Study on the Rhine-Alpine TEN-T Core Network Corridor and support to Coordinator

Phase III of 3rd Study

Final Report
November 2023

Table of contents

1 Abstract 7

2 Outline 8

3 Task 1 Further elaborating the knowledge base of the Rhine-Alpine Corridor 9

3.1 Rail compliance 10

3.2 Airport compliance 10

3.3 IWW compliance 12

3.4 Main corridor achievements between 2018 and 2023 13

4 Monitoring and analysing the state of project implementation and reporting 23

5 Preparing, supporting, and following up on the meetings of the Corridor Forum and its Working Groups 32

5.1 Corridor Forum meetings 32

5.2 Working group meetings 32

6 Conclusions and Recommendations 34

Figures

Figure 1: Airport compliance map for the RALP Corridor 12
Figure 2: Main achievements for Rail + Rail ERTMS on the RALP Corridor (2018-2023) 14
Figure 3: Main achievements for Airports + aviation on the RALP Corridor (2018-2023) 15
Figure 4: Main achievements for IWW on the RALP Corridor (2018-2023).....17
Figure 5: Main achievements for Road on the RALP Corridor (2018-2023) 19
Figure 6: Main achievements for Maritime on the RALP Corridor (2018-2023) 20
Figure 7: Main achievements for Multimodal on the RALP Corridor (2018-2023) 22
Figure 8: Task 3 - Detailed work program and interrelations 23
Figure 9: Evolution of Maturity criteria "expected completion time" since the first PIR 24
Figure 10: Evolution of Maturity criteria "expected completion time" since the first PIR (No. of projects).....25
Figure 11: Evolution of Maturity criteria "expected completion time" since the first PIR (Share of projects) 25
Figure 12: Diagram of finance criterion "project costs (official)" by completion time in the PIRs [€ bn] 27
Figure 13: Diagram of finance criterion "project costs (official)" in the PIRs [Share of completion time clusters] 27
Figure 14: Evolution of project financing sources and value of completed projects (Official costs only) [€ bn] 29
Figure 15: Shares of project financing sources [shares] and value of completed projects (official costs only) 29
Figure 16: Evolution of share of "approved" financing by source on the CNC RALP 30

Tables

Table 1: TEN-T Key Performance Indicators to be updated in TENtec OMC 9
Table 2: Latest Rail KPI compliance rates for the RALP Corridor.....10
Table 3: Latest Airport KPI compliance rates for the RALP Corridor 11
Table 4: Latest IWW KPI-compliance rates for the RALP Corridor.....13
Table 5: Main achievements for Rail + Rail ERTMS on the RALP Corridor (2018-2023) 13
Table 6: Main achievements for Airports + aviation on the RALP Corridor (2018-2023) 14
Table 7: Main achievements for IWW on the RALP Corridor (2018-2023) 16
Table 8: Main achievements for Road on the RALP Corridor (2018-2023).....17
Table 9: Main achievements for Maritime on the RALP Corridor (2018-2023) 19
Table 10: Main achievements for Multimodal on the RALP Corridor (2018-2023).....21

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Version

The version 1.0 was finalised on 30 November 2023.

Abbreviations

CEF	Connecting Europe Facility
CNC	Core Network Corridor
DG MOVE	European Commission's Directorate General for Transport and Mobility
EC	European Commission
e.g.	exempli gratia (English: for example)
ERTMS	European Rail Traffic Management System
EU	European Union
i.e.	id est (English: that is)
IFI	International financial institutions
Infrabel	Belgian Rail Infrastructure Manager
IWW	Inland waterways
Km/h	Kilometre per hour
KPI	Key performance indicator
No.	Number
OMC	Open Method of Coordination
P400	Rail loading gauge
PIR	Project Implementation Report
RALP	Rhine-Alpine Corridor
RFC	Rail Freight Corridor
RIS	River Information Service
TEN-T	Trans-European Transport Network
TENtec	TENtec is the European Commission's Information System to coordinate and support the TENT-T policy
TRAN	Transport and Tourism (Committee of the European Parliament)
WG	Working Group

Country Codes (ISO 1366)

BE	Belgium
CH	Switzerland
DE	Germany
FR	France
IT	Italy
LU	Luxembourg
NL	the Netherlands

1 Abstract

This last phase of the Study on the TEN-T Corridor Rhine-Alpine (RALP) focused on updating financial and maturity data of the projects included in the Project List, providing update for selected Key Performance Indicators (KPI) including their update in TENtec OMC and performing two Corridor Forum Meetings and Working Group Meetings.

The Project List updated in April 2023 included 449 projects worth €145.7bn of known costs. End of 2023, 191 projects (43%) with a total cost of €28.9bn (19%) were completed since the adoption of the TEN-T Regulation.

In this Phase III of the RALP corridor study, 152 projects have been completed from 2018 onwards until end of 2023 with a significant impact on the corridor development. Rail KPIs show generally a high rate of compliance. Currently, there are two remaining standards, i.e. the 'Train length ≥740 m' and 'Intermodal gauge ≥P400' that need further improvement. At the moment, these are available on around 89% and 92% respectively of the RALP core freight rail lines. All main international airports on the Rhine-Alpine Corridor have a connection to the rail network. For inland waterway transport, all KPI parameters are already compliant, except for the target draught of at least 2.5 m all year round that is not achieved on the Middle Rhine section in Germany.

The results of the project list analysis are presented in the latest Project Implementation Report (PIR 2023-1) which constitutes a separate document. Extensive consultation with different stakeholders, including national authorities and important representatives from the transport sector are reflected in the Corridor Forum and Working Group meetings minutes.

2 Outline

The present report constitutes the Final Report III of the 3rd phase of the Study on the Rhine-Alpine Core Network Corridor.

In accordance with the tender specifications, this Final Report is a concise summary of Phase III with an interpretation and a problem analysis of the results of the KPIs updated in TENtec OMC. It demonstrates, in particular, the current state of implementation per infrastructure section or transport node.

The main elements included in this progress report are:

- Task 1: Further elaborating the knowledge base of the Rhine-Alpine Corridor;
- Task 3: Monitoring and analysing the state of project implementation and reporting;
- Task 5: Preparing, supporting, and following up on the meetings of the Corridor Forum and its Working Groups.

3 Task 1 Further elaborating the knowledge base of the Rhine-Alpine Corridor

The update of TENtec data was executed between June and August 2023. Until then, data on technical parameters (KPIs) were available up to the reference year 2020 (status 31st December 2020) for each section or element of the Rhine-Alpine Core Network Corridor.

During the 3rd phase of the RALP Corridor study, the 2021 and 2022 values for the following 11 KPIs were added into the TENtec (OMC) system for existing sections, which are not yet compliant with the TEN-T standards. The relevant KPIs are shown in Table 1.

Table 1: TEN-T Key Performance Indicators to be updated in TENtec OMC

Rail	Requirement
Loading gauge	≥P400
Train length* (core freight lines)	min. 740m
Axle Load (core freight lines)	22.5t
Line speed (core freight lines)	≥100km/h
Track gauge	1,435mm
Electrification	Electrified
Airports	
Connection to Rail	Yes
Inland Waterways (IWW)	
RIS-Implementation	Yes
Permissible height under bridges	≥5.25m
Permissible draught	≥2.5m
CEMT IV class	≥IV

Source: Hacon

The consultants supporting different core network corridor had cooperated with each other and had organised the workflow with particular respect to the responsibilities for overlapping sections. TENtec has been updated based on the narrowly updated project list (PIR 2023-1) and thereon based compliance checks. National experts were consulted to verify if a KPI was indeed improved. Furthermore, network statements of the infrastructure managers were utilised.

The results are visible in the TENtec OMC system and have been presented in the 19th Corridor Forum in November 2023.

3.1 Rail compliance

For the RALP rail network, changes have been identified for line speed (≥100km/h), train length (min.740m), and intermodal gauge ≥P400. Improvements for line speed have been identified in Belgium (+4% compared to 2020), projects with improvements of possible train length are located in Italy (+16% due to various infrastructure improvements in Northern Italy) and optimisation of intermodal gauge has been carried out on rail sections in Belgium (+3%), Germany (+3%) and Italy (+17% due to significant improvements in Northern Italy). The identified KPI improvements have been marked in green in Table 2 below.

Table 2: Latest Rail KPI compliance rates for the RALP Corridor

TENtec Technical Parameters		All entries: Share of all sections fulfilling respective standard					
2023 Analysis		**NL**	**BE**	**DE**	**CH**	**IT**	**Total**
Length of all sections	km	466	517	1,442	518	488	**3,431**
Electrification Requirement	Electrified	100%	100%	100%	100%	100%	**100%**
Track gauge	1,435mm	100%	100%	100%	100%	100%	**100%**
Line speed (core freight lines)	≥100km/h	96%	86% (+4%)	100%	90%	100%	**96%** (+1%)
Axle Load (core freight lines)	22.5t	82%	100%	100%	100%	100%	**98%**
Train length* (core freight lines)	min. 740m	100%	100%	100%	100%	20% (+16%)	**89%** (+2%)
Intermodal gauge (core freight lines)	≥P 400	100%	99% (+3%)	99% (+3%)	100%	44% (+17%)	**92% (+5%)**

*) Agreement between MS: Operation of 740m long trains is theoretically possible in the Netherlands, Belgium and Germany. According Belgian network statement, for each train longer than 650m an individual agreement with the IM Infrabel is needed.

Restrictions e.g. due to capacity bottlenecks during peak hours are likely to occur; however, it is not possible to mathematically measure the impact of these restrictions on the compliance, hence the 100% compliance rate in the table.

Source: RappTrans / Hacon

For the entire RALP Corridor, electrification and track gauge are established standards. Compliance of line speed is realised on 96% of the sections, axle load of 22.5 tonnes on 98%. Freight trains with a length of 740m can be operated in most countries. For Belgium, it is important to notice that although infrastructure parameters allow for 740m long trains, but according to the latest version of Infrabel's Network Statement (August 2023) for each train longer than 650m an agreement with the national Infrastructure Manager Infrabel is needed.

3.2 Airport compliance

Along the RALP Corridor, 13 airports are considered. The airports of Amsterdam, Brussels, Frankfurt, Dusseldorf, Cologne, Zurich and Milano Malpensa are important hubs for international and transcontinental passenger transport and have direct rail connections. Since 2022, Milano-Linate is connected to rail via the underground "Metro Line 4". However, this is not a heavy rail line and therefore no relevant KPI change had been recorded. Regarding all other airports in Belgium, the Netherlands, Switzerland and Italy, there are neither light nor heavy rail tracks connected to the terminals. It is important to note that the airports of Bergamo and Liège are exempted

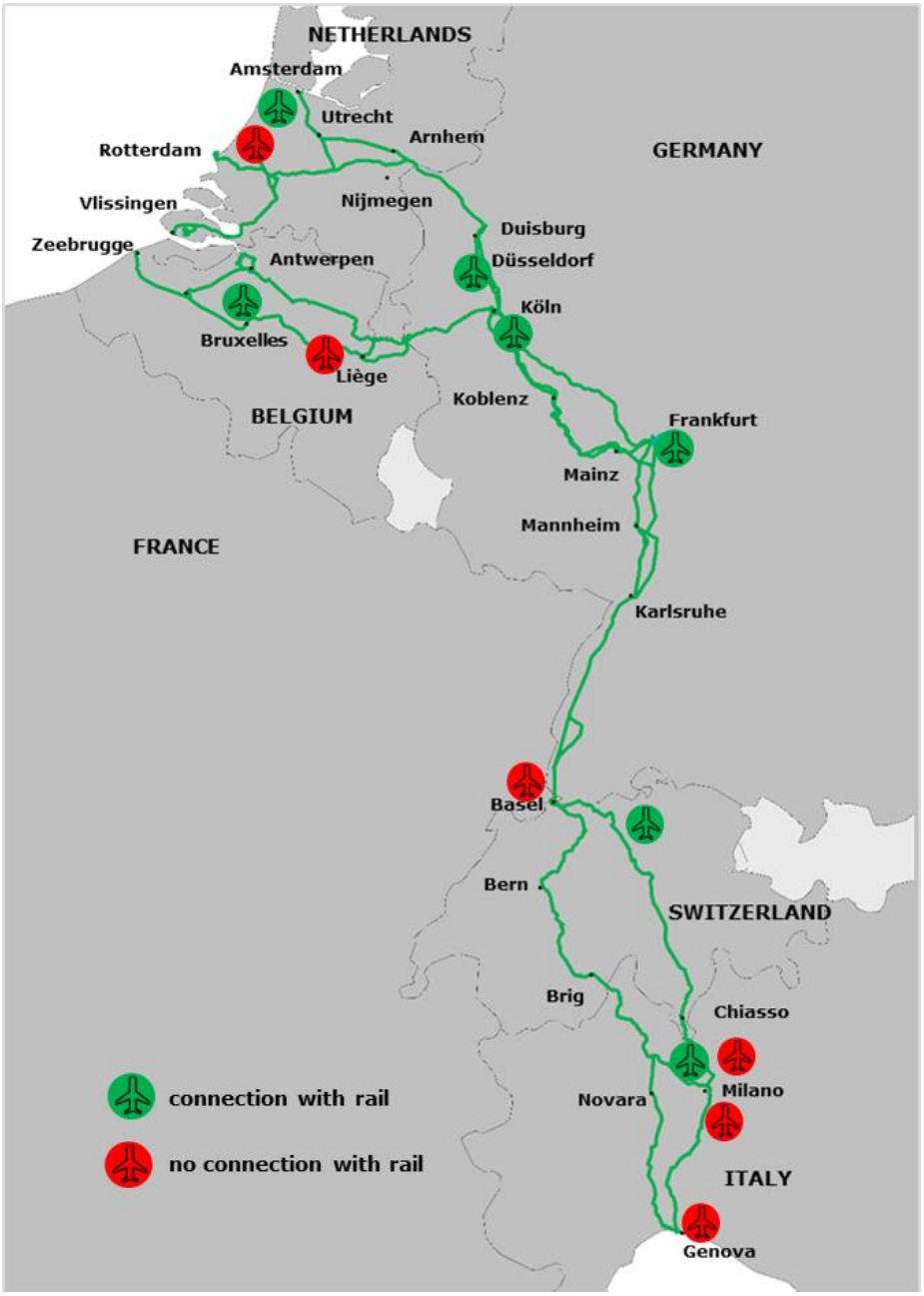
from the obligation to have rail connection (see Table 3 and Figure 1). A rail connection for the airport of Genoa is expected to be available by 2030.

Table 3: Latest Airport KPI compliance rates for the RALP Corridor

Airport	Connection with rail
Rotterdam Airport	No
Amsterdam Airport	Yes
Brussels National	Yes
Liege Airport	No (with exemption)
Dusseldorf Airport	Yes
Köln-Bonn Airport	Yes
Frankfurt/Main Airport	Yes
Zürich Airport	Yes
Basel EuroAirport	No
Linate (Milan) Airport	No
Malpensa (Milan) Airport	Yes
Orio al Serio (Bergamo) Airport	No (with exemption)
Genova-Sestri Airport	No

Source: RappTrans / Hacon

Figure 1: Airport compliance map for the RALP Corridor



Source: RappTrans / Hacon

3.3 IWW compliance

On the RALP Corridor, 1,784 km of inland waterways (IWW) are reported, including the Moselle and Neckar Rivers, as well as an alignment on selected sections of the rivers in France and Luxembourg. Italy does not have an alignment for IWW on the RALP Corridor. The Belgian IWW network is not part of the RALP Corridor, and thus is not included in the compliance analysis nor affecting the total values. The relevant latest IWW KPIs for the corridor are presented in Table 4.

Table 4: Latest IWW KPI-compliance rates for the RALP Corridor

IWW		Share of sections fulfilling the parameter							
TENtec Technical Parameters		NL	BE	DE	FR	LU	CH	IT	Total
Length of all sections	km	409	-	1,151	183	36	6		**1,784**
CEMT requirement for class IV IWW	Class IV or higher	100%	-	100%	100%		100%		**100%**
RIS implementation (set in RIS directive)	According to RIS directive	100%	-	100%	100%		100%		**100%**
Permissible draught	Min. 2.5m	100%	-	77%	100%		100%		**85%**
Permissible height under bridges	Min. 5.25m	100%	-	100%	100%		100%		**100%**

Source: RappTrans / Hacon

For inland waterways, no changed KPIs have been recorded between 2020 and 2023.

3.4 Main corridor achievements between 2018 and 2023

For the duration of the third RALP study from 2018 until 2023, the main corridor achievements have been identified and presented in the 19th Corridor Forum. This analysis consists of projects for rail, airports, IWW, road, maritime ports, and multimodal transport finalised in the relevant time frame.

Rail and Rail ERTMS

For 'Rail and Rail ERTMS' altogether, 45 projects have been finalised between 2018 and 2023, thereof 34 classified as rail measures and 11 as pure ERTMS implementation projects. Total costs amount to €7.9bn. In this context, Rail measures have a share of 94%, ERTMS-related measures account for only 6%. It should be noted that rail infrastructure projects often also include ERTMS installation.

The most important projects with a total cost of more than €100 million are summarised in Table 5 below.

Table 5: Main achievements for Rail + Rail ERTMS on the RALP Corridor (2018-2023)

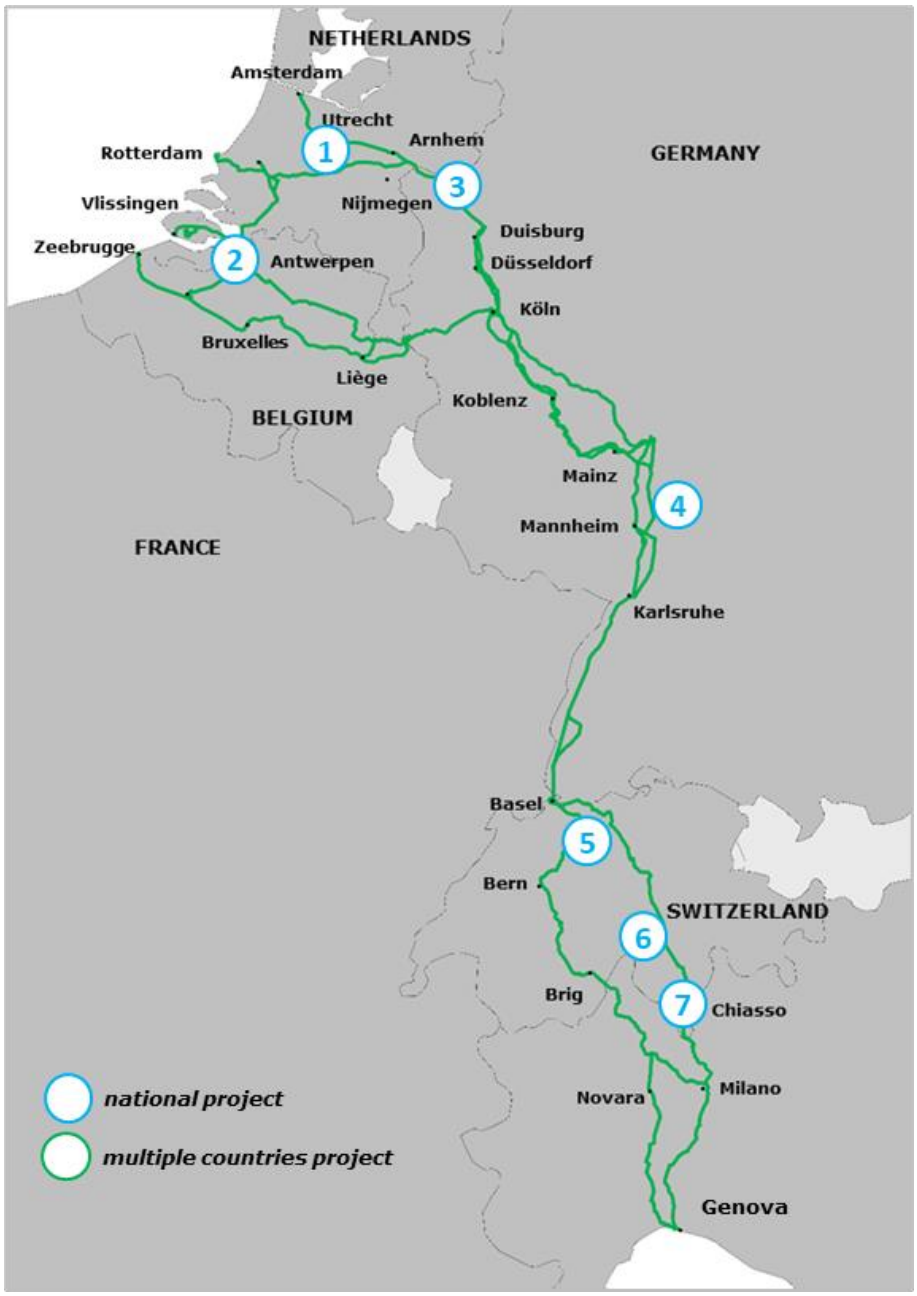
No	Project	Country	Year[1)]
1	Vleuten-Geldermalsen: upgrading of existing rail line	NL	2020
2	Port of Antwerp: upgrade of shunting yards and junctions	BE	2020
3	Emmerich–Oberhausen: upgrading of the rail section	DE	2018 2022
4	Emmerich–Basel: ERTMS implementation on various sections of the RALP Corridor	DE	2021 2022
5	Eppenbergtunnel: resolution of physical bottlenecks	CH	2020
6	Basel-Bellinzona–Chiasso: intervention concerning profile limitations (upgrade to P400) and telematics implementations	CH	2021 2023
7	Ceneri Basetunnel	CH	2020

1) If two years are mentioned, subprojects have been completed

Source: Hacon

The geographical allocation of the projects on the RALP Corridor is pictured in the following Figure 2.

Figure 2: Main achievements for Rail + Rail ERTMS on the RALP Corridor (2018-2023)



Source: RappTrans / Hacon

Airports and aviation

In the category 'Airports and aviation' 5 projects have been finalised in the timeframe between 2018 and 2023. Their financial volume sums up to €245 million.

Table 6: Main achievements for Airports + aviation on the RALP Corridor (2018-2023)

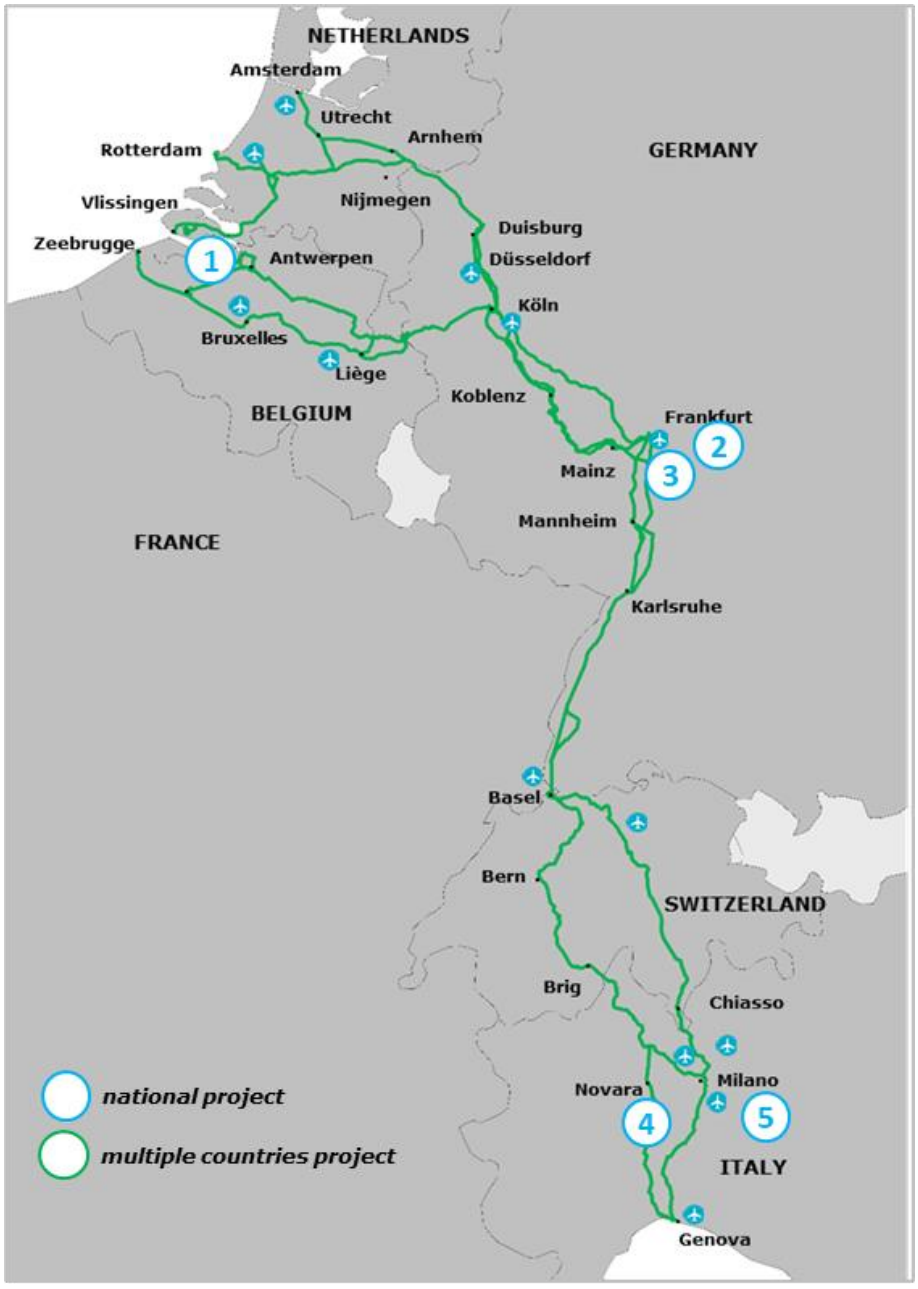
No	Project	Country	Year
1	Performance Based Navigation procedures and rationalisation of Air Navigation infrastructure in the Netherlands	NL	2023
2	Deployment of digital Voice-over-IP Tower Communication System and Centre-Tower Intercom System	DE	2023

No	Project	Country	Year
3	Frankfurt: construction of the underground line section and the "Frankfurt-Main Gateway Gardens / Terminal 2" station ensuring sustainability of intermodal transport links at Frankfurt Airport	DE	2019
4	Milano Malpensa: MXP-AT Railink	IT	2018
5	Milano Linate: Connection to light rail	IT	2022

Source: Hacon

The geographical location of the above-mentioned Air projects on the RALP Corridor is shown in Figure 3 below.

Figure 3: Main achievements for Airports + aviation on the RALP Corridor (2018-2023)



Source: RappTrans / Hacon

IWW

For 'IWW', 17 projects have been finalised in the timeframe between 2018 and 2023. inn terms of value, these projects totalled €1.7bn. The most important projects with a total t cost of more than €10 million are listed in Table 7.

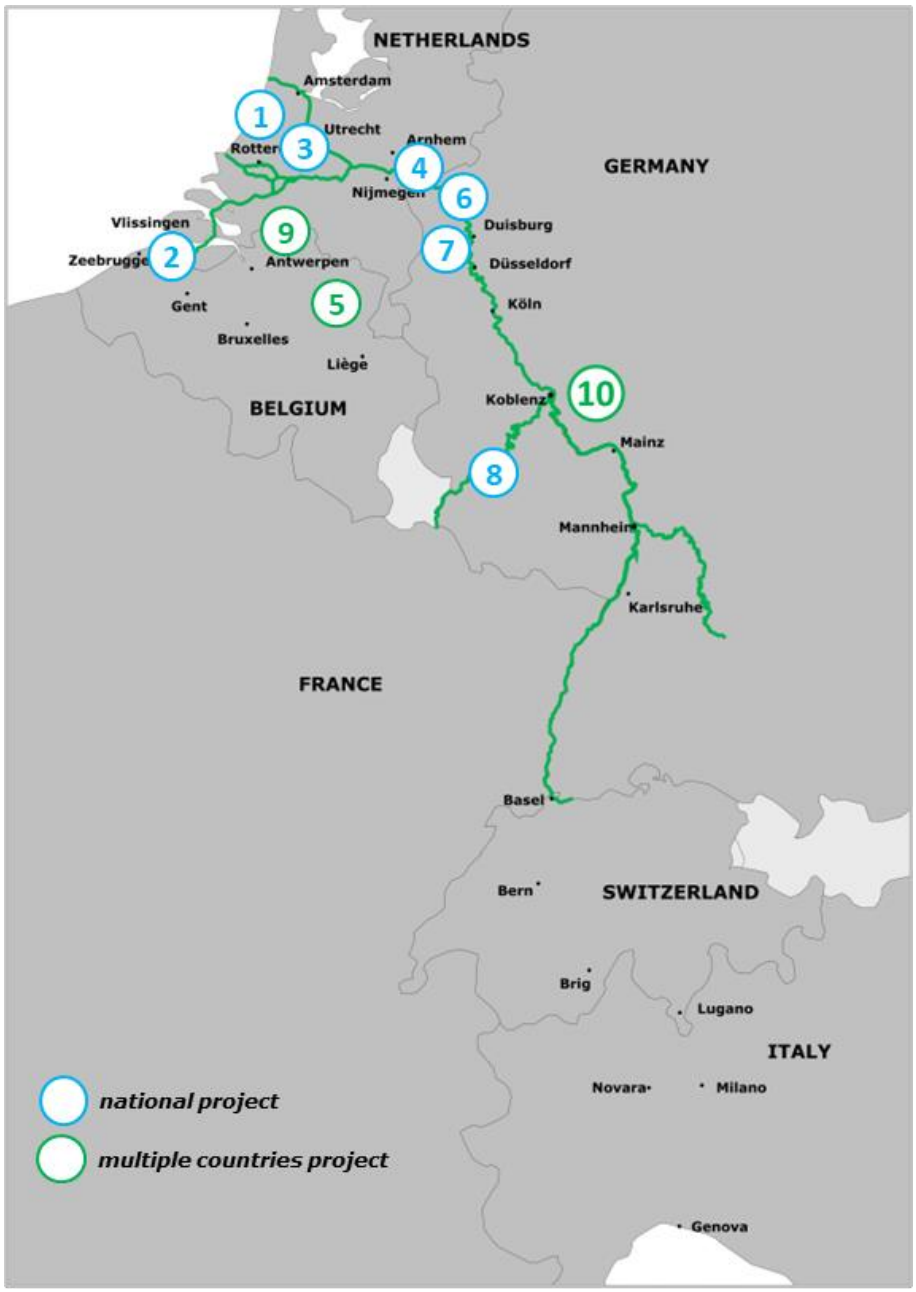
Table 7: Main achievements for IWW on the RALP Corridor (2018-2023)

No	Project	Country	Year
1	Ijmuiden: new sealock	NL	2022
2	Princess Beatrix Lock and Lek Canal	NL	2019
3	Capacity expansion of mooring locations Merwede	NL	2021
4	Spijk: overnight mooring facility on the German-Dutch border	NL	2023
5	Port-Liner, "zero emission" ships for inland waterways	multiple countries	2019
6	Rhine: Riverbank protection at Wardt	DE	2019
7	Duisburg: Logport VI - Expansion of inland waterway infrastructure at the inland port Duisburg on the river Rhine	DE	2022
8	Mosel: Second lock chamber Trier	DE	2021
9	ACCEL BARGE: Accelerated Electrification of Inland Waterways	multiple countries	2021
10	RIS COMEX (multiple countries 2022	multiple countries	2022

Source: Hacon

The geographical location of the above-mentioned IWW projects on the RALP Corridor is shown in Figure 4.

Figure 4: Main achievements for IWW on the RALP Corridor (2018-2023)



Source: RappTrans / Hacon

Road

For 'road', 44 projects have been finalised in the timeframe between 2018 and 2023. Their financial volume sums up to €2.3bn. The most important measures with a total project cost of more than €70mn are summarised in Table 8 below.

Table 8: Main achievements for Road on the RALP Corridor (2018-2023)

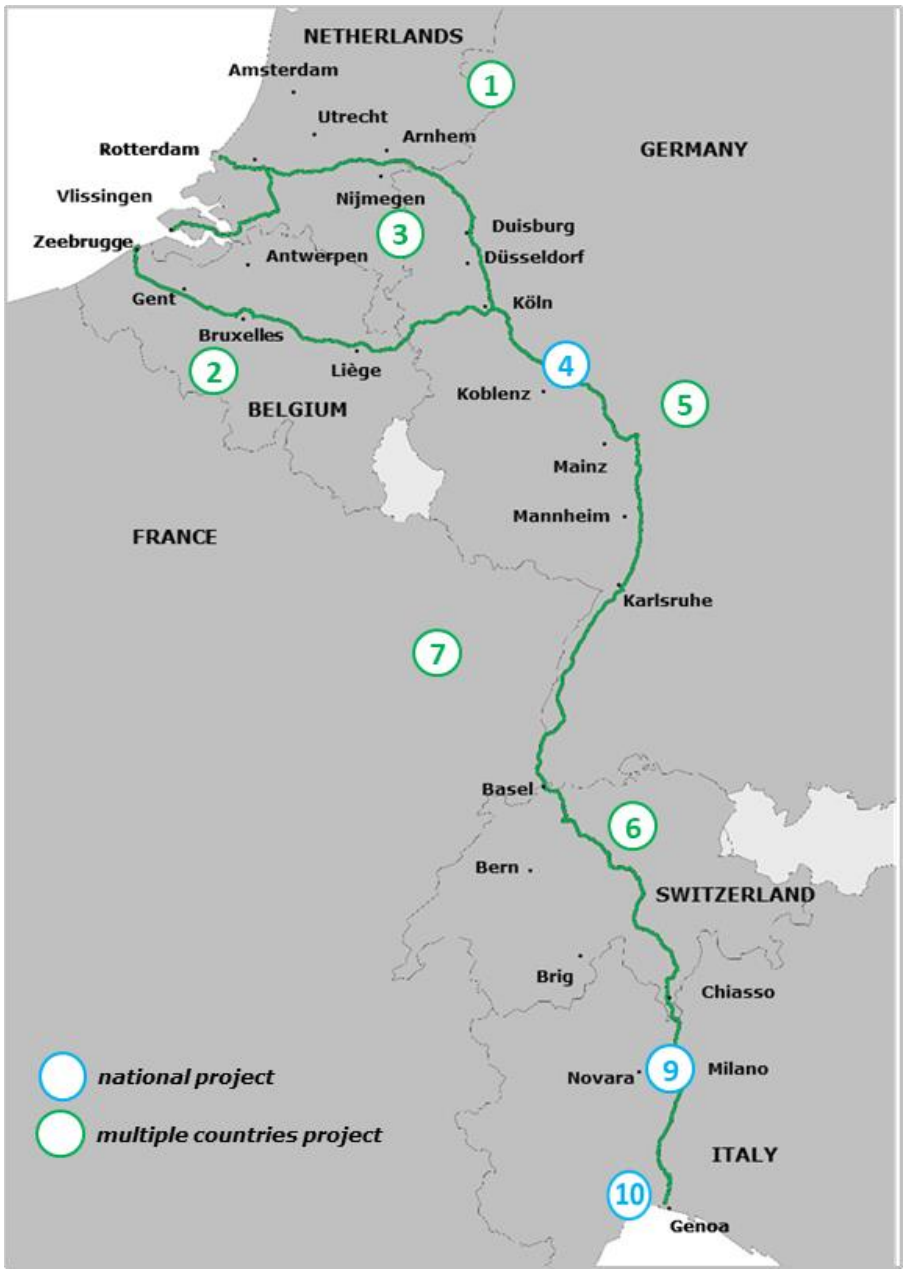
No	Project	Country	Year
1	EUROP-E: European Ultra-Charge Roll Out Project–Electric	multiple countries	2021
2	MEGA-E: Metropolitan Greater Areas–Electric: installing 322 ultra-charging (UC) stations in 20 European countries	multiple countries	2023
3	BioLNG EuroNet: lowering carbon emissions in European road	multiple	2023

No	Project	Country	Year
	Transport	countries	
4	Lorry parking positions extension in Germany	DE	2020
5	ITS implementation URSA MAJOR 2 and URSA MAJOR NEO	multiple countries	2023
6	AMBRA-Electrify Europe: network of ultra-fast charging stations for electric vehicle on CNCs	multiple countries	2022
7	LNG motion: fuelling trucks with LNG/CNG along CNCs	multiple countries	2020
8	Central European Ultra Charging: network of ultra-fast charging stations for electric vehicle on CNCs	multiple countries	2021
9	Milan: realization of fourth "dynamic" lane on the A4 motorway	IT	2019
10	Ponte di Genova San Giorgio-Ponte Morandi re-construction	IT	2020

Source: Hacon

The geographical location of the above-mentioned Road projects on the RALP Corridor is shown in Figure 5 below.

Figure 5: Main achievements for Road on the RALP Corridor (2018-2023)



Source: RappTrans / Hacon

Maritime infrastructure

In the 'Maritime' category, 7 projects have been finalised between 2018 and 2023 and they totalled €1.1bn. These projects are listed in Table 9 below.

Table 9: Main achievements for Maritime on the RALP Corridor (2018-2023)

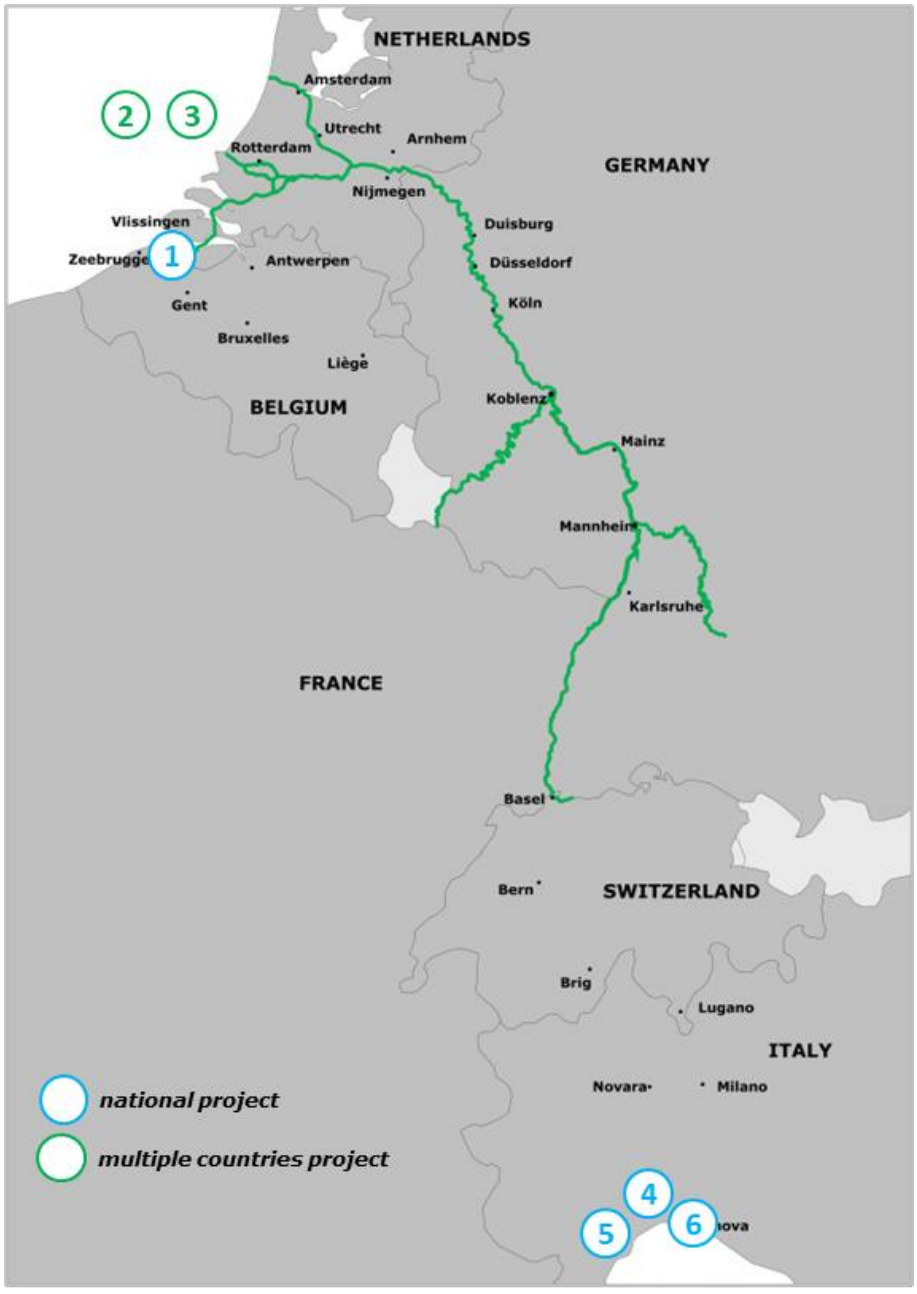
No	Project	Country	Year
1	Terneuzen: new sealock	NL	2022
2	Installation of loop scrubbers	multiple countries	2018
3	Sustainable LNG Operations for Ports and Shipping – Innovative Pilot Actions (GAINN4MOS)	multiple countries	2019
4	Genoa: electrification of the quays in Genoa Voltri – Electricity supply to the ships via connection to the ground grid	IT	2021

No	Project	Country	Year
5	Genoa: port dredging plan for the port of Genoa	IT	2023
6	Genoa: re-configuration of Maritime access to Sampierdarena Port Basin	IT	2022
7	Genoa: New Ports Master Plan preparatory studies	IT	2023

Source: Hacon

The geographical location of the above-mentioned Maritime projects on the RALP Corridor is shown in Figure 9 below.

Figure 6: Main achievements for Maritime on the RALP Corridor (2018-2023)



Source: RappTrans / Hacon

Multimodal

For 'Multimodal', 19 projects have been finalised in the timeframe between 2018 and 2023 and they amounted to €400million. The most important measures with total costs of more than €70million are presented in Table 10 below.

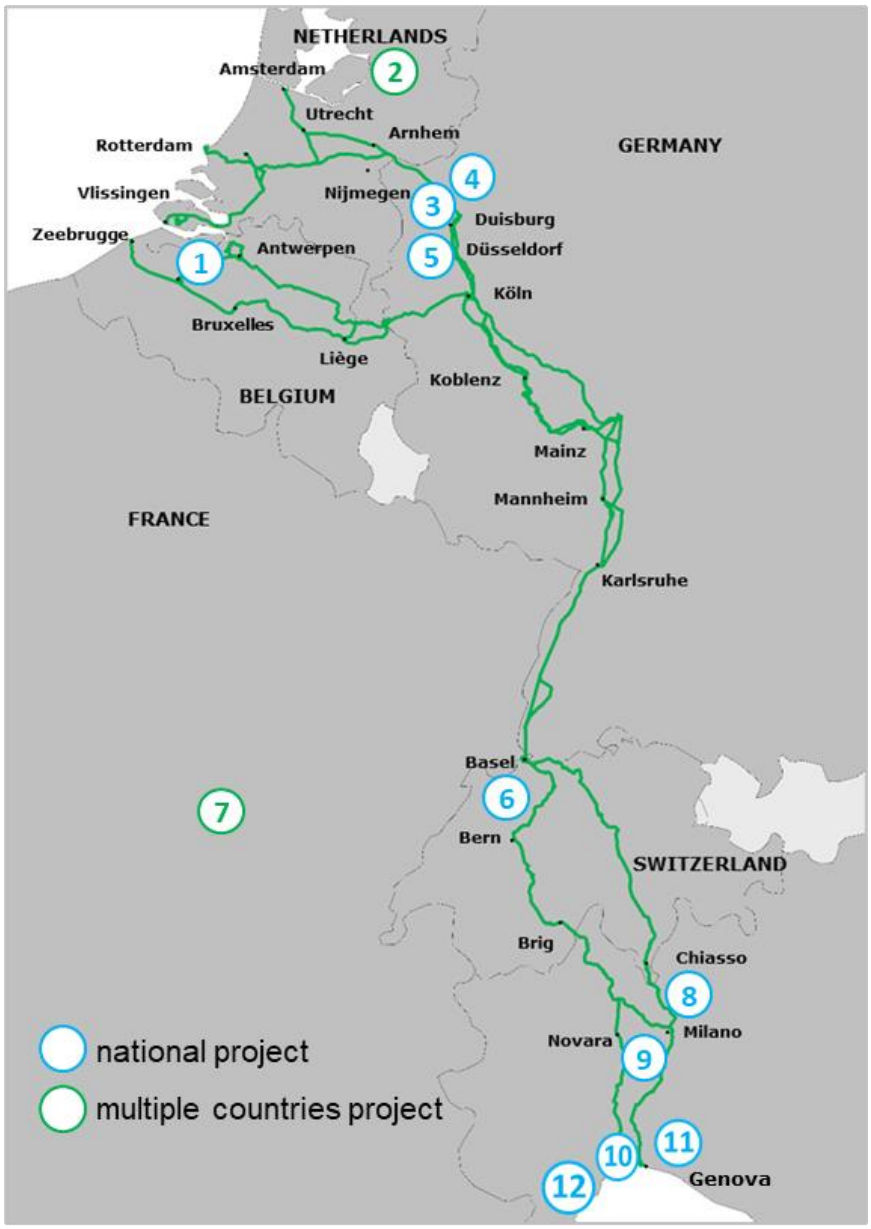
Table 10: Main achievements for Multimodal on the RALP Corridor (2018-2023)

No	Project	Country	Year
1	Gent: Mercatordok: extension and upgrade of a combined terminal	BE	2023
2	FENIX-European Federated Network of Information exchange in logistics	multiple countries	2022
3	Duisburg: upgrade terminal Duisburg PKV, construction of 3 tracks	DE	2020
4	Duisburg: Rhine-Ruhr intermodal hub	DE	2023
5	Neuss: upgrade of Contargo terminal Neuss	DE	2018
6	Basel: connection to Auhafen – Ports of Switzerland	CH	2020
7	FEDeRATED multimodal IT-Platform	multiple countries	2023
8	Milano: upgrading of Milano Smistamento intermodal terminal	IT	2021
9	Novi San Bovo: development and operations of the intermodal terminal with an innovative automated system	IT	2021
10	Genoa: new access system in Genoa	IT	2021
11	Genoa: E-BRIDGE. Emergency and broad Information development	IT	2023
12	Vado Ligure: road connection between the VIO intermodal terminal, the main road network, and the port of Vado Ligure	IT	2020

Source: Hacon

The geographical allocation of the above-mentioned Multimodal projects on the RALP Corridor is shown in the following Figure 7.

Figure 7: Main achievements for Multimodal on the RALP Corridor (2018-2023)

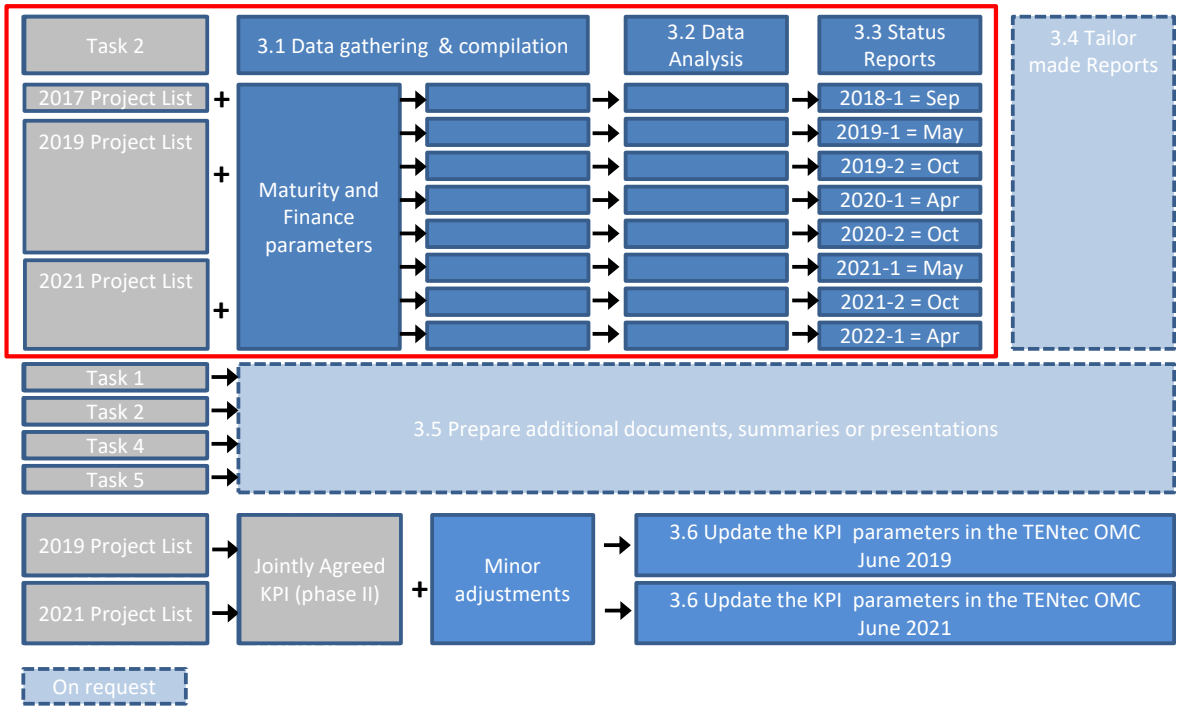


Source: RappTrans / Hacon

4 Monitoring and analysing the state of project implementation and reporting

This Task builds on the requirement that biennial updating of the entire project list and the Work Plan of the European Coordinators should be accompanied by a more frequent status analysis of the projects, which will allow the Commission and the Coordinator to counteract in case of inconsistencies and delays. Therefore, the implementing stages of projects and their financing have been monitored twice a year throughout the study from June 2018 to May 2022, and one additional time in May 2023 in the framework of the prolongation of Phase III.

Figure 8: Task 3 - Detailed work program and interrelations



Source: Consultant's presentation at Kick-off meeting, updated for October 2021

For the monitoring of project implementation, "narrow updates" of the project list are performed every six months between the regular complete updates (2019 and 2021) in order to trace the implementation progress of existing projects. "Narrow update" means that Member States and other stakeholders are requested to update selected project parameters, which are particularly relevant for the semi-annual monitoring:

- Project maturity and implementation;
- Project costs and financing/funding.

The "PIR"-reports are formal deliverables and are due in September 2020 to April 2022, and June 2023. The first report (September 2018) included also considerations and agreement on the methodology, while further reports (every 6 months) have been prepared on the basis of the agreed methodology and include only the presentation of results in PowerPoint format.

The recent deliverable reports the results of the PIR 1-2023 which refers to the (narrow) project list update due in April 2023.

Project maturity - Completion time clusters:

By the reporting date, 449 RALP-relevant projects are included in the Project List. This means that there are six projects more than in the last report with 443. Of the 449 RALP-relevant projects, 148 (33%) projects have already been completed by the end of December 2022. This number comprises 29 projects that have been completed by 2016, 68 projects that have been finalised between 2017 and 2020, and 51 projects that have been completed between 2021 and 2022. Further 103 projects (154 minus 51 projects already completed between 2021 and 2022) are still to be completed by 2025 and 137 by 2030, i.e. the target date of the TEN-T Regulation 1315/2013 for the core network. However, 25 projects are said to be completed only after that target year, and for further 36 projects, the completion end date is "unknown".

This missing information is partially due to the current uncertainty about the completion time, e.g. projects that are in the planning stage, and partially due to lack of data.

Nevertheless, the majority of the projects (i.e., 391) are expected to be completed by 2030, and it is assumed that the vast majority of projects with "unknown" status will also be completed by 2030.

Figure 9: Evolution of Maturity criteria "expected completion time" since the first PIR

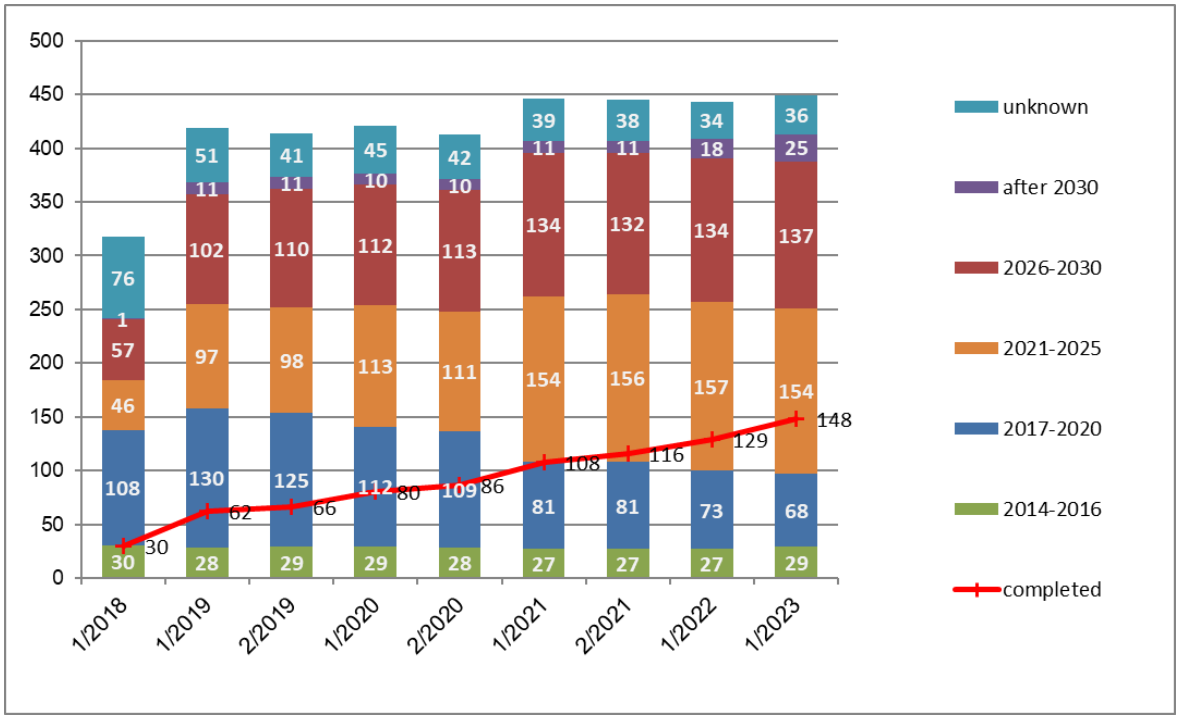
Report N°	1/2018	1/2019	2/2019	1/2020	2/2020	1/2021	2/2021	1/2022	1/2023
Reporting Date	09/2018	05/2019	10/2019	04/2020	10/2020	05/2021	10/2021	04/2022	05/2023
Project Status	11/2017	12/2018	06/2019	12/2019	06/2020	12/2020	06/2021	12/2021	12/2022
2014-2016	30	28	29	29	28	27	27	27	29
2017-2020	108	130	125	112	109	81	81	73	68
2021-2025	46	97	98	113	111	154	156	157	154
2026-2030	57	102	110	112	113	134	132	134	137
after 2030	1	11	11	10	10	11	11	18	25
unknown	76	51	41	45	42	39	38	34	36
Total	318	419	414	421	413	446	445	443	449
Thereof completed*	30	62	66	80	86	108	116	129	148

n1: *additional/obsolete projects according to* Project List *updates*
nx: *completed projects according to respective project status*
**:* *completed projects until "Project Status", presently 12/2022*
Source: *KombiConsult analysis based on status 04/2023 Project List of RALP*

Actually, only the update of the Project List every two years shall lead to a modification of the number of projects and their allocation to the completion time clusters. Nevertheless, it showed that even when "only" updating the maturity criteria, this led to a modification of the number of projects and their allocation. Additionally, projects that were marked "completed" in previous lists have been re-assessed by the stakeholders and marked as 'ongoing' so that also the number of projects completed in the "past" periods 2014-2016 and 2017-2020 has been changed.

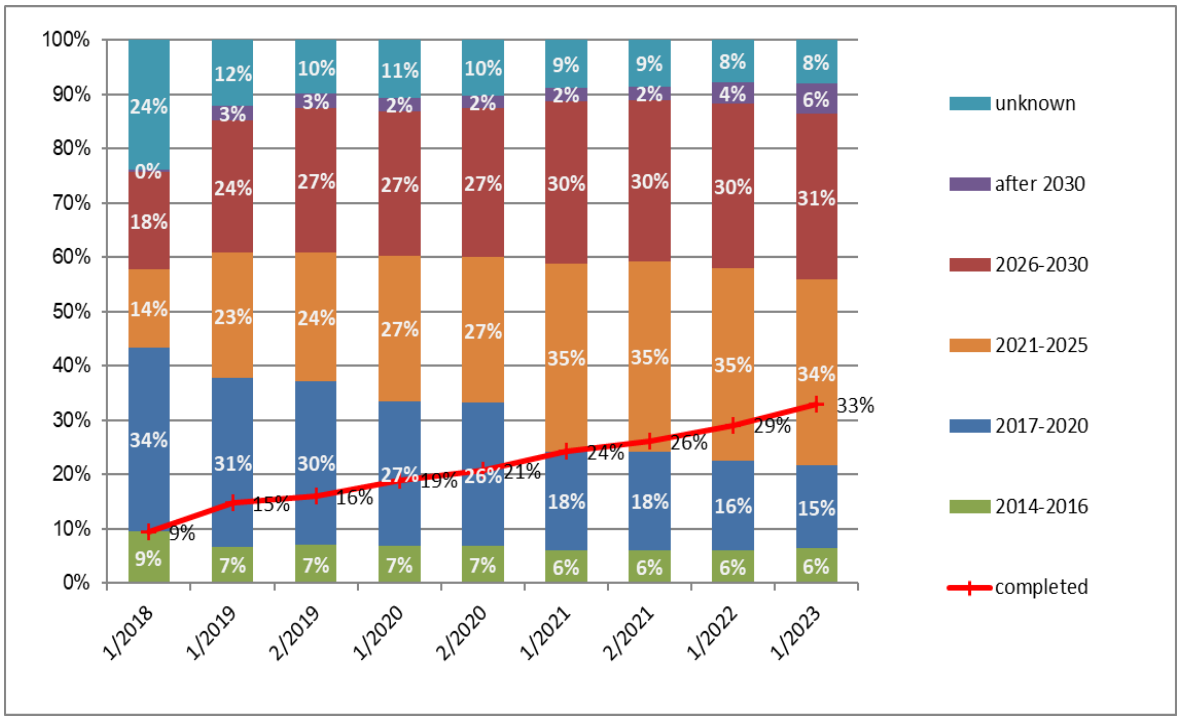
For a better understanding and graphical visualisation, two outputs are needed: the absolute figures showing the number of projects and the standardized figure (showing the relative share cumulating to 100%). Figure 10 and Figure 11 provide a template for such a graphical presentation, filled with the current data available from the respective Project Lists. The graphic presents the number of projects per completion time cluster and the number of completed projects.

Figure 10: Evolution of Maturity criteria "expected completion time" since the first PIR (No. of projects)



Source: KombiConsult analysis based on 04/2023 Project List of RALP

Figure 11: Evolution of Maturity criteria "expected completion time" since the first PIR (Share of projects)



source: KombiConsult analysis based on 04/2023 Project List of RALP

All three ways of presentation (see Figure 9, Figure 10and Figure 11) allow for monitoring and tracing the maturity criterion bi-annually. Starting with the first Project Implementation Report 1/2018 (project status 11/2017), the main results of the evaluation can be summed up in the following way:

- Since the first Project Implementation Report, further 131 RALP-relevant projects have been added to the Project List. Taking into account that some projects were deactivated meanwhile, this number actually might have been higher. The number of projects relevant to the RALP Corridor thus increased from 318 projects in the first Project Implementation Report up to 449 projects in the current Project Implementation Report;
- Since the first Project Implementation Report, further 118 projects have been completed (project status 12/2022). The number of completed projects thus almost quintupled from 30 (9% share) to 148 projects (33% share);
- The number of projects with unknown completion dates could be decreased by 42 projects from 76 to 36, taking also into account that at least 131 projects were added to the Project List meanwhile;
- The number of projects foreseen for completion beyond 2030 increased from one to 25 projects;
- Projects with late finalisation date (i.e. 2026-2030, after 2030) comprise particularly 79 rail projects (Rail + Rail ERTMS), followed by 39 road projects and 14 projects concerning IWW. All other categories have 30 projects in these time clusters altogether;
- Most projects where the finalisation is unknown are also Rail + Rail ERTMS projects (10), followed by IWW (8) and Road (7). The other categories are equal to or below five projects respectively;
- Of the 148 projects that have been completed so far, most projects refer also to the project category Rail (Rail + Rail ERTMS) with 44 projects, followed by Road (43), IWW (20), and Multimodal (16). The other projects are equal to or below seven projects each.

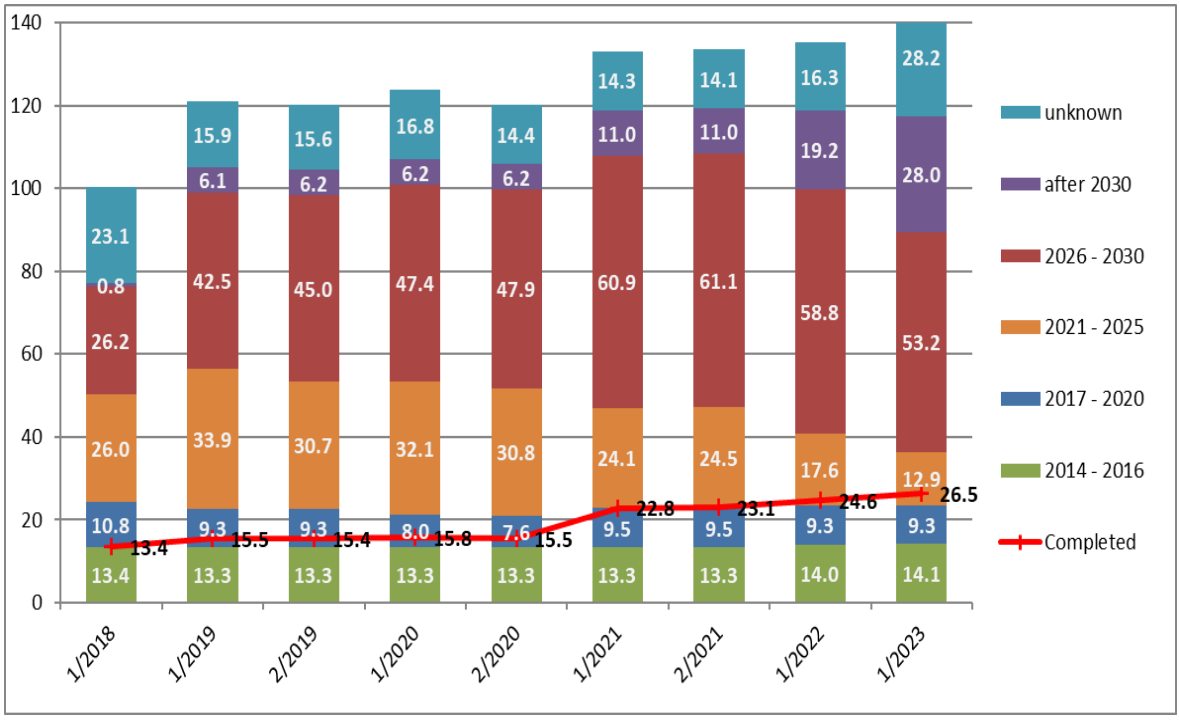
This interpretation describes the present situation and the evolution since the first Project Implementation Report.

Project finance – Official costs by completion:

Figure 12 and Figure 13 visualise the number of official project costs (i.e. cost figures verified by the project promoters) per completion time cluster, as absolute figures, and as relative shares, cumulating to 100%.

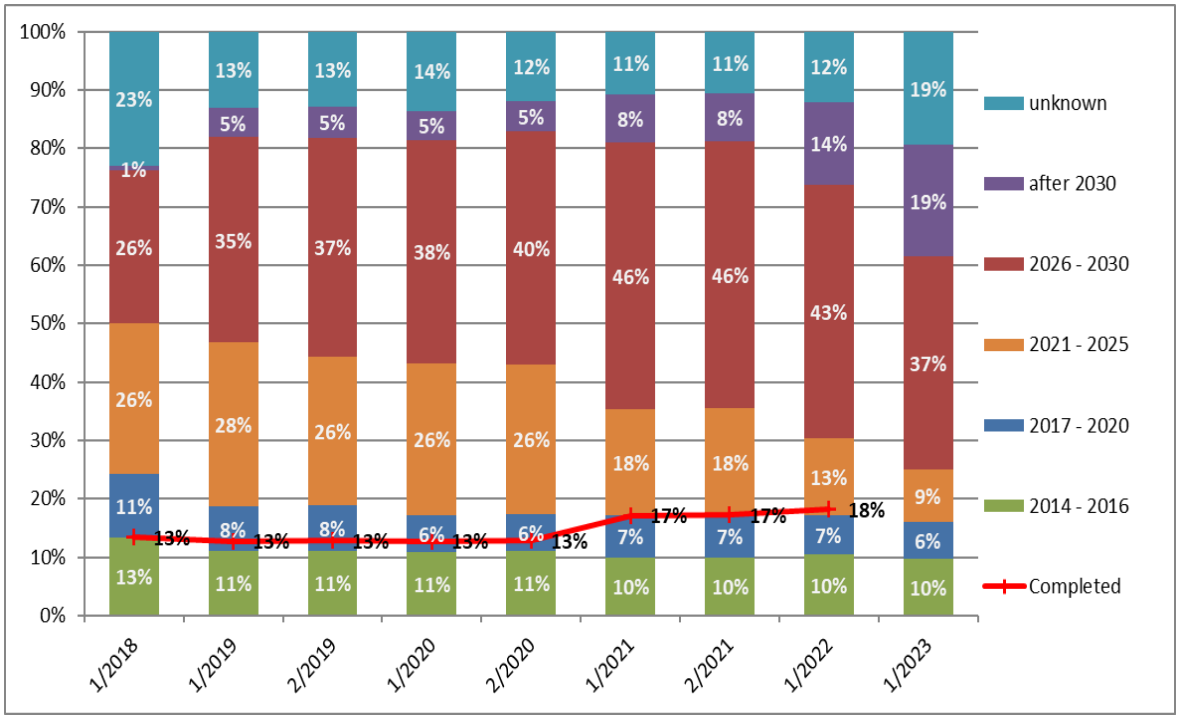
Since the first Project Implementation Report 1/2018, the overall official project costs have increased from € 100.3bn to € 145.7bn.

Figure 12: Diagram of finance criterion "project costs (official)" by completion time in the PIRs [€ bn]



Source: KombiConsult analysis based on 04/2023 Project List of RALP

Figure 13: Diagram of finance criterion "project costs (official)" in the PIRs [Share of completion time clusters]



Source: KombiConsult analysis based on 04/2022 Project List of RALP

Summarising, the PIRs show the following main developments:

- Since the first Project Implementation Report, the value of completed projects increased from about €13.5bn to €26.5bn, rising its share from 13% to 18%;

- The project costs in the several timeframes from 2017 to 2025 decreased, while the project costs in the timeframes from 2026 to "after 2030" increased; in particular, the cost of projects to be implemented after 2030 grew from 1% to 19%.
- While the project costs allocated to projects of which the completion time is unknown decreased from €23.1bn to €16.3bn until the last Project Implementation Report, they have now increased again up to €28.3bn; This is due to a high rate of Rail + ERTMS projects (see below), which increased considerably with the latest update of the project list;
- Projects with late (2026-2030, after 2030) finalisation date, particularly comprise 79 projects in the category Rail + Rail ERTMS, which also represent the biggest share with €48.6bn costs, followed by Road (€23.3bn costs) and Maritime (€3.9bn costs);
- Most costs allocated to projects where the finalisation is unknown are by far Rail + Rail ERMTS (€26.2bn costs), followed by Road with €1.7bn. The other categories cumulate to €0.3bn costs altogether in this category;

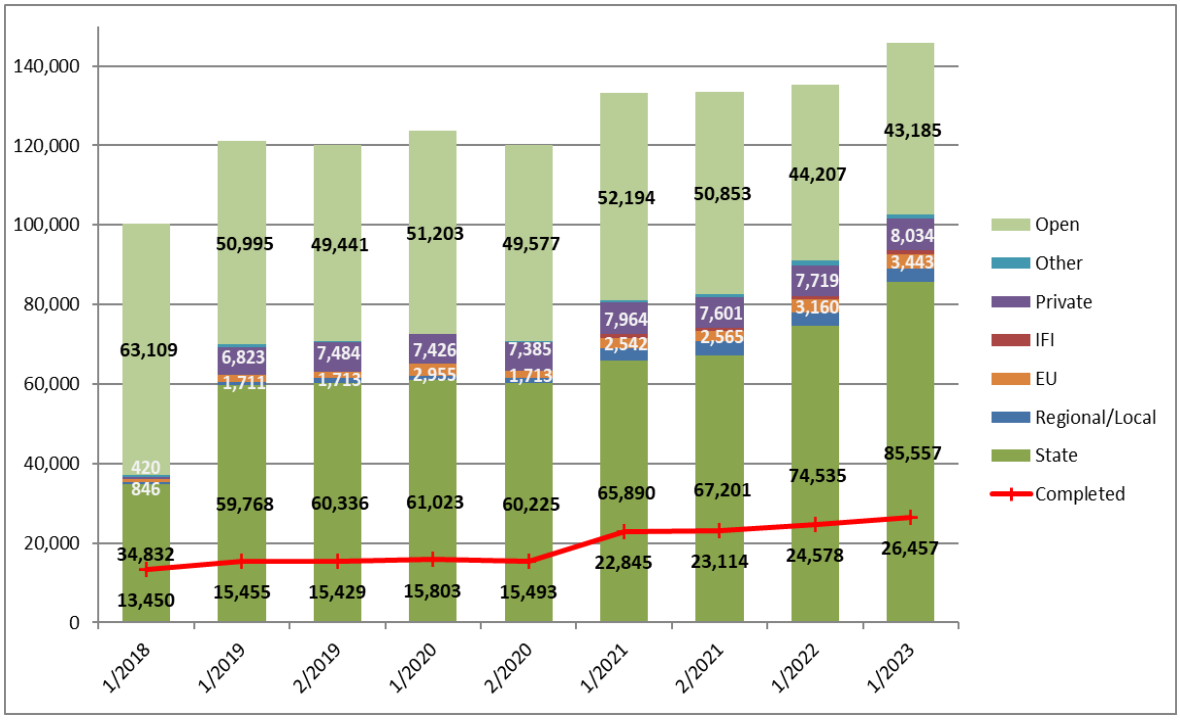
Out of 148 projects that have been completed so far, most project costs refer also to the project category Rail + Rail ERTMS with €20.1bn, followed by Road (€3.5bn costs) and IWW (€1.7bn costs). The other categories are all below €0.4bn and have costs of ~€1.0bn cumulatively.

Project finance – Financing sources:

Figure 14 and Figure 15 allocate the official project costs to the financing and funding sources in absolute and relative figures, regardless of this financing has been classified as "approved", "potential" or "unknown".

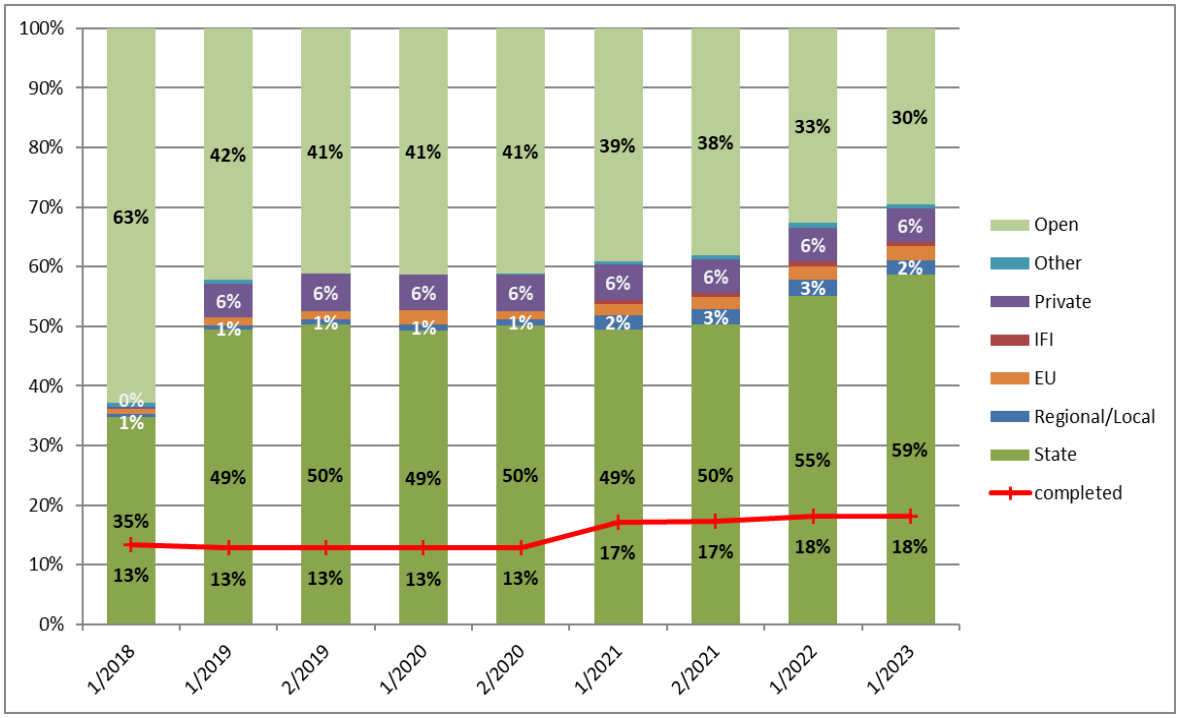
Most of the project costs (about 59%) are envisaged to be covered by the State. The rest of the envisaged financial contribution of only about 12% is shared between all other sources, such as EU or regional financing, and thus they play a rather smaller role. The share of costs where their financing is "open" decreased significantly from 63% (Project Implementation Report 2018-1) to 30% now. Figure 14 and Figure 15 show these shares in absolute and relative terms for the April 2023 Project List.

Figure 14: Evolution of project financing sources and value of completed projects (Official costs only) [€ bn]



Source: KombiConsult analysis based on 04/2023 Project List of RALP

Figure 15: Shares of project financing sources [shares] and value of completed projects (official costs only)



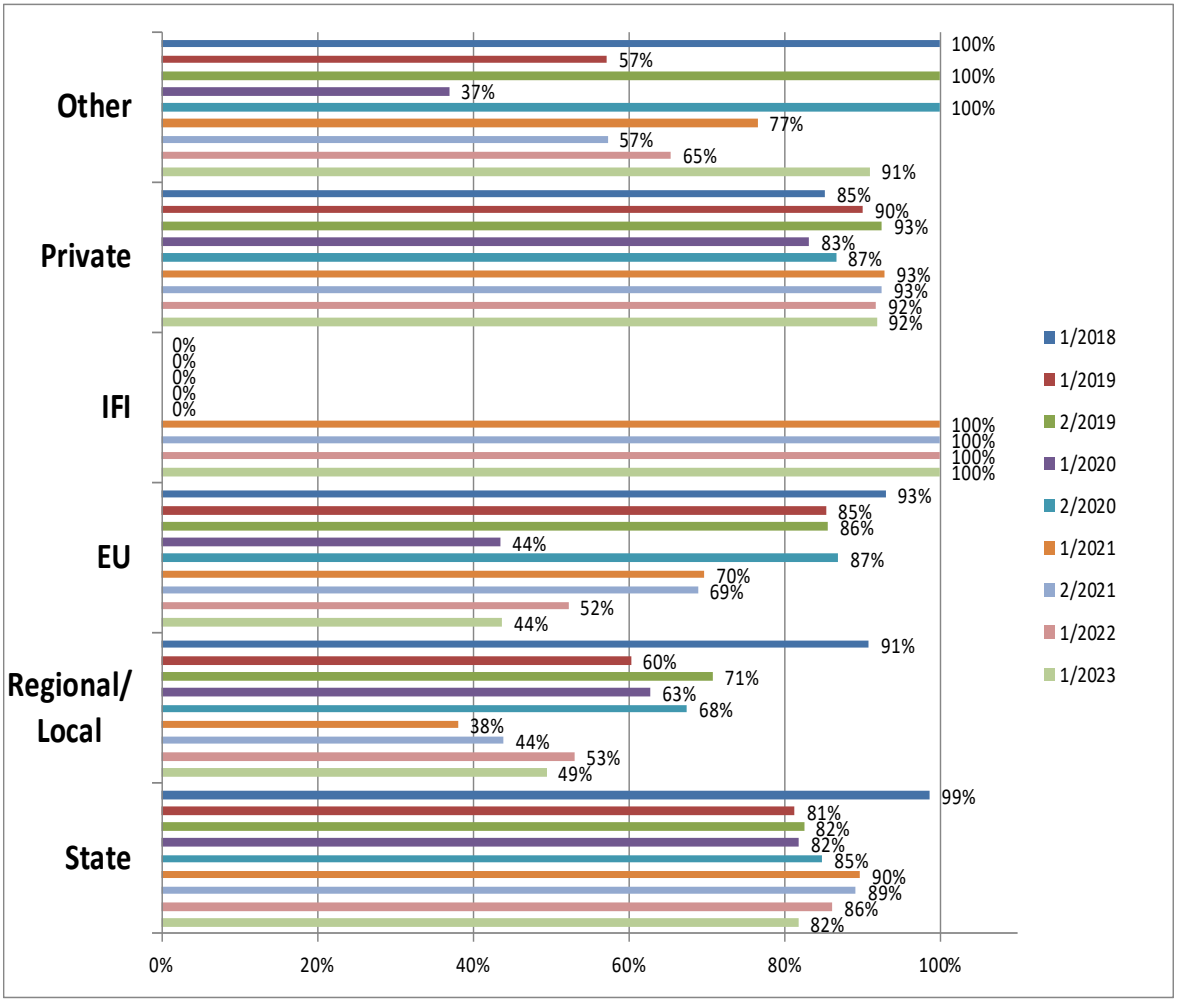
Source: KombiConsult analysis based on 04/2023 Project List of RALP)

Project finance – levels of financing commitment:

The level of financing commitment is an important indicator for the evaluation of the project implementation. This is expressed by the share of "approved" against "potential" and "unknown" financing. This analysis includes official costs of ongoing and planned projects only; they are the basis for the calculation of "relevant costs". In contrast, finalised projects are excluded, as these projects must have already been financed completely.

Figure 16 shows the development of the highest financing level ("approved") since the first PIR in 2018.

Figure 16: Evolution of share of "approved" financing by source on the CNC RALP



Source: KombiConsult analysis based on 04/2023 Project List of RALP

From the €145.7bn of total project costs included in the April 2023 Project List, the amount of around €26.5bn (or 18%) comes from the projects completed by the end of December 2022 and thus ~€119.3bn (82%) correspond to the costs of the ongoing or planned projects. Out of these costs, ~€94.5bn (79%) have an indicated financing source and as stated above, for €76.2bn (64%) of these costs the financing is already approved. "Private" (92%) and "State" (82%) financing sources still show very high approval rates. With 49% in the current report for "Regional/Local", the financing is approved for about half of the envisaged financing, and for "EU" financing sources,

44%. As for the first five Reports, no IFI financed costs were indicated at all. Since Report 1/2021, €1.0bn (for one particular project) has been still declared as 100% approved and financed by IFI.

5 Preparing, supporting, and following up on the meetings of the Corridor Forum and its Working Groups

5.1 Corridor Forum meetings

For the preparation, implementation, and follow-up of these meetings, the following steps were carried out in close cooperation with the Rhine-Alpine Corridor advisor: (1) drafting of an agenda, (2) selection of potential presenters, (3) information and invitation of participants and (4) follow-up activities such as minutes of meetings and provision of presentations.

- The 18th Corridor Forum Meeting of the Rhine-Alpine Core Network Corridor took place on Thursday, 5th June 2023 as a physical meeting in Brussels in Centre Albert Borschette. It gathered 33 participants. The following topics were discussed/presented in the meeting:
  - State of Play of the TEN-T CNC study: progress, results on Project Implementation Report, and upcoming activities;
  - Information from the Coordinator on the 2023 Corridor events;
  - CEF III: exchange of views on the financing aspects and possible recommendations for the next EU financial perspective;
  - TEN-T revision process and main elements of negotiations, ongoing CEF II call, the new online public dashboard on EU funding, update on results and information on the third Military Mobility call, resilience of the TEN-T network, and the Connecting Europe Days 2024;
  - The role of the urban policy in the TEN-T policy.

- The 19th Corridor Forum Meeting of the Rhine-Alpine Core Network Corridor took place on Thursday, 13th November June 2023 as a physical meeting in Brussels in Brussels in Centre Albert Borschette. It was attended by 41 members. The following topics were discussed/presented in the meeting:
  - Updates on the TEN-T revision: state of play and main elements of the negotiations and Connecting Europe Days 2024;
  - CEF 2 transport calls on the Rhine-Alpine Corridor;
  - Progress on the Rhine-Alpine Core Network Corridor (state of play before the revised TEN-T Regulation);
  - Rhine-Alpine Corridor investments: planning projects vs. operational needs from the perspective of the RFC Rhine-Alpine;
  - CEF digital program: 5G corridors and synergies with TEN-T policy.

5.2 Working group meetings

on 11-12 May 2023, a joint "Event on Synergy Projects in Transport, Energy, and Digital Networks" was held in Amsterdam. This event involved the Rhine-Alpine, the North Sea-Baltic, and the North Sea-Mediterranean Corridors. More than 130 participants attended, including representatives from the infrastructure and transportation sectors. The event was supported by the Ministry of Infrastructure and Water Management of the Netherlands and the Port of Amsterdam. It involved

prominent figures, including the Dutch Minister of Infrastructure and Water Management, as well as the three core network corridors (Paweł Wojciechowski, Catherine Trautmann and Péter Balázs). The focus of the event was on promoting collaboration and efficient use of transport, energy, and digital infrastructures to advance sustainability goals.

6 Conclusions and Recommendations

The TEN-T Regulation, the role of the European Coordinators, and the studies supporting their activities have become an asset for engaging with the stakeholder community and finally completing the TEN-T network by the given deadlines.

The timing of the validity of the Guidelines, the mandate of the Coordinator, and the assignment of the consultants shall be harmonised with no interruptions in the future.

Although the Rhine-Alpine Corridor has already a relatively high compliance regarding the relevant KPIs, the infrastructure has been improved in the last years to provide more efficient, safer, smarter, and sustainable transport services.

From today's perspective, it can be assumed that nearly all rail sections will meet the TENT-T requirements by 2030 (only few exceptions due to operational restrictions). For inland navigation, the main challenge will be to guarantee the permitted draught on the Rhine in Germany between Iffezheim and Koblenz in periods of extreme aridity and low water.

The merger between the Rhine-Alpine and the North Sea-Mediterranean Corridor now offers the opportunity to transfer this momentum to the new joint NSRM Corridor and develop it further. In doing so, it should be taken into account that investments should be made where there is the greatest need, i.e. where infrastructure capacities are insufficient. In this context, it should also be ensured that national investment plans are coordinated across the corridor, especially for cross-border projects.