronic interlocking; RBC is part of ongoing ETCS L2 installation activities.

On the section Monor–Szajol ETCS L2 is available for commercial service from 12 December 2021.

Szajol (excl.) – Püspökladány (incl.)

67 km long track and interlocking reconstruction is ready just end of 2015. All (5) stations are equipped with Elektra electronic interlocking. The interlocking project contains RBC but not complex ETCS L2 installation. Low-cost EVM (legacy ATP) remain parallel with ETCS L2.

The final commissioning of ETCS L2 is expected in 2023.

Püspökladány (excl.) - Debrecen (incl.)

44 km long track and interlocking reconstruction is planned to be finished at the end of 2023. Domino55 relay interlocking remain on all (3) stations. Domino70 relay interlocking of Debrecen will be replaced by a new electronic/relay one. Low-cost EVM (legacy ATP) remain parallel with ETCS L2.

The final commissioning of ETCS L2 is expected in 2023.

Budapest (excl.) – Miskolc – Nyíregyháza

270 km long railway line.

The suburban section between Budapest and Hatvan the line is upgraded and will be equipped with ETCS L2 until 2023.

Between Hatvan and Miskolc (120 km) track and interlocking reconstruction is planned for 2030. Old relay interlocking between Budapest and Hatvan stations will be replaced (call-for tender is ongoing). Between Hatvan and Miskolc, Domino55 relay interlocking on middle-sized stations remain. Miskolc area will be replaced by a new electronic one.

Between Miskolc and Nyíregyháza (90 km) no reconstruction planned up to 2030. The whole line is planned for ETCS L2. Estimated GSM-R and ETCS L2 PIO: after 2025.

Budapest (excl.) – Dombóvár – Gyékényes border (incl.)

265 km long railway line.

- Between Budapest and Pusztaszabolcs (50 km) track and interlocking reconstruction is ongoing. Old electro-mechanical interlocking between Budapest and Pusztaszabolcs stations is replaced. ETCS L2 is available for commercial service between Budapest and Százhalombatta from 12 December 2021.
- Between Pusztaszabolcs and Dombóvár, Domino55 relay interlocking on middle-sized stations remain.
- Between Dombóvár and Kaposvár Domino55 relay interlocking on middle-sized stations remain.
- Between Kaposvár and Gyékényes no reconstruction planned up to 2030.
- The suburban line section is planned for ETCS L2. Estimated GSM-R and ETCS L2 on Budapest – Pusztaszabolcs section up to 2023.

Cost Benefit Analysis

Costs

The costs are incurred at national level; when available, they have been described in the sections above.

Interoperability

Until the deployment of ETCS, railway undertakings have to change their locomotives every time they cross a border, or they have to equip these locomotives with multiple expensive on-board control command systems. The first choice has a negative impact on travel time and on rolling stock management. The second is expensive.
With ETCS, they will be able to use locomotives that can run from the origin to destination with a single on-board control command system. This will facilitate asset management, save journey time and reduce costs.
On top of that, ETCS will enable a driver to run an international train with the sole knowledge of ETCS related driving rules. In contrast, with the current situation were a driver is allowed to run in several countries only if he/she has been trained to use each national legacy system.

National legacy systems ("Class B") renewal

All the Infrastructure Managers of Mediterranean RFC consider that ETCS will replace in the mid run or in the long run, the national Control Command systems in use, and will hence provide a solution to the obsolescence of these legacy systems. However, the deadline is not the same among infrastructure managers.

This benefit however should not be overestimated as the deployment of ETCS will not be as simple as the mere renewal of legacy systems. The complexity will depend on the characteristics of the legacy systems but in some cases, the new and the old systems will have to cohabit for many years and the old system may even have to be renewed after the deployment of ETCS.

Increased competition

ETCS is an opportunity for a Railway Undertaking to use its own rolling stock and act with open access, opening up competition and potentially bringing prices at market level

Reduction of externalities

With cost savings and increased competition, the railway mode should become more attractive and gain market share, hence reducing road congestion, greenhouse effect emissions and air pollution. On top of that, players who will switch from road to rail will enjoy cost savings or journey time reduction.

Safety

ETCS is a state-of-the-art tool as far as safety is concerned and, at various degrees and its deployment provides infrastructure managers with benefits from an increase of safety compared to the safety provided by their legacy systems.

Recovery in the event of disturbances

In France, ETCS will allow a faster recovery in the event of disturbances compared to the current KVB legacy system which is driven by the so-called VISA driving principle. Consequently, the deployment should lead to more robust performances.

Conclusion

The computation of a monetary value for the benefits listed above is difficult, as corridor members/partners use different methods to assess them. This is specifically the case for the assessment of safety improvement. On top of that, the value of time saved thanks to ETCS when operating a railway node is a factor that cannot be determined, as it is sensitive to the node characteristics, and the time and conditions of operation.

All in all, corridor members and partners share the view that the ground deployment of ETCS does not provide an immediate financial return on investment nor a positive socio-economic net asset value. The traffic gains induced by the use of ERTMS are presently difficult to assess, especially in the starting phase when few trains will be running in ETCS mode.

What is more, the socio-economic benefits of ETCS vary a lot from one country to another as it depends on the characteristics of the legacy control command system and on the size of the country.

6.4 Reference to Union Contribution

Mediterranean RFC was established and developed thanks to the co-financing received by the European Commission.

Recently, it was the recipient of the following funding awarded from the European Commission:

- CINEA.B – Sustainable networks and investments B.2 – CEF Transport: Central and Southeast Europe + ATM and JTM GRANT AGREEMENT Project 101081917 — 21-IT-TG-MedRFC-TA

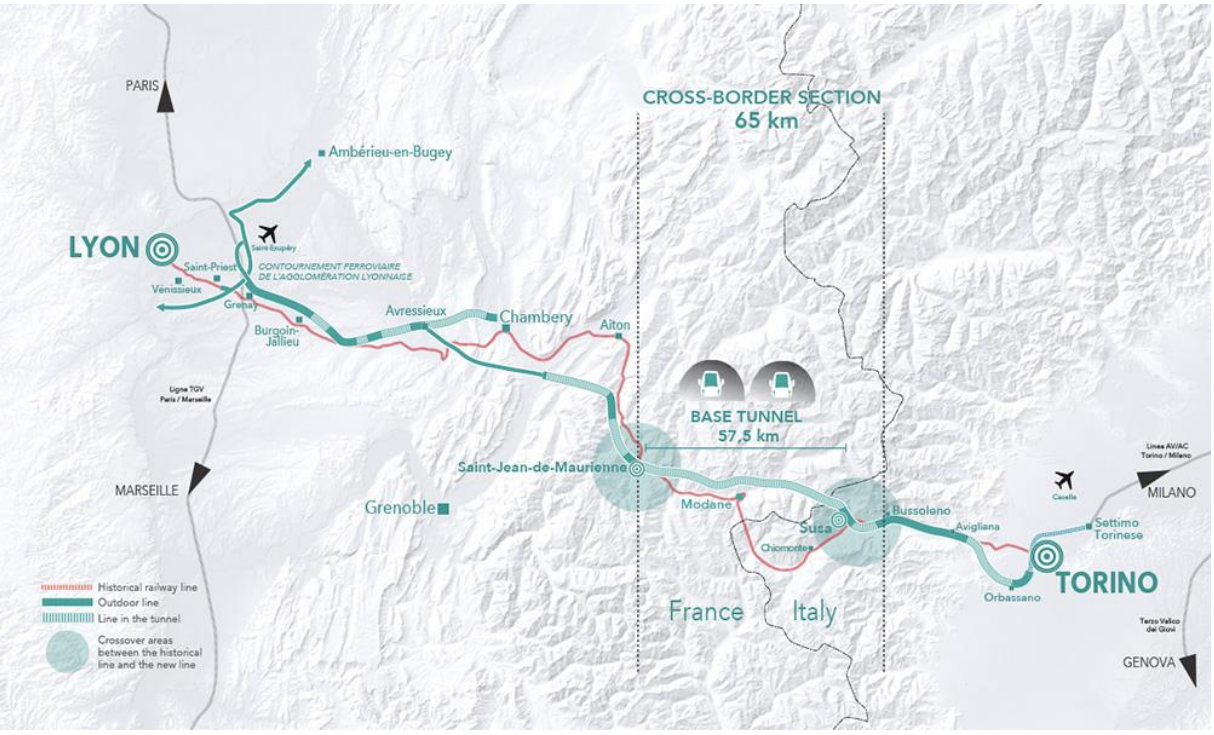
In the past, it was co-financed by the European Commission under:

- Mediterranean Rail Freight Corridor Support to the implementation of the priorities identified by the rail sector to boost international rail freight, INEA/CEF/TRAN/M2016/PSARFC06
- Connecting Europe Facility (CEF) funding, Proposal 2014-IT-TM-0089-S, Action "Upgrade and Strengthening of Mediterranean RFC including Extension to Croatia"
- TEN-T Programme 2007-2013, Decision C (2012) 7813 of the 26.10.2012 concerning "Studies, managerial structures and activities for the establishment of the Mediterranean RFC in line with Regulation No. 913/2010", Action 2011-EU-95093-S
- TEN-T Programme 2007-2013, Decision C (2010) 5873 of the 20.08.2010 concerning "Deployment of ERTMS on Corridor D: Valencia to Budapest", Action 2009-EU-60122-P
- TEN-T Programme 2007-2013, Decision C (2011)3250 of the 06.05.2011, which modifies Decision C (2008) 7888 of the 10.12.2008 concerning "ERTMS implementation on the Railway Corridor D (Valencia-Budapest)"; Action 2007-EU-60120-P

Annex 1 - TELT

The cross-border section of the Lyon-Turin freight and passenger railway line extends over a stretch of 65 km between Susa in Piedmont and Saint-Jean-de-Maurienne in Savoy. The main feature of the work is the 57.5 km long Mont Cenis base tunnel – 12.5 km in Italy and 45 in France – linking the international stations of Saint-Jean-de-Maurienne and Susa, which constitute the connection points to the respective national lines in France and Italy.

Tunnel Euralpin Lyon Turin (TELT) is a company owned 50% by the Italy state, 50% by the French state. This company is not part of the RFC Med, together with the corresponding line.

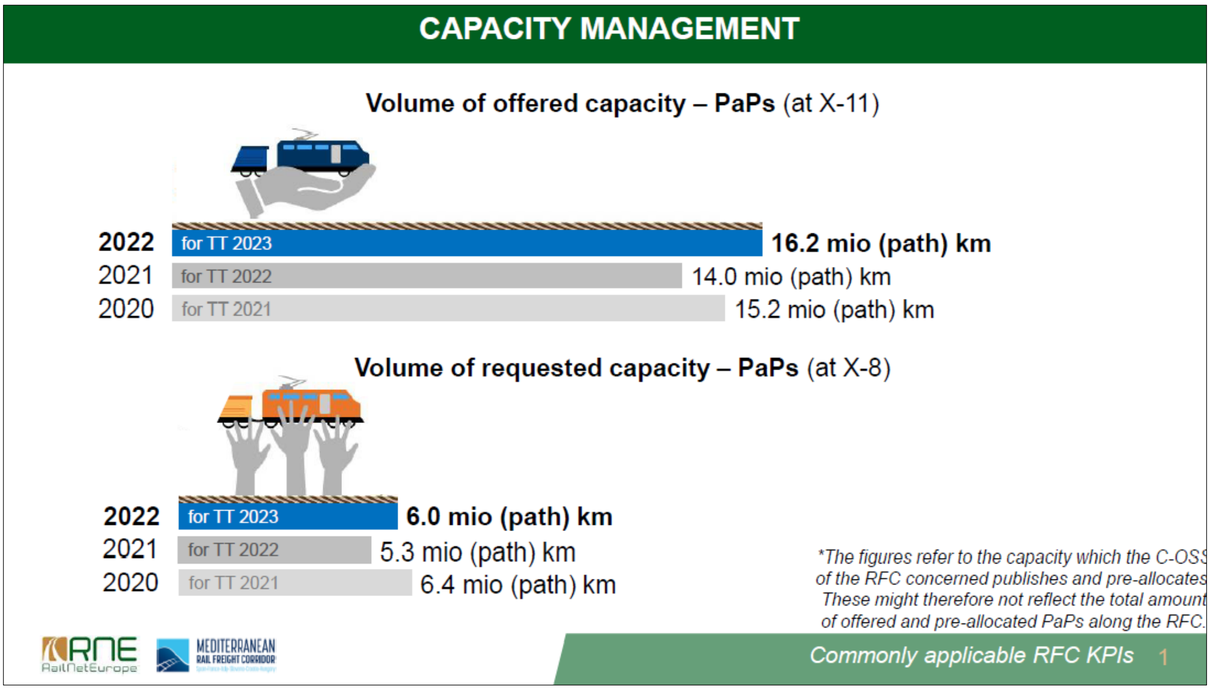


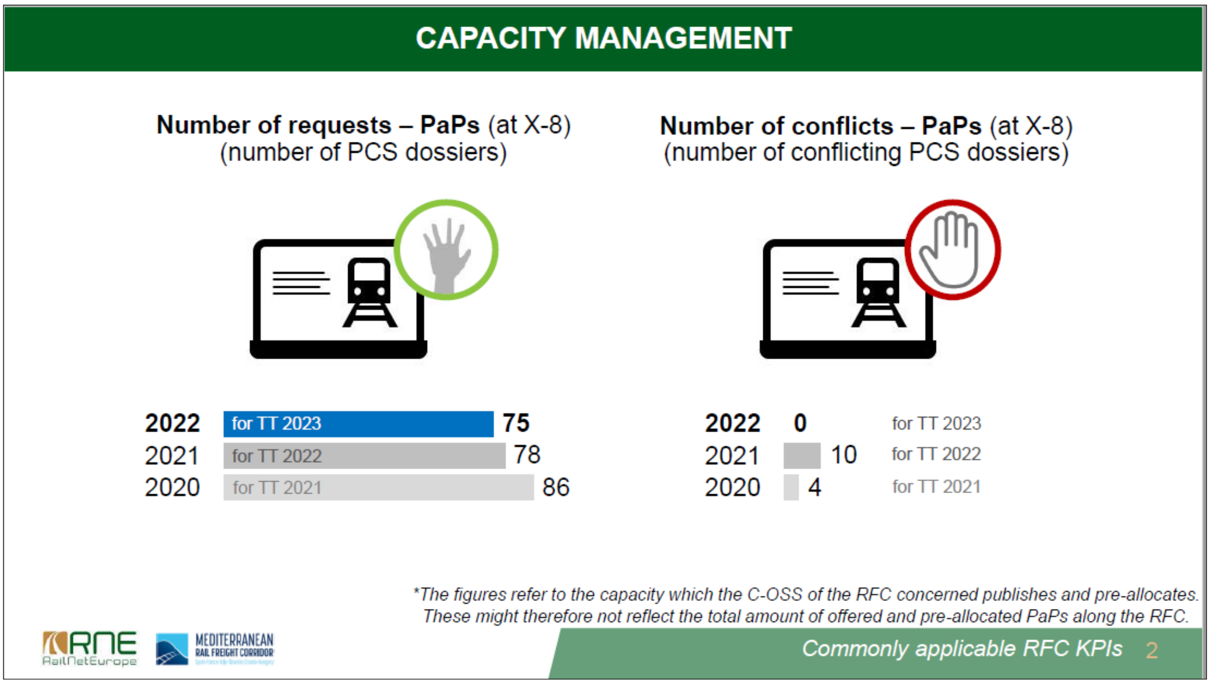
This project includes the development of the construction of the Base Tunnel under Mont Cenis, together with its financial requirements and resources.

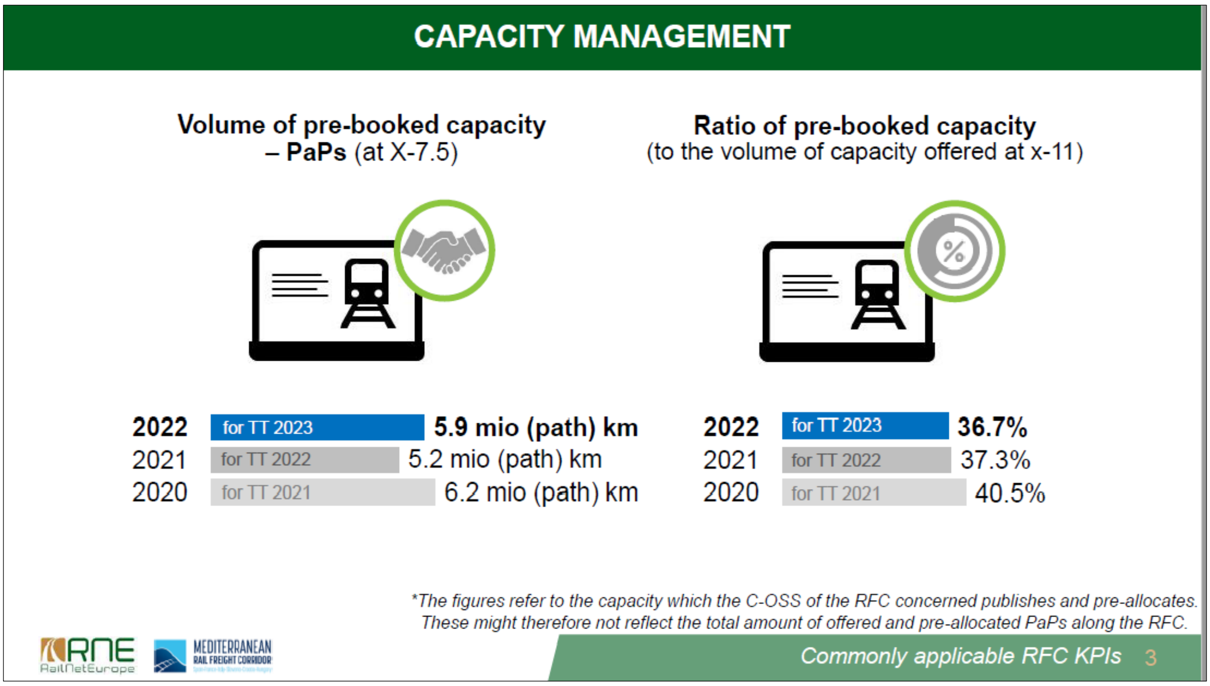
Region (if required)	**Railway section**	**Nature of Projects**	**Benefits for RFC 6**	**Start date of the works**	**End date of the works**	**Actual step**	**Estimation of the costs in M€**	**Funder1**	**Funder2**	**Funder3**
RAA-Piemonte	New Line under the Alps St jean de Maurienne (FR)- Susa (IT)	New line	Safety / Security Higher speed Punctuality improvement Maintenance of performance Capacity improvement Interoperability	2017	2029	Under construction	8,300	EU	French State	Italian State

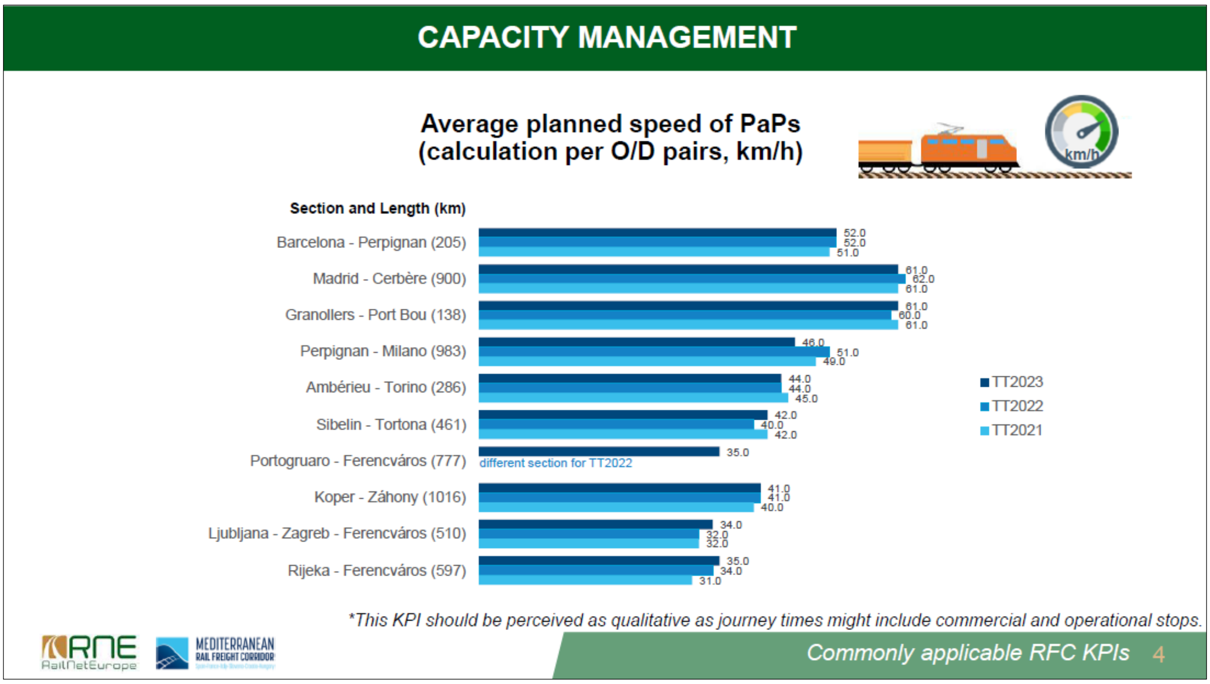
Annex 2 – KPIs

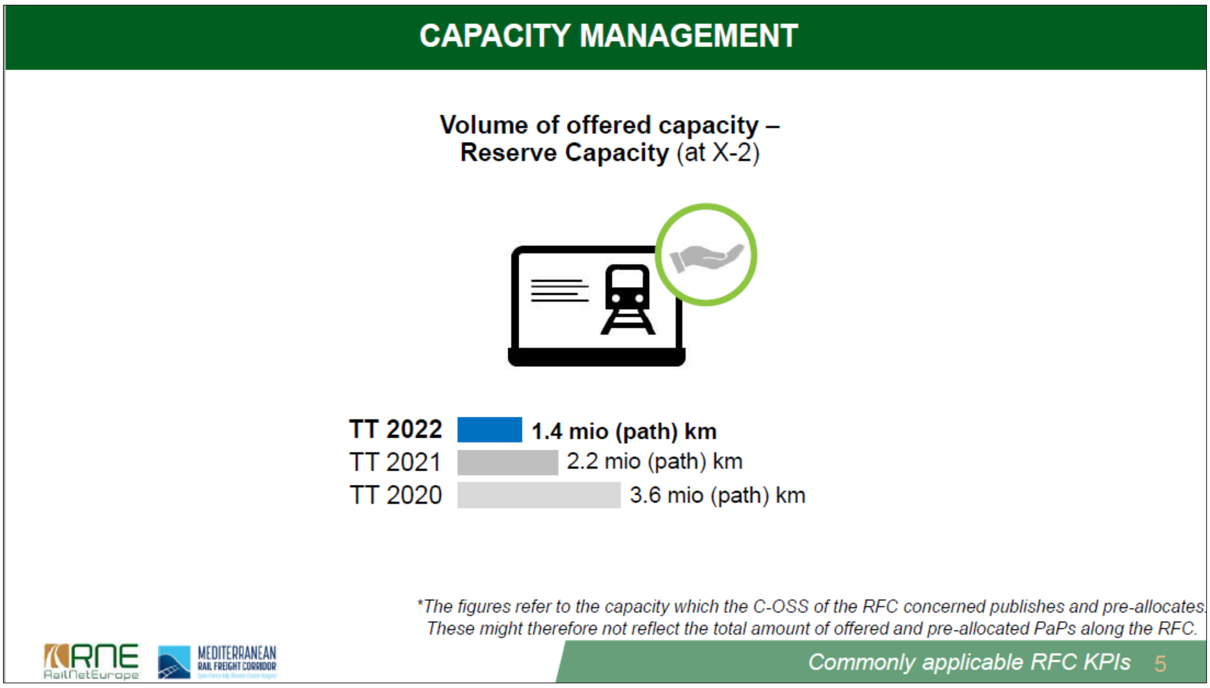

RNE
RailNetEurope
Commonly applicable RFC KPIs
RFC Mediterranean
June 2022
MEDITERRANEAN
RAIL FREIGHT CORRIDOR

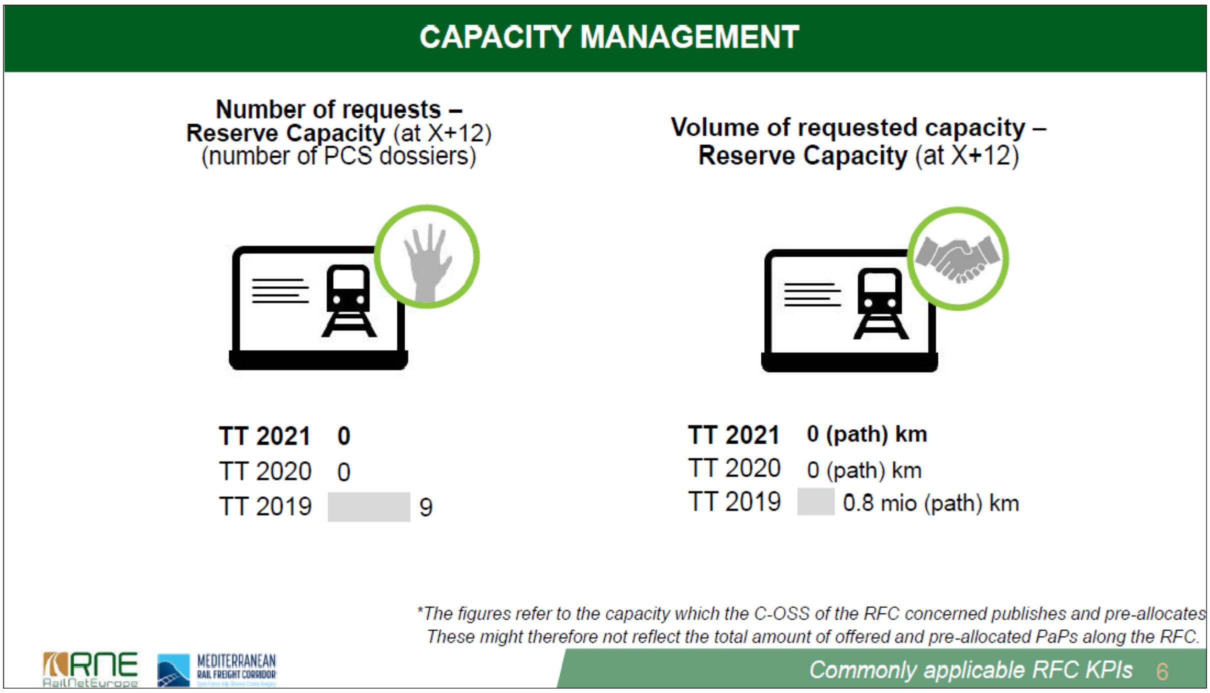

CAPACITY MANAGEMENT
Volume of offered capacity – PaPs (at X-11)
2022
for TT 2023
16.2 mio (path) km
2021
for TT 2022
14.0 mio (path) km
2020
for TT 2021
15.2 mio (path) km
Volume of requested capacity – PaPs (at X-8)
2022
for TT 2023
6.0 mio (path) km
2021
for TT 2022
5.3 mio (path) km
2020
for TT 2021
6.4 mio (path) km
*The figures refer to the capacity which the C-OSS of the RFC concerned publishes and pre-allocates. These might therefore not reflect the total amount of offered and pre-allocated PaPs along the RFC.
Commonly applicable RFC KPIs 1


CAPACITY MANAGEMENT
Number of requests – PaPs (at X-8)
(number of PCS dossiers)
2022
for TT 2023
75
2021
for TT 2022
78
2020
for TT 2021
86
Number of conflicts – PaPs (at X-8)
(number of conflicting PCS dossiers)
2022
0
for TT 2023
2021
10
for TT 2022
2020
4
for TT 2021
*The figures refer to the capacity which the C-OSS of the RFC concerned publishes and pre-allocates.
These might therefore not reflect the total amount of offered and pre-allocated PaPs along the RFC.
Commonly applicable RFC KPIs 2


CAPACITY MANAGEMENT
Volume of pre-booked capacity – PaPs (at X-7.5)
Ratio of pre-booked capacity (to the volume of capacity offered at x-11)
2022 for TT 2023 5.9 mio (path) km
2021 for TT 2022 5.2 mio (path) km
2020 for TT 2021 6.2 mio (path) km
2022 for TT 2023 36.7%
2021 for TT 2022 37.3%
2020 for TT 2021 40.5%
*The figures refer to the capacity which the C-OSS of the RFC concerned publishes and pre-allocates. These might therefore not reflect the total amount of offered and pre-allocated PaPs along the RFC.
RNE RailNetEurope
MEDITERRANEAN RAIL FREIGHT CORRIDOR
Commonly applicable RFC KPIs 3

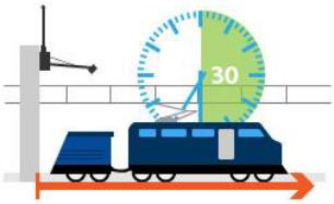

CAPACITY MANAGEMENT
Average planned speed of PaPs (calculation per O/D pairs, km/h)
km/h
Section and Length (km)
Barcelona - Perpignan (205) 52.0 52.0 51.0
Madrid - Cerbère (900) 61.0 62.0 61.0
Granollers - Port Bou (138) 61.0 60.0 61.0
Perpignan - Milano (983) 46.0 51.0 49.0
Ambérieu - Torino (286) 44.0 44.0 45.0
Sibelin - Tortona (461) 42.0 40.0 42.0
Portogruaro - Ferencváros (777) 35.0
different section for TT2022
Koper - Záhony (1016) 41.0 41.0 40.0
Ljubljana - Zagreb - Ferencváros (510) 34.0 32.0 32.0
Rijeka - Ferencváros (597) 35.0 34.0 31.0
TT2023
TT2022
TT2021
*This KPI should be perceived as qualitative as journey times might include commercial and operational stops.
RNE RailNetEurope
MEDITERRANEAN RAIL FREIGHT CORRIDOR
Commonly applicable RFC KPIs 4


CAPACITY MANAGEMENT
Volume of offered capacity –
Reserve Capacity (at X-2)
TT 2022 1.4 mio (path) km
TT 2021 2.2 mio (path) km
TT 2020 3.6 mio (path) km
*The figures refer to the capacity which the C-OSS of the RFC concerned publishes and pre-allocates.
These might therefore not reflect the total amount of offered and pre-allocated PaPs along the RFC.
RNE RailNetEurope
MEDITERRANEAN RAIL FREIGHT CORRIDOR
Commonly applicable RFC KPIs 5


CAPACITY MANAGEMENT
Number of requests –
Reserve Capacity (at X+12)
(number of PCS dossiers)
TT 2021 0
TT 2020 0
TT 2019 9
Volume of requested capacity –
Reserve Capacity (at X+12)
TT 2021 0 (path) km
TT 2020 0 (path) km
TT 2019 0.8 mio (path) km
*The figures refer to the capacity which the C-OSS of the RFC concerned publishes and pre-allocates
These might therefore not reflect the total amount of offered and pre-allocated PaPs along the RFC.
RNE RailNetEurope
MEDITERRANEAN RAIL FREIGHT CORRIDOR
Commonly applicable RFC KPIs 6

OPERATIONS

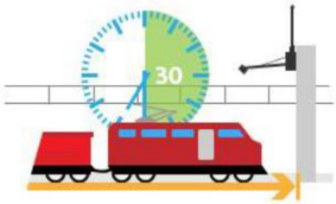
Punctuality at origin (RFC entry)



(delay ≤ 30 minutes)

2021: 60.0%
2020: 64.0%
2019: 56.0%

Punctuality at destination (RFC exit)



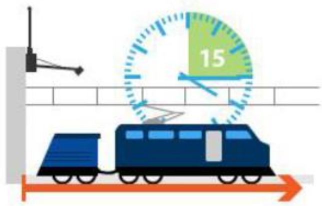
(delay ≤ 30 minutes)

2021: 48.0%
2020: 52.0%
2019: 43.0%

Commonly applicable RFC KPIs 7

OPERATIONS

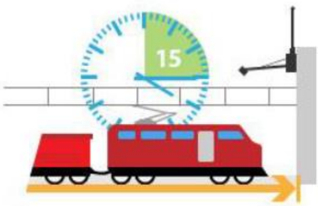
Punctuality at origin (RFC entry)



(delay ≤ 15 minutes)

2021: 55.0%
2020: 59.0%
2019: 53.0%

Punctuality at destination (RFC exit)



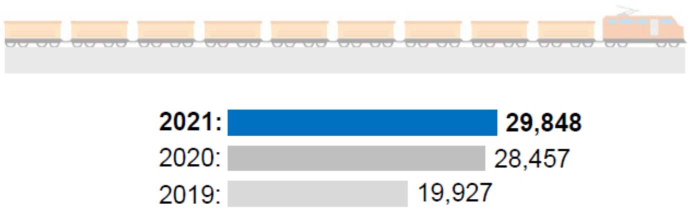
(delay ≤ 15 minutes)

2021: 44.0%
2020: 48.0%
2019: 40.0%

Commonly applicable RFC KPIs 8

OPERATIONS

Number of trains crossing a border along the RFC*



*The calculation of this KPI is based on data in RNE's TIS. International freight trains crossing a border of an RFC are considered in the calculation.

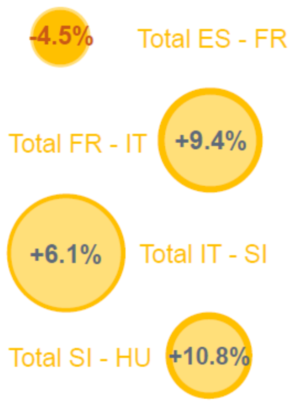
RailNetEurope MEDITERRANEAN RAIL FREIGHT CORRIDOR

Commonly applicable RFC KPIs 9

MARKET DEVELOPMENT

Number of trains per border - Part 1*

	2019	2020	**2021**
Total ES - FR:	N/A	4,778	**4,562**
Total FR - IT:	N/A	7,530	**8,271**
Total IT - SI:	7,186	8,455	**8,973**
Total SI - HU:	N/A	6,097	**6,755**



*The calculation of this KPI is based on data in IMs' systems. The total sum of the figures per border does not correspond to the figure of the KPI 'Overall number of trains on the RFC' due to, among other reasons, the potential double-counting of trains crossing more than one border.

RailNetEurope MEDITERRANEAN RAIL FREIGHT CORRIDOR

Commonly applicable RFC KPIs 10

MARKET DEVELOPMENT

Number of trains per border - Part 2*

	2019	2020	**2021**
Total SI - HR:	N/A	7,300	**7,161**
Total HR - HU:	N/A	8,001	**7,091**

-1.9% Total SI - HR

Total HR - HU -11.4%

*The calculation of this KPI is based on data in IMs' systems. The total sum of the figures per border does not correspond to the figure of the KPI 'Overall number of trains on the RFC' due to, among other reasons, the potential double-counting of trains crossing more than one border.

Commonly applicable RFC KPIs 11

MARKET DEVELOPMENT

Ratio of capacity allocated by the C-OSS and the total allocated capacity*

Location Code	Between member states		Between operational points		Allocated by C-OSS 2019	Allocated by C-OSS 2020	Allocated by C-OSS 2021
EU00120	France	Spain	Cerbère	PortBou	56.0%	66.0%	84.0%
EU00121	France	Spain	SNCF Réseau/LFP	Límite LFP/ADIF	38.0%	53.0%	62.0%
EU00127	France	Italy	Modane	Bardonecchia	56.0%	66.0%	72.0%
EU00151	Italy	Slovenia	Villa Opicina	Sežana	9.0%	10.0%	11.0%
EU00185	Slovenia	Hungary	Hodoš	Őriszentpéter	49.0%	42.1%	7.7%
EU00201	Croatia	Hungary	Botovo	Gyékényes	11.0%	13.0%	18.0%
EU00216	Slovenia	Croatia	Dobova	Savski Marof	6.0%	25.0%	22.0%

*In case of border points with more than one C-OSS responsible (in case of common offer or in case of overlapping sections), the KPI figure presents the combined number of all C-OSSs concerned.

Commonly applicable RFC KPIs 12