Lyon Valence Avignon Marseille Nîmes Montpellier Perpignan Girona Barcelona Tarragona Lleida Zaragoza Guadalajara Madrid

C7

CLYMA Intermodal Action Plan

EXECUTIVE SUMMARY

This Plan identifies the investment requirements for the corridor, taking into account infrastructure requirements, along with technological, IT and managerial structures, and analyses the financial possibilities for the development of the corridor, considering the optimisation of public and private funds.

It also includes an Immediate Action Plan aimed at boosting intermodal transport within the shortest time frame and the lowest cost possible.

STUDY CONDUCTED BY:
TEIRLOG Ingeniería
with the collaboration of Robert Claraco (2015)

The full document is accessible to the project's Stakeholders Interest Group on the CLYMA website: **www.clyma.eu**

CLYMA
THE GREEN LINE

DEVELOPMENT OF THE
CONNECTION
LYON-MADRID
ON THE MEDITERRANEAN
CORRIDOR

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

Conclusions of the analysis

The analysis of linear infrastructures, terminals, intermodal services and management issues, included in the CLYMA studies: “Technical diagnosis of the Lyon-Madrid Axis infrastructure”, “Catalogue of intermodal terminals and associated services”, “Management assessment of the Lyon-Madrid Axis” and “Regular freight transport services supply”, has made it possible to diagnose and identify problems, bottlenecks and shortcomings that are slowing and/or preventing the development of intermodal transport in the Madrid-Lyon section of the Mediterranean corridor.

As a starting point for preparing the Action Plan, the main conclusions of this analysis are listed below, highlighting the most relevant problems identified.

Most relevant problems identified are:

- The **Madrid-Lyon rail axis** suffers from **infrastructural discontinuity for freight traffic**.
- Each country’s rail network has its own difficulties: **infrastructural problems on the Spanish side** and **capacity problems on the French side.**
- The **crossborder between Spain and France** continues to be the **corridor’s main problem for freight trains.**
- Currently, the **main problem for using UIC is the lack of traction** (locomotives). Traction services are not available in the proper economic and service conditions.
- **Interoperability problems remain in terms of infrastructure** (3 voltages, 3 safety systems, changing locomotive and engine driver)
- The option of using the **conventional Iberian gauge line between Barcelona and Portbou** and the transhipment at the border remain but this **increases the cost for services and management.**
- Other noteworthy obstacles are related to the **management of slots and rolling stock** (availability and cost).
- In **Spain** there are a problems in terms of the **service offer, quality and costs of terminals.**

The Action Plan has been structured into four operational areas, each one with its strategic objectives.

Operational Areas	Strategic Objectives
Linear Infrastructures	Resolve or mitigate the breaks in the continuity of the corridor caused by the **INFRASTRUCTURES**, and eliminate bottlenecks, to guarantee capacity and overcome technical problems, aiming to adjust to the parameters of the European Core Network
Nodal Infrastructures	Make the **NODAL INFRASTRUCTURE** along the corridor (basically the intermodal infrastructures) as efficient as possible using actions to improve the offers of facilities and services.
Management	Deal with infrastructure **MANAGEMENT** problems which reduce the efficiency of the corridor, and also take action to favour market competitiveness and facilitate competition procedures.
Services	Promote the development of intermodal freight transport **SERVICES**, consolidating existing ones and fostering the creation of new intermodal transport services.

The actions proposed for each operational area are listed in the following pages.

These tables indicate only the estimated cost of each measure. However, in the Action Plan each measure has been assigned a level of priority in accordance with the seriousness or importance of the issue to be resolved; a promoter, which could be a public or private organisation; an estimate of the timing for execution, in tune with the priority for the action; and an estimate of the cost of executing the measure.

Activities by operational area

LINEAR INFRASTRUCTURES	Cost (M€)
Action Solve cross-border constrains	
Infrastructural improvement of UIC section Mollet - TP Ferro - Perpignan	
Implementation of ERTMS and 25 kV electrification between the TP-Ferro-Perpignan section	30
Reach the standard load of 22.5 tonnes per axle in the stretch between Le Perthus and Perpignan	No data
Build one or two sidings (under study) in the stretch between Mollet and the TP Ferro section	12.5 / 25
Infrastructural improvement of conventional section Mollet - Portbou - Perpignan	
Create a seamless dual gauge connection to the tunnels in Portbou and Cerbère	40
Implement the UIC gauge using a third rail between Mollet and Portbou	255
Remove bottlenecks of the Corridor	
Infrastructural improvement	
Implement a double track between Calatayud and Ricla	800
Implement double track in the sections of single track between Zaragoza and Reus	3,650
Implement double track at Elne section, in the junction between Le Boulou railway terminal and Perpignan one	210
Actions to avoid the level crossing between rail connection to Saint Charles station and the high speed line to Spain	50
Include the northern rail section between Zaragoza and Reus in the Core Network	0
Actions in nodes and bypass	
Extend the Southern Railway Bypass of Zaragoza	No data
Plasencia de Jalón – Plaza: Creation of new structure (line, tunnel, bridge, leapfrog)	119.53
Montpellier <--> Nîmes (new line): Creation of a high-speed bypass line of both cities, for freight and passengers	2,300
Lyon Node (new line): Lyon area bypass (CFAL). New line of bypass of the agglomeration	3,500
First treatment of Lyon node	1,000-1,150
Further treatment of the Lyon node	400-1,200
Marseille node: Underground crossing at Marseille	2,500
New rail linear infrastructures	
Technical studies to mitigate traffic overload at Martorell-Castellbisbal stretch	1 – 5
Double track railway between Alcalá de Henares and Guadalajara exclusively for freight trains	265
Montpellier <--> Perpignan (new line): Creation of a new high-speed line, both passenger and freight	6,300
Road infrastructure	
A2 Girona: Road section N-II / A-2 Girona	Evaluation on going
A27 Montblanc: Road section A-27 Morell-Montblanc	Evaluation on going
B40 Barcelona: Fourth ring road of Barcelona (B-40)	Evaluation on going
Fos-sur-Mer <-> Marseille: Bypass of Martigues and Port-de-Bouc	145
Fos-sur-Mer <-> Avignon: Bypass of Miramas	61.2
Fos-sur-Mer <-> Avignon: Motorway link Fos <-> Salon-de-Provence	300
Fos-sur-Mer <-> Marseille: Bypass of Arles	300
Specific studies for the improvement of road accessibility to the French terminals, particularly the case of Lyon node ones	1 – 5
Lyon Node, Lyon <-> Avigon, Lyon <-> Modane: Centralized Network Control System Lyon-Perrache / Rive Gauche	500 all the Lyon area
Achieve the standard parameters of the Core Network	
Measures to achieve standard parameters	
Upgrade the conventional Madrid-Barcelona rail line. Enlargement of maximum freight train length to 750 m. Implementation of sidings with a minimum useful length of 750 metres in the stretches of the Madrid-Lyon Corridor where they are lacking	25 - 30
Castellbisbal-Vilaseca. Implement UIC gauge. Enlarge maximum freight train length to 750 m Third rail between Reus and Vila-seca: Conversion to mixed gauge (Iberian and UIC)	372.81
Implement UIC gauge (third rail) between Reus and Zaragoza through north rail itinerary (Lleida)	135
Implement UIC gauge (third rail) between Reus and Zaragoza through south rail itinerary (Mora)	120
Implement UIC gauge (third rail) progressively between Madrid and Zaragoza	345
Implement ERTMS progressively in the conventional railway between Madrid and Mollet	660
Technical studies for high gauges allowing the development of rail motorways in the Spanish part	1 – 5

LINEAR INFRASTRUCTURES (cont.)	Cost (M€)
Achieve the standard parameters of the Core Network (cont.)	
Implement electrification in 25 kV progressively in the conventional railway between Madrid and Barcelona (Mollet)	335
Implement ERTMS progressively in the French part of the corridor	Not defined
Implement electrification in 25 kV progressively in the French part of the corridor	Not defined
Implement the third rail in the Iberian gauge line between Portbou and Cerbère	4
Other problems linked to the infrastructure	
Resolve energy feeding problems in the stretch Mollet-Vilobí d'Onyar	Not defined
Establish regulations for securing goods on trains	0
Adapt the Spanish braking regulations to enable 1000-metre trains (VIIA) to run on the stretch between Mollet and the section granted under concession to TP-Ferro	0
Promote routing of traffic to or from Italy through alternative routes that avoid Lyon	0

NODAL INFRASTRUCTURES	Cost (M€)
Rail – Road terminals	
Rail access to terminals	
Barcelona La Llagosta Terminal: Implementation of intermodality and UIC gauge.	100
Progressive implementation of UIC gauge accesses to the intermodal terminals of the Barcelona – Madrid axis	150
Aranjuez Complex. UIC gauge rail connection	25 – 30
Vicálvaro and Abroñigal Terminals UIC gauge connection	165,29
Barcelona Can Tunis Terminal: Implementation of intermodality and UIC gauge	33
Improvement of the rail access to the Dry Port of Coslada	Not defined
Improvement of the rail-road terminal of Miramas (Clesud): upgrade of the rail connections to the terminal	4 (rail connection)
Improvement of the rail access to the Fos XXL Terminal	50
Upgrade terminal facilities	
Zaragoza tmZ: Upgrade rail terminal facilities	7
Zaragoza PLAZA: Upgrade rail terminal facilities	Evaluation on-going
Dry Port of Madrid Coslada: Upgrade rail terminal facilities	1,2
Dry Port of Azuqueca: Upgrade rail terminal facilities	Evaluation on-going
Intermodal Terminal of Monzon: Upgrade rail terminal facilities	Evaluation on-going
Study for transforming the dead-end tracks into through tracks in the terminals of the Corridor where that action is possible	1 – 5
Study for the progressive extension of the R/d and L/U tracks of the Barcelona – Madrid axis, in the terminals where that action is possible	1 – 5
Develop terminals	
Madrid-Vicálvaro Multimodal Terminal and logistics development	165,29
Develop a Dry Port in Guadalajara	18
Develop the Far d'Empordá – Vilamalla Intermodal Terminal	Fase 1: 41,4 Fase 2: No data
Develop the Vallés Logistics Centre – La Llagosta	180
Develop the Intermodal Terminal of El Penedès	128,8
Develop a new rolling motorway terminal in Barcelona	30
Develop a combined platform in the south of Lyon with good road connectivity	View Lyon node activity
Other infrastructure measures	
Analyse and identify the I.T. in which the implementation of facilities for high performance intermodal services can be expected (Rolling Highways)	1 – 5
Rank actions in the I.T. of the Corridor which, due to their size or their location in urban surroundings, make it difficult to develop or carry out their activities	1 – 5
Study for developing UIC gauge 'last mile' connections to private sidings belonging to potential generators of rail traffic	1 – 5
Services in the intermodal terminals	
Study and implement resources and equipment to provide temperature control services in the I.T. of the Corridor	1 – 5
Study for conditioning specific areas for storing ITUs of dangerous goods	1 – 5
Identify terminals of the Corridor in which tank cleaners and authorised ITUs can be implemented inside the intermodal terminals, as well as the corresponding maintenance workshops, with their subsequent implementation	0,11 M€/terminal
Increase the offer of logistics services (for the goods) in the terminals of the Corridor	Not defined

NODAL INFRASTRUCTURES (cont.)	Cost (M€)
Rail – Road terminals (cont.)	
Services in the intermodal terminals	
Provide the I.T. of the Corridor with a significant volume of international sea containers, customs and para-customs services	Not defined
Optimise the management of arrivals and departures of heavy load vehicles in the terminals of the Corridor	Not defined
Ports	
Rail access improvement	
Tarragona Port: Upgrade railway access: Electrification. New rail access. UIC and Iberian gauge	18
Barcelona Port: new rail accesses	141
Improve the capacity of the rail access to the port of Fos-sur-Mer	8
Automate access and new links to the port and industrial zone of Fos-sur-Mer	Evaluation on going
Improve the capacity of the rail access to the port of Marseille (Mourepiane link)	18.5
Road access improvement	
Tarragona Port: Upgrade road access: access to port/logistic platform (ZAL)	9.3
Barcelona Port: Upgrade road access	242.8
Intermodal terminals	
Tarragona Port: Upgrade the I.T. inside the port. Intermodal rail terminal. Rail infrastructure. I.T. for trains. Upgrade	13.3
Barcelona Port: Construction of the Port of Barcelona Intermodal Terminal in the former Llobregat riverbed	200
Marseille node (RRT + port): Improve port rail connection, RRT creation: Mourepiane combined transport terminal	41.8
Marseille node (RRT + port): Rolling motorway terminal (creation of new RRT)	5
Marseille node (RRT + port): Upgrade Short Sea Shipping terminals	80
Marseille node (Fos-sur-Mer port): Dredging works and waterway access	34
Inland ports	
Intermodal terminals	
Lyon node (Salaise - Sablons): 340 ha multimodal platform, including a 35 ha area with direct connection to the waterway	132
Avignon node: Create a trimodal platform IWW-rail-road	110
Upgrade of the Port of Lyon including: renewal of roads in the port, direct connection with the national rail network,…	20.8
Core Network standards	
Sete - Marseille: Improve the capacity of the Rhône-Sète canal	75
Core network for Rhône inland waterway (NSMed): Standardise Slipway in Arles	6.7
Core network for Rhône inland waterway (NSMed): Develop quays and waiting areas for alternate traffic direction	3.3

MANAGEMENT	Cost (M€)
Achieve an efficient slot and traffic management	
Slot assignation criteria	
Make capacity reservation processes smoother and more flexible	0
Increase the number of slots reserved for international freight traffic	0
Coordinate with regional passenger traffic	0
Deterrents to be applied to rail operators who do not use their reserved slots	0
Traffic objectives	
Intensify and optimise of the unified Axis management	0
Establish prioritising criteria if rail traffic share the same track	0
Subordinate the maintenance bands (maintenance periods) to commercial slot requirements	0
Intensify the implementation of traceability systems	<3
Facilitate the availability of rolling stock	
Rolling stock measures	
Boost and support the creation of an option for neutral traction in the UIC gauge itinerary	<5
(ES) Increase the supply of rolling stock hired out by ROSCO	Not defined
(ES) Encourage the development of independent repair workshops for new operators	<1
Facilitate the certification and type-approval processes of rolling stock	0
Promote research and the use of new technologies (self-loading wagons, variable-gauge axles for goods wagons, etc.)	<5
Disseminate the applicable European programmes (CEF, Horizon 2020, etc.)	<1
Propose mechanisms for encouraging renewal and/or increase of rolling stock	<1

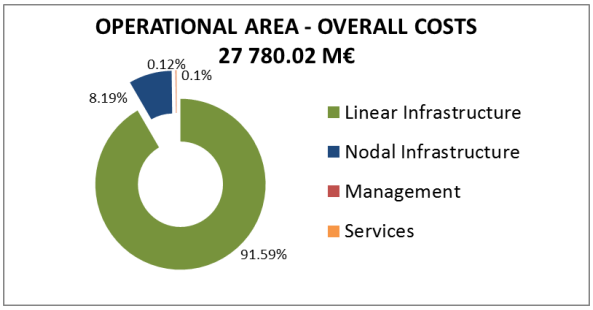
MANAGEMENT (cont.)	Cost (M€)
Ensure the competition, access to market and services	
Administrative measures	
Simplify the licensing processes and safety certificate regulations	0
(ES) Adapt the rail fee system to promote the involvement of private operators in freight management	0
Establish a rail staff training system validated for the Corridor	0
Redefine / remove the advantages acquired by Renfe Operadora and SNCF	0
Define the differences and responsibilities between the rail operators and logistic operators who provide intermodal services	<1
Monitor the activities of rail operators in the Axis	<1
Propose specific actions to rail regulators	<1
Solve Cross-border Problems Related to Management	
Cross-border management	
Increase the current traction supply for crossing the border via TP Ferro	0
Adapt the maintenance on the TP Ferro network to increase its capacity	0
Coordinate management of the three cross-bordering systems among the infrastructure managers	<1
Review the fees for diverse operations at the two railway border crossings between Spain and France	<1
Improve the Management of Terminals	
Concession model	
(ES) Exercise effective control over the quality of the service offered in public terminals	<1
Encourage integral terminal management	0
Establish longer terminal management contracts	0
Propose the definition and standardisation of infrastructural parameters in terminals	<1
Adapt the opening and closing times of the terminals to the rail operators' needs	Costs assumed by terminal operators
Ensure the services in public terminals are offered in equal conditions	0
Promote the application of procedures and tools for optimising ITU handling processes	<3
Promote the implementation of self-loading wagons, with or without specialised terminals, especially on Rolling Highways	<5
New technologies for identifying ITUs and vehicles during haulage	<1

SERVICES	Cost (M€)
Intermodal Services	
Development and promotion of conventional intermodal rail services	
Identify new intermodal services with potential	<3
Develop alliances and relationships between manufacturers and operators that enable the concentration of loads	<5
Develop formulas to combine/integrate services that facilitate the concentration of loads	<1
Develop rolling highways	
Prepare feasibility studies for Rolling Highways	<3
Develop intermodal transport services in ports	
Develop intermodal transport services in ports	<1
Develop river intermodality	
Develop river intermodality	<1
Intermodal Operators	
Attract and promote international intermodal operators. Cooperation among operators of different modes	
Attract intermodal operators to the Madrid – Lyon Axis	<1
Foster cooperation/coordination among operators of different modes	<3
Boost the creation of proximity rail operators and foster the activity of those that have already been implemented	<3
Regulations and Standards	
Encourage the modification of the regulations that foster intermodality	
Authorise MMA of 44 tonnes	<1
Eliminate traffic restrictions	<1
Facilitate the use of 45-foot containers in maritime transport	<1
Create working groups to collaborate with competent authorities to optimise the regulations	<1
Amend EU 913/2010 standard	<1
Advocate the application of economic incentives to intermodal services	<1
Encourage better use of funding sources from European and other programmes that are applicable to the corridor (CEF, Horizonte 2020, ERDF, etc.)	<1

Key budget summary

The overall budget for the measures defined in this Development Plan comes to 27 780.02 M€, most of which is for the lineal infrastructure needs (25 444.04 M€, 91,6% of the overall costs) .

The operational areas related to supplying infrastructure absorb 99.78% of the resources, and the management areas only the 0.22%.



According to the priority of proposed measures the distribution of the total cost for each operational area is the following:

OPERATIONAL AREA	Priority 1 (M€)	Priority 2 (M€)	Priority 3 (M€)	TOTAL COSTS (M€)
Linear infrastructure	5 795.01	8 469.53	11 179.50	25 444.04
Nodal infrastructure	1 293.19	311.20	671.59	2 275.98
Management	6.00	16.00	10.00	32.00
Services	16.00	8.00	4.00	28.00
OVERALL COSTS	7 110.20	8 804.73	11 865.09	27 780.02

Sources of funding for the Action Plan

Generally, four basic funding models for transport infrastructure can be defined:

- Public budgetary funding
- Public non-budgetary funding
- Mixed funding (public-private collaboration)
- Private funding

The financial sources proposed for the main activities of the Action Plan are the following:

Action	Cost (M€)	Financial sources						
		State	Region	Port Auth.	EU-CEF	EU-ERDF	Private	Others
Solve cross-borders constrains	350	O			X			
Remove bottlenecks of the corridor	23 360	O	X		X	X		
Achieve the standard parameters of the Core Network	2 001	O			X			
Other problems linked to the infrastructure	0-Not defined	O					X	
Rail-Road terminals	1 137	O	X		X	X	O	O
Ports	438	O	X	O	X			X
Inland Ports	348	O	X	X	X	X		

O → Main financial source X → Secundary financial source

Immediate Action Plan: Quick-Win measures

The **Immediate Action Plan (IAP)** aims **at boosting intermodal transport within the shortest time frame and the lowest cost possible**. The IAP includes all measures that were deemed to have the greatest urgency due to their ability to produce quick results with a low financial effort.

Hence, **the IAP is composed of "Quick-Win" measures**, i.e. those measures whose investment needs are low but are able to significantly support and promote intermodal transport.

At the outset, it should be noted that the Action Plan described in this study has prioritized the proposed measures into three levels. Therefore, we have started with those measures **already assessed as Priority 1 (the highest priority)** for the preparations of this IAP.

The IAP was drafted based on a number of initial general criteria in which the measures selected for this IAP are framed:

- **Ports are of considerable importance for developing intermodal transport** in the Madrid-Lyon Corridor.
- **The major nodes** that generate and/or attract containerized/containerisable goods for industry and consumption **are essential** for the Corridor's optimal operation.
- **Those measures** included in the Action Plan **that are currently being implemented will not be evaluated.**
- The proposed measures regarding **Management and Services** blocks have very low or no costs.

To better establish the IAP, the selection of measures that will constitute it has been refined using a **multicriterial analysis**, considering 4 factors:

- Budget
- Time frame
- Feasibility
- Contribution to intermodal traffic

Linear infrastructures
Solve Cross-border constraints
Implement ERTMS and 25 kV electrification between the TP Ferro-Perpignan section
Remove bottlenecks from the Corridor
Technical studies to mitigate traffic overload at Martorell-Castellbisbal stretch
Achieve the standard parameters of the Core Network
Upgrade the conventional Madrid-Barcelona rail line. Enlarge of maximum freight train length to 750 m. Implementation of sidings with a minimum useful length of 750 metres in the stretches of the Madrid-Lyon Corridor where they are lacking.
Other problems linked to the infrastructure
To solve energy feeding problems in the stretch Mollet-Vilobí d'Onyar
Establish regulations for securing goods on trains
Estimated cost: 61 M€

Nodal infrastructures
Ports
Port of Tarragona: Upgrading railway access: Electrifi-cation. New rail access. UIC and Iberian gauge
Capacity improvement of the rail access to the port of Fos-sur-Mer
Capacity improvement of the rail access to the port of Marseille (Mourepiane link)
Port of Tarragona: Upgrading road access: access to port/logistics platform (ZAL)
Marseille node (RRT + port): Rolling motorway terminal (creation of the new RRT)
Inland ports
Core network for Rhône inland waterway (NSMed): Standardise Slipway in Arles
Core network for Rhône inland waterway (NSMed): Develop of quays and waiting areas for alternate traffic direction
Estimated cost: 68.8 M€

Management
Achieve efficient slot and traffic management
Make the capacity reservation processes smoother and more flexible
Increase the number of slots reserved for international freight traffic
Coordinate with regional passenger traffic
Deterrents to be applied to rail operators not using their reserved slots
Intensification and optimisation of the unified Axis management
Establish priority criteria in the event that rail traffic share the same track
Subordinate the maintenance bands to commercial slot requirements
Availability of rolling stock
Boost and support the creation of an option for neutral traction in the UIC gauge itinerary
Increase the supply of rolling stock hired out by ROSCO
Facilitate the certification and homologation processes of rolling stock
Ensure competition, access to market and services
Simplify the licensing processes and safety certificate regulations
Establish a rail staff training system validated for the Corridor
Solve cross-border problems related to management
Increase the current traction supply for crossing the border via TP Ferro
Improve the management of terminals
Monitor the quality of the services offered in public terminals
Adapt opening/closing times of the terminals to the rail operators' needs
Estimated cost: 6 M€

Services
Intermodal services
Identify new intermodal services with potential
Foster alliances and relationships between manufacturers and operators that enable the concentration of loads
Develop formulas to combine/integrate services that facilitate the concentration of loads
Prepary feasibility studies for Rolling Highways
Regulations and standards
Eliminate traffic restrictions
Amend EU 913/2010 standard
Advocate the application of economic incentives to intermodal services
Encourage better use of funding sources from European and other programmes that are applicable to the corridor (CEF, Horizonte 2020, ERDF, etc.)
Estimated cost: 16 M€

Conclusion

A small effort in these Quick-Win actions (about 150 M€, 0.5% of the total cost of the Action Plan) **will mean a significant advance in developing the corridor.**

CLYMA project consists of the implementation of the corridor approach to a section of the **Mediterranean corridor**, concretely to the Western part of the corridor and specifically to the Lyon-Madrid Axis.

The project comprises of studies and actions on the organization and optimal implementation of the **TEN-T network**, taking into account long term perspectives, environmental aspects and associated needs, as well as studies that promote environmental sustainability, resource efficiency and low-carbon transport within an integrated transport concept. This should stimulate the deployment of the **Green Corridor concept.** The project also intends to develop a **managerial structure** for the intermodal corridor.

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The sole responsibility of this publication lies with the author. The European Union is not responsible for any use that may be made of the information contained therein.

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