Promotion du Grand Axe Ferroviaire de marchandises
Scandinavie-Rhin-Rhône-Méditerranée Occidentale A.S.B.L

FERRMED Extraordinary General Assembly and FMWG General Steering Committee meeting

Presentation of progress of the FERRMED Study of Traffic and Modal Shift Optimisation in the EU

Brussels, March 25th 2021

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1. GENERAL INTRODUCTION

Presented by Joan Amorós and Josep Maria Rovira

PERFORMANCE AND ENVIRONMENTAL IMPACT OF THE EUROPEAN LAND FREIGHT TRANSPORT SYSTEM

BACKGROUND

- In 2015 transport volume in the EU-28 was **19 billion tonnes** of goods transported **(or 2,385 billion tonne-kilometre)**. In terms of tonne-kilometre, **75% was transported by road, 18% by rail and 7% by barge**.

- Alternatively: In the year 2018, total freight transport performance in the EU-27 (without the UK) was **2,267 billion tonne-kilometre** of which **75,4% by road, 18,7% by rail and 6% by inland waterway**.

- The major part (around 55%) of total road freight transport performance was over distances of more than 300km of which, roughly one third, where over more than 1000km.

- The impact of road freight transport on the environment is massive: some **275 million tonnes of CO_2** per annum representing **30% of total GHG emissions of the transport sector** as a whole.

PRESENT CONDITIONS OF THE EUROPEAN LAND FREIGHT TRANSPORT SYSTEM

❖ In the EU, according to the "World Economic Forum":

- 24% of freight vehicles run empty
- The loading of the rest is, on average, of 57% in terms of weight
- Overall efficiency is only 43%
- Estimated recoverable loss of 160 billion Euros/year (similar conditions appear at Eurasian level)

- **Rail has 6 times lower specific energy consumption and external costs than road however, there has been no increase in European rail freight share in the last 15 years!**

CALL FOR A COMPREHENSIVE PLAN OF MODAL SHIFT OPTIMISATION

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Considering:

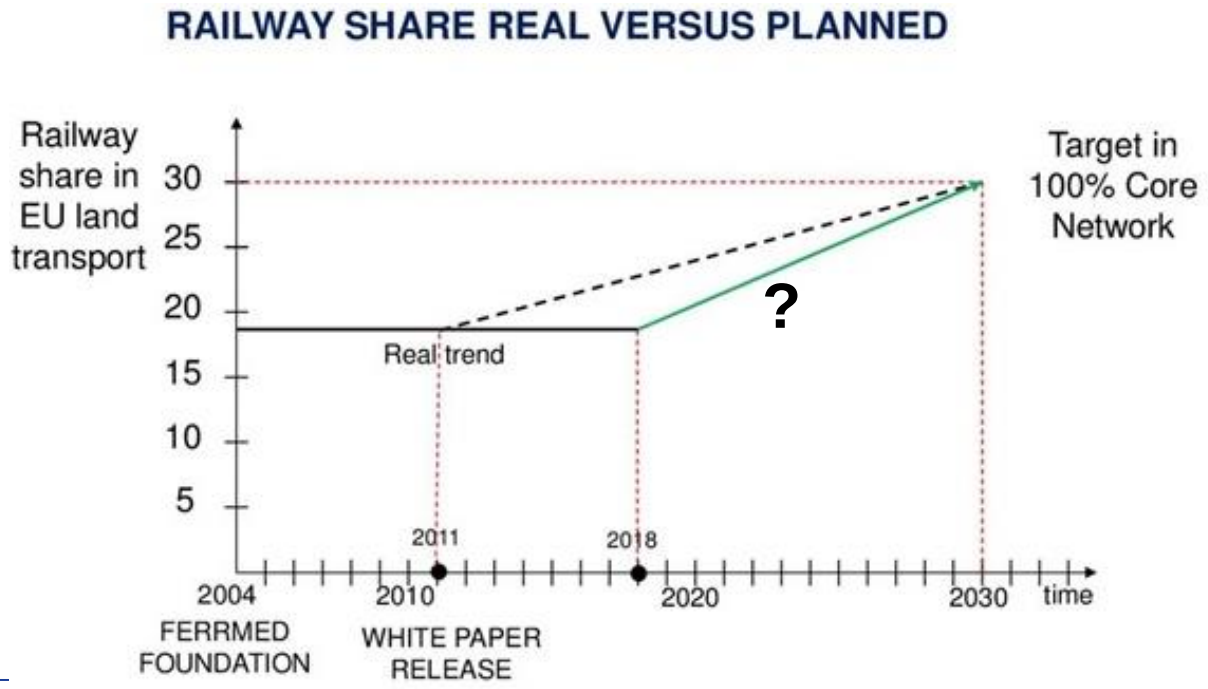
- The performance and environmental impact
- The development expected from 2019 until 2030
- The existing inefficiency of the system
- The waste of economic resources in useless investments
- The lower specific energy consumption and external costs of the railway versus the road

Under the scope of the "European Green Deal", a comprehensive plan at EU level (even at Eurasian level) **of modal shift optimisation** is urgently needed.

THE FERRMED STUDY OF TRAFFIC AND MODAL SHIFT OPTIMISATION IN THE EU

PRELIMINARY

Considering there has been no increase in EU rail freight share in the last 15 years (17,9% in 2005 and 17,3% in 2017) and that the EU Transport Core Network is too vast (~70,000 km), **the shift from road to rail requires the concentration of investments in a selective part of the main corridors of the Core Network.** FERRMED has initiated a major study highlighted below.

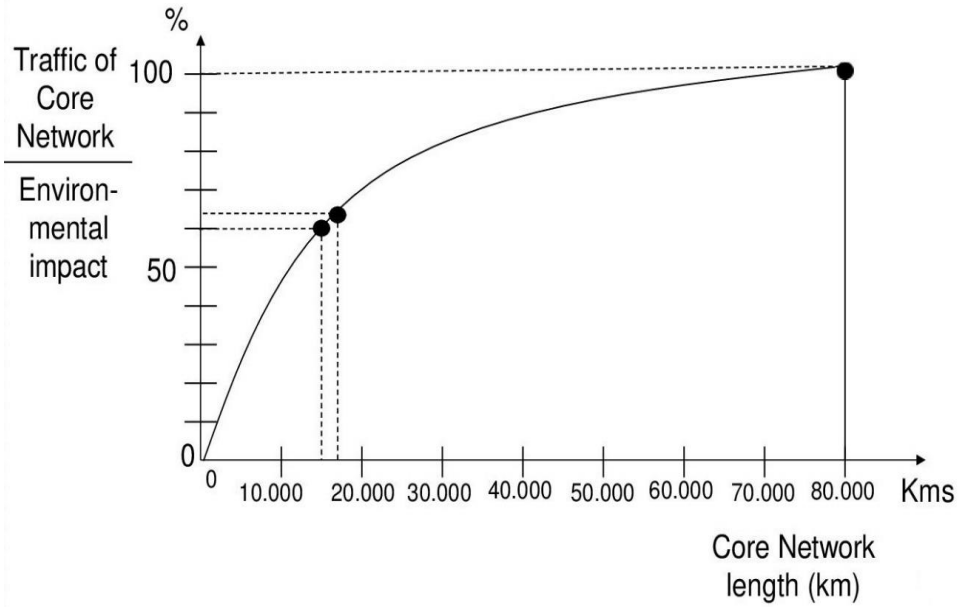


OBJECTIVES OF THE STUDY

The key objectives of the study are:

- **To identify freight traffic** in total and by mode of transport in the main corridors of the EU Core Network (EU Backbone Network).
- **To propose an Action Plan** to achieve the EU "White Paper" targets by 2030 (30% of freight land transportation over 300 km carried by rail or barge) in the most crowded sections of the corridors, covering 60-65% of the traffic related to the EU Core Network.
- **To be a key tool for the EU COVID-19 Recovery Plan in Transport & Logistics.**

FERRMED APPROACH TO ACHIEVE AT LEAST 60 ÷ 65% OF "WHITE PAPER" TARGETS IN 2030



BASIC STRUCTURE AND CONTENTS OF THE STUDY

IDENTIFICATION OF:

- The sections of Main Corridors of the Core Network with most traffic (all transport modes) → "Backbone Network" (65% of Core Network traffic).
- The key strategic logistics hubs.
- The key intermodal terminals & ports of the "Backbone Network".
- The main interconnection links, back-up links and feeder links related to the key intermodal terminals & ports in the "Backbone Network".
- The bottlenecks in intermodal terminals & ports and interconnection links according to the traffic (present and future conditions)
- The best routes inside the "EU Backbone Network" of interconnection with Eurasian Transport System

BASIC STRUCTURE AND CONTENTS OF THE STUDY

Actions with a socio-economic and environmental impact:

- Railway Network (terminals and interconnection links) considering infrastructure and operation
- Rolling Stock
- Inland waterways

Socio-economic and environmental results:

- Required investments
- Savings in VOC
- Savings in travel transport time
- Savings in environmental issues: reduced pollutant emissions, reduced GHG emissions, reduced number of accidents
- Net Present Value, Benefit-Cost Ratio, EIRR and GDP impact
- Possible financing resources

MAIN ACTIVITIES OF THE STUDY DEVELOPMENT (I)

- **Data collection of traffic on railways, road and inland waterways**

  Status: done / Checking: under way

- **Interactive maps of traffic and main network characteristics**

Status:

- Traffic representation done.
- Main network characteristics: partially done. Pending information about terminals and interconnection links characteristics.

Checking: under way.

- **EU Backbone determination (sections covering at least 65% of the EU Core Network transport volume)**

  Status: done / Checking: under way

- **Definition and determination of the strategic Socio-Economic hubs in the EU**

  Status: First draft done

MAIN ACTIVITIES OF THE STUDY DEVELOPMENT (II)

- **Data collection of essential characteristics of intermodal terminals and marshalling yards**

Status: Under way (to be finished by April 2021). Stakeholder survey (to be done in parallel)

- **Selection of main interconnection links, back-up links and feeder links (Railway and Barge) interconnecting the Strategic socio-economic hubs and key terminals & ports**

Status: First draft done. Checking under way.

- **Data collection of basic characteristics of interconnection links (Railway & Barge) and determination of bottlenecks**

Status: Under way (to be finished by March/April 2021)

- **Forecast traffic scenarios (short term 2023, mid term 2025, long term 2030)**

Status: basic criteria established / Stakeholder survey: just started

Short term according to stakeholder survey; mid term according to stakeholder survey (at least 23% railway share); long term (two alternatives: stagnant with regard to 2019 and 20% increase with regard to 2019. Share: 30% railway, >7% barge).

MAIN ACTIVITIES OF THE STUDY DEVELOPMENT (III)

❖ **Analysis of the impact of traffic scenarios in the intermodal terminals, marshalling yards and interconnection links**

Status: Modelling: under way. Determination of traffic and actions to be undertaken: pending

❖ **Analysis of Rolling Stock (railway)**

- Required freight locomotive and wagons.
- Intelligent and long trains.
- Identification of improvement actions.

Status: Under way. To be finished by July 2021

❖ **Action plan in intermodal terminals and interconnection links (Railway and IWW)**

Railway: actions in infrastructure, operation and rolling stock

Barge: actions in Infrastructure and operation

Status: pending

MAIN ACTIVITIES OF THE STUDY DEVELOPMENT (IV)

- **General trends in Trans-Eurasian trade, share of freight by the three main transportation modes, basic transportation costs, transit times.**

Status:

  - Start: March
  - Finish: July 21

- **Identification of strategic Eurasian socio-economic hubs, related intermodal terminals, determination of appropriated core railway routes, improvement of capacity and efficiency, full FERRMED Standards implementation, proposed action plan.**

Status: pending

DEVELOPMENT TIMING

	MAIN ACTION / ACTIVITY	CALENDAR													
		3Q 2019	4Q 2019	1Q 2020	2Q 2020	3Q 2020	4Q 2020	1Q 2021	2Q 2021	3Q 2021	4Q 2021	1Q 2022	2Q 2022	3Q 2022	4Q 2022
1	Definition/approval of targets and content														
2	Definition/approval of budged and required manpower														
3	Establishment of agreements/collaborations with key international Associations														
4	Development timing preparation														
5	Data collection of traffic on railway, road and IWW														
6	Backbone Network determination														
7	Interactive maps preparation														
8	Data collection intermodal terminals & ports and marshalling yards + stakeholders survey														
9	Data collection interconnecting links														
10	Forecast traffic & scenarios + stakeholders survey														
11	Analysis of traffic & scenarios impact in intermodal terminals & marshalling yards + Actions required														
12	Analysis of traffic & scenarios impact in interconnection links + Actions required														
13	Rolling Stock improvement														
14	Trans-Eurasian Main Railway Network Enhancement														
15	Socio-economic and environmental analysis														
16	Edition of the Study content														
17	Dissemination FERRMED - EULER DECLARATION														

TASK FORCE ALLOCATION

- Total people days required c.1,700
- Status: 800 people days already executed (February ’21)
- Task force:
  - FMWG: 12 Senior analysts & advisors
  - Catalonia Technical University: 1 professor and 2 students
  - Antwerp University: 1 professor
  - Other students: 3
  - MCrit 5: Senior analysts: 3 Junior analysts: 2

NOTE: Additional Senior analysts could be included from China, the Russian Federation and Kazakhstan, regarding “Trans-Eurasian Main Railway Network enhancement”

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2. TABLES AND MAPS OF THE EU LAND TRAFFIC

Presented by Efrain Larrea

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Data collection

- **Data gathering** from several sources for **year 2015**, mainly **UNECE census** for road and rail
- **Complementary** data obtained from **national sources** wherever necessary (Italian toll motorways association, Croatian national transport model…)
- **Inland waterway** traffic calculated using an **assignment** model based on **origin-destination matrices** obtained from **national sources**

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Data representation

- **Rail map** displaying 2015 traffics on the rail sections, with distinction between passenger and freight
- **Road map** displaying 2015 traffics on the road sections
- **IWW map** displaying 2015 traffics on the IWW sections
- **Aggregated map of 2015 traffics displayed** on the **representative** railway **section** in each corridor → a line can represent several roads, rails and IWW sections all together

Data representation

- Traffic is converted from **trains** into net tonnes using conversion tables based on national averages (including **empty** circulations)

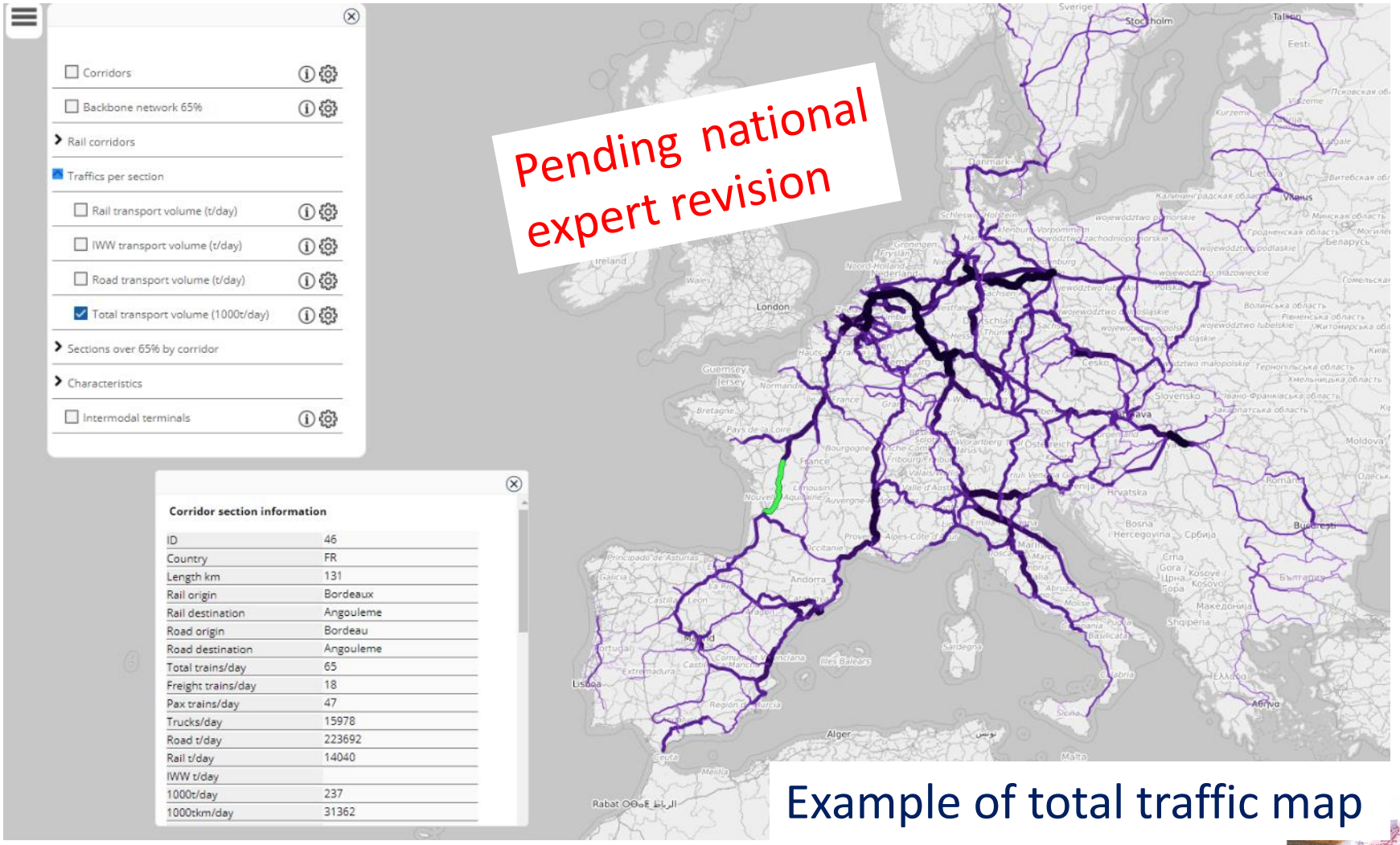
- Traffic is converted from **trucks** into tonnes using a general EU average of 14 net tonnes per HGV, including **empty** trips

Traffic table example

ID1	Origin rail	Destination rail	Origin road	Destination road	Name road	Country code	Comments	Length	cor1	cor2	cor3	cor4	cor5	cor6	cor7	cor8	cor9	feeder	backup
1	Marseille	Miramas	Marseille	Miramas	A-7	FR	Trucks merged from section 3	52.499	-	1	-	-	-	-	-	-	-	-	-
2	Miramas	Tarascon	Miramas	Tarascon	D-17	FR		46.418	-	1	-	-	-	-	-	-	-	-	-
3	Tarascon	Avignon	Tarascon	Avignon	D-35/D-2/A-9	FR		21.138	-	1	-	-	-	1	-	-	-	-	-
4	Avignon	Valence	Avignon	Valence	A-7	FR		122.97	-	1	-	-	-	1	-	-	-	-	-
5	Valence	Lyon	Valence	Lyon	A-7	FR		0.0467	-	1	-	-	-	1	-	-	-	-	-
5	Valence	Lyon	Valence	Lyon	A-7	FR		100.14	-	1	-	-	-	1	-	-	-	-	-

ID1	Trains	Freight Pax trains	Freight trains	Trucks	Tonnes rail	Tonnes road	Tonnes IWW	Total 1000 tonnes	Total 1000 tonnes/km
1	86	61	25	3537	19500	49518	8843	78	4088
2	89	61	28	2509	21840	35126	8843	66	3055
3	102	61	41	14325	31980	200550	10079	243	5128
4	76	35	41	18602	31980	260428	10079	302	37196
5	189	129	60	19972	46800	279608	10079	336	16
5	189	129	60	19972	46800	279608	10079	336	33694

TABLES AND MAPS OF THE EU LAND TRAFFIC



Example of total traffic map

TABLES AND MAPS OF THE EU LAND TRAFFIC

Example of characteristics map

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3. EU BACKBONE NETWORK DETERMINATION

Presented by Efrain Larrea

EU BACKBONE NETWORK DETERMINATION (I)

A) Central EU Backbone Network

Includes all sections of the corridors of the EU Core Network (all transportation modes added with a single threshold for the whole EU Core Network) that are over the identified threshold and that together represent 65% of the traffic in tonnes per kilometre (t/km).

EU threshold (first draft): **122,000 Tonnes/day/section**

B) Extended EU Backbone Network

Includes all sections of the 9 main corridors of the EU Core Network that get 65% of the traffic in each Member State in tonnes per kilometre.

In Member States with a high level of traffic the “National threshold” is over the “EU threshold”. Conversely, in the Member States with moderate to low level of traffic, the “National Threshold” is below the “EU threshold” level.

The Extended EU Backbone Network is the addition of all Member State sections that, country by country, are over 65% of the traffic in tonnes per kilometre. In the case of countries with a high level of traffic, the “EU threshold” must be considered instead of national threshold.

EU BACKBONE NETWORK DETERMINATION (III)

- Extension of EU Core Network: 54,000 km
- Extension of the Central EU Backbone Network: 17,000 km 31% of EU Core Network 122,000Tonnes km/day transported
- Extension of the Extended EU Backbone Network: 8,700 km 16% of EU Core Network

Country thresholds in 1000 tonnes/day

Austria	116	Greece	41	Luxembourg	117
Belgium	182	Spain	99	Latvia	36
Bulgaria	35	Finland	30	Netherlands	213
Switzerland	153	France	124	Poland	80
Czech Republic	121	Croatia	20	Portugal	28
Germany	179	Hungary	172	Romania	55
Denmark	120	Italy	166	Sweden	45
Estonia	62	Lithuania	62	Slovenia	93
				Slovakia	76
		EU	122		

EU BACKBONE NETWORK DETERMINATION (III)

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4. DEFINITION AND DETERMINATION OF STRATEGIC SOCIO-ECONOMIC HUBS

Presented by Professor Lanfranco Senn

EU STRATEGIC SOCIO-ECONOMIC HUBS DEFINITION AND CHARACTERISTICS (I)

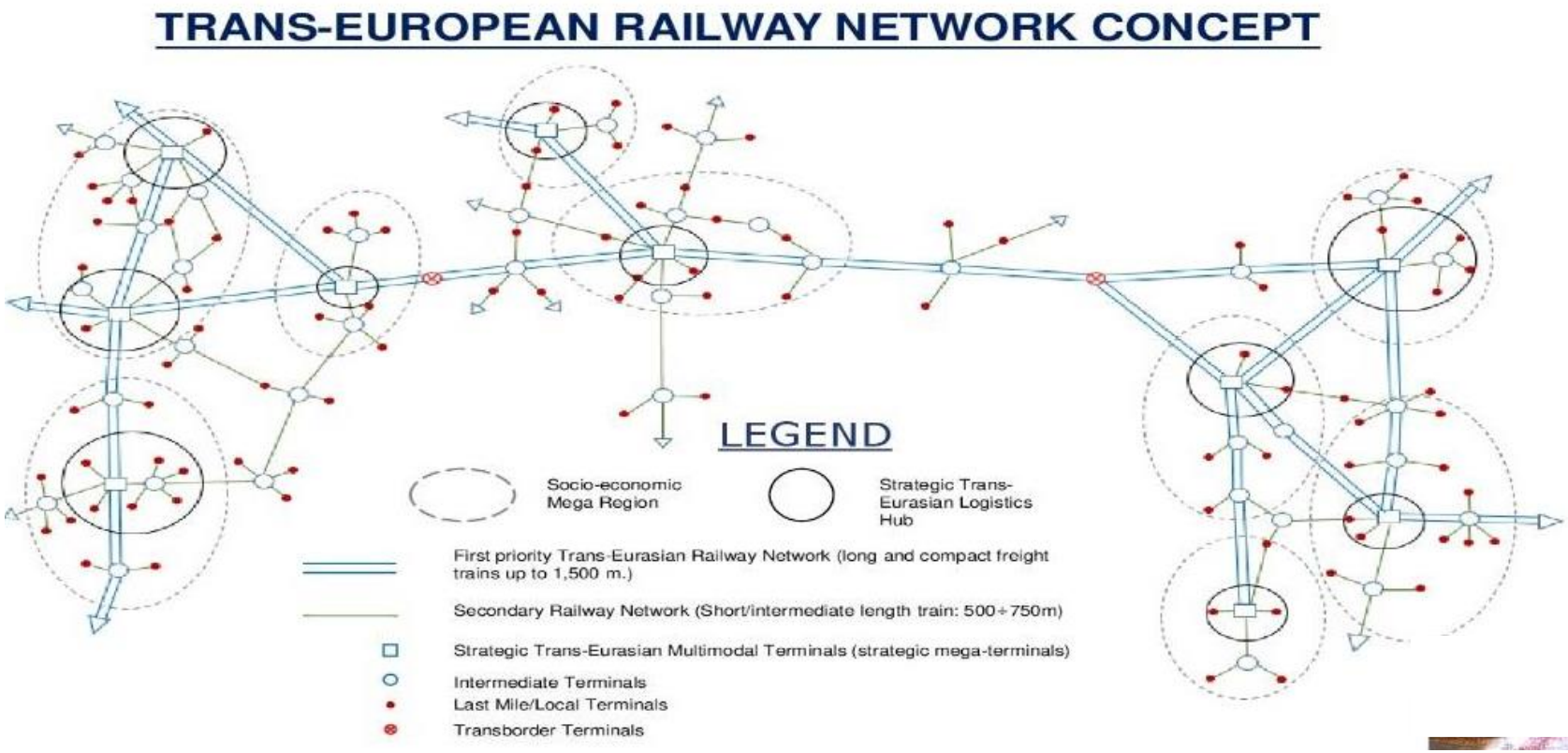
We understand as a EU strategic socio-economic hub, the urban areas with:

- **an important population** in the surroundings (at least ~ 1% of the EU population)
- **a good communication system**, motorways, railways, sea or inland ports and airport with powerful international links
- **efficient complementary facilities** like: universities and research centres, business schools, shopping districts, etc.

The main attributes or characteristics of the EU strategic socio-economic hubs are related to logistics and industry. One key point is to be a zone with sectors of comprehensive and diversified economic activity like: aeronautical, agrifood, automotive, ceramics, construction auxiliary industry, electronics, iron and steel, logistics services, metallurgical, mining, petrochemical, pharmaceutical, railway rolling stock manufacturing, textile and clothing, etc., (to reduce logistics costs and better "bi-directional flow" balancing).

EU STRATEGIC SOCIO-ECONOMIC HUBS DEFINITION AND CHARACTERISTICS (II)

Another significant issue **is to be integrated in a main trans-European route** (deep sea, railway, aerial) and to get a net of interrelated subsidiary intermediate hubs.



EU STRATEGIC SOCIO-ECONOMIC HUBS: SELECTION (first draft)

Using the definition/characteristics of socio-economic hubs outlined, we can consider the following as EU strategic hubs:

- Kopenhaven/Malmö
- Rotterdam/Amsterdam
- Antwerpen/Brussels
- Hamburg
- Duisburg/Düsseldorf
- Mannheim/Ludwigshafen/Frankfurt am Main
- München
- Lyon
- Milan/Verona
- Vienna/Bratislava
- Praha
- Warsaw/Lodz
- Katowice/Slawkaw/Krakow
- Barcelona/Tarragona
- Budapest
- Bucharesti/Constanta

STRATEGIC ZONES AND CORRIDORS INTERRELATED WITH THE STRATEGIC SOCIO-ECONOMIC HUBS (I)

Examples of interrelated strategic zones

- Antwerpen/Brussels ® Zeebrugge, Liège, Lille and Luxembourg
- Hamburg ® Bremen and Berlin
- Duisburg/Düsseldorf ® Köln and Dortmund
- Manheim/Ludwigshafen/Frankfurt am Main ® Sttutgart
- Lyon ® Paris and Marseille
- Milan/Verona ® Torino, Genoa, and Venice
- Vienna/Bratislava ® Koper
- Barcelona/Tarragona ® Madrid, Valencia/Sagunt and Zaragoza
- Praha ® Ostrava

STRATEGIC ZONES AND CORRIDORS INTERRELATED WITH THE STRATEGIC SOCIO-ECONOMIC HUBS (II)

Examples of interrelated corridors

- Duisburg/Düsseldorf
  - Rhine – Alpine
  - North Sea – Baltic
- Manheim/Ludwigshafen/Frankfurt am Main
  - Rhine – Alpine
  - Atlantic
  - Rhine – Danube
- Lyon
  - Mediterranean
  - North-Sea Mediterranean
- Milan/Verona
  - Mediterranean
  - Rhine – Alpine
  - Scandinavian - Mediterranean
- Barcelona/Tarragona
  - Mediterranean (coast)
  - Mediterranean (inland)
- Budapest
  - Mediterranean
  - Orient East Med
  - Rhine - Danube

NOTE: All main strategic socio-economic hubs and interrelated strategic zones must be inside the “EU Backbone Network”

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5. DEFINITION AND ANALYSIS OF INTERMODAL TERMINALS

Presented by Lluís Bassas

INTERMODAL TERMINALS STRATEGIC CLUSTERS

In the **main strategic socio-economic hubs and interrelated zones**, we have to take into account "the **Intermodal terminals clusters**" of significant intermodal terminals (both public and private) located in every strategic hub or interrelated zone.

- The **intermodal terminal strategic cluster** could have several kind of terminals, all of them served by railway, jointly with their corresponding marshalling yards.
- Altogether, a minimum of 50 operational tracks (existing or planned) is required.

FORECASTED CATEGORIES OF TERMINALS

- Strategic
- Intermediate
- Local
- Cross-border

DATA COLLECTION OF INTERMODAL TERMINALS AND MARSHALLING YARDS

- The FERRMED Database of the EU Backbone Network will consist of the main characteristics of the terminals as well as some screenshots.
- Checking sessions of the gathered information are being made.
- A stakeholder's survey asking for any missing information and expansion possibilities will be made

Basic key characteristics requested:

Intermodal Terminals

1. Contact information
2. Modes served
3. Opening hours for load/unload
4. Total terminal area (m²)
5. Number and usable length of tracks (m), for loading/unloading
6. Number and usable length of tracks (m), for marshalling/shunting
7. Number of gantry cranes
8. Number of reach stackers
9. Expansion plans

Marshalling yards

1. Contact information
2. Operating hours
3. Total area (m²)
4. Number and usable length of tracks (m)
5. Maximum length of formed trains (m)
6. Expansion plans

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Data collection tables for intermodal terminals and marshalling yards

Shared examples

DATA COLLECTION OF INTERMODAL TERMINALS AND MARSHALLING YARDS (MY)

Present situation

❖ Countries from which data is being collected so far and number:

Country	# Terminals/MY
Belgium	7
France	8
Germany	183
Spain	107
The Netherlads	22

❖Stakeholders survey: underway in parallel with the data collection.

- Number of inquiries already launched: 8

❖Ending of this activity: May 2021

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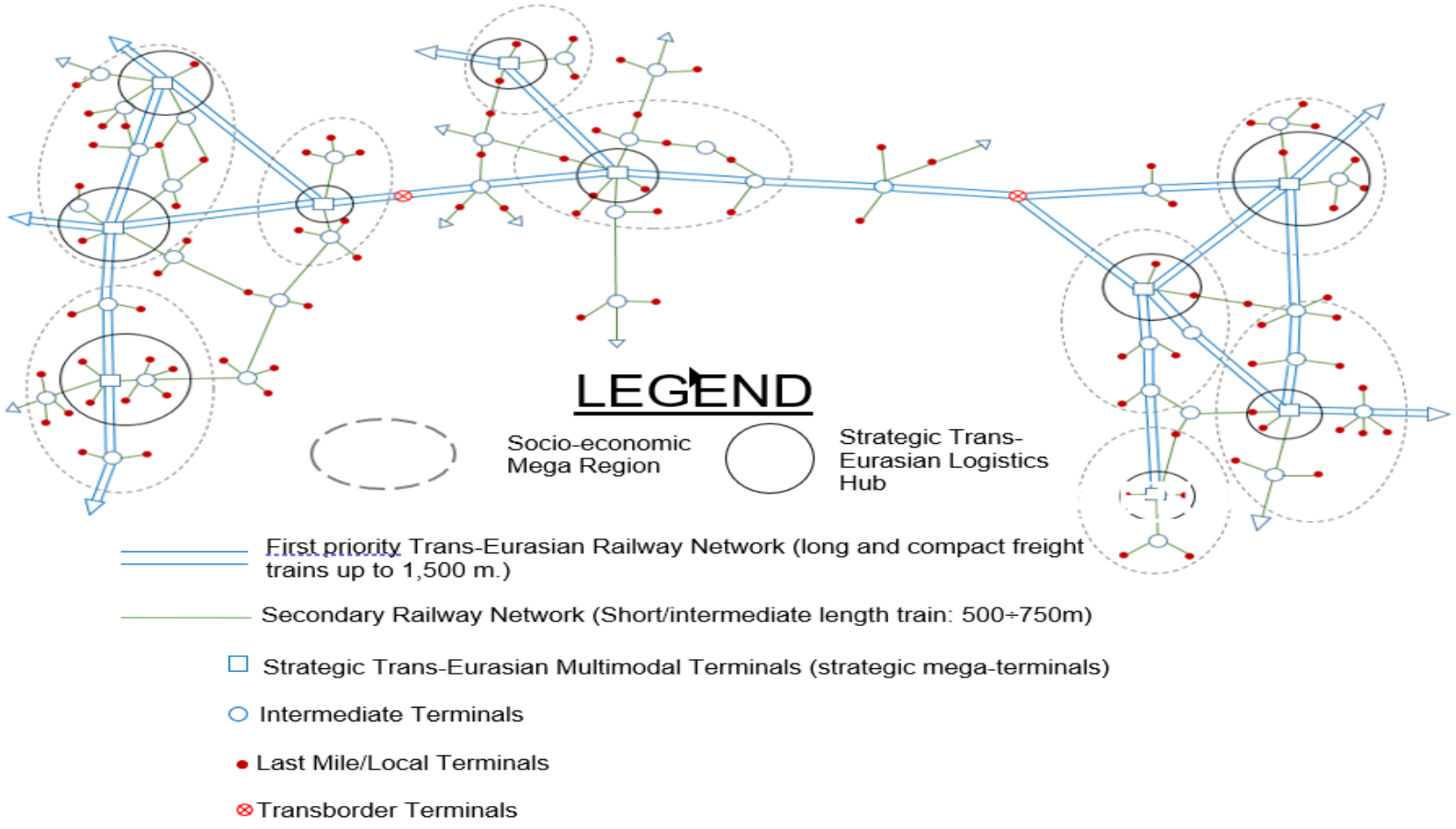
6. SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS

Presented by Josep Maria Ojea

SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS INTERCONNECTING THE MAIN STRATEGIC LOGISTICS HUBS AND INTERRELATED ZONES



SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS INTERCONNECTING THE MAIN STRATEGIC LOGISTICS HUBS AND INTERRELATED ZONES

Once defined the 16 main hubs located in the EU railway Backbone Network and their Eurasian links, we explain how to connect it:

We have three kinds of links:

- **Main links:** they are located on international corridors and meet the requirements that later are exposed
- **Back-up links:** they are located on national network and almost always belong to a rail corridor. They act like alternative links with less traffic
- **Feeder links:** allow the hub terminals to be connected with others outside. They feed the main links and do not always belong to the international corridors of the EU Core Network

Infrastructure characteristics data collection

The first step of selection and analysis of interconnection links is to have a data collection of them including the key infrastructure and operation parameters to consider as requirements.

Key infrastructure characteristics

- Length of the trains
- Loading gauge
- ERTMS implementation
- International track gauge
- Number of tracks
- Electrification
- Train Speed acceptance
- Track Gradient
- Operation issues
- Rolling stock issues
- Line saturation (identification of bottlenecks)

SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS INTERCONNECTING THE MAIN STRATEGIC LOGISTICS HUBS AND INTERRELATED ZONES

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Data collection table

FERRMED STUDY OF TRAFFIC AND MODAL SHIFT OPTIMISATION.- INTERCONNECTION LINKS (RAILWAY)

Version Revised Table 21-01-2021

COUNTRY: LUXEMBURG

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
CORRIDOR		RAIL WAY																							
NAME	INTERCONNECTION LINK M-Main B- Back-up F- Feeder	SECTION				NUMBER OF TRACKS	SIDING TRACKS	MAXIMUM CAPACITY					TRACK GAUGE (mm)	ELECTRIFICATION		CONTROL SIGNALING		MAXIMUM LENGTH FREIGHT TRAINS (M)	LOADING GAUGE	TRAIN SPEED (KM/H)	GRADIENT (0/00)	GROUPED SECTIONS	ACTIONS		
		NUM.	FROM	TO	Kms			Trains / day															PRIORITY SECTIONS	% GLOBAL TRAFFIC	PROPOSED ACTIONS
								Freight	Passenger	TOTAL	Acceptance	Saturation		YES/NO	TYPE OF CURRENT	ERTMS Y/N/YEAR	NATIONAL								
										0		0													
N.S.-Med	M	1	Kleinbettingen B Border	Luxemburg	18,8	2		8	89	97	210	-113	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	M	2	Luxemburg	Bettembourg	14,1	2		19	174	193	210	-17	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	M	3	Bettembourg	Bettembourg / F Border	2,5	2		20	56	76	210	-134	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	12				
N.S.-Med	M	4	Bettembourg	Pelange	25,2	2		25	122	147	210	-63	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	90<V<100	18				
N.S.-Med	M	5	Pelange	Rodange	2,6	2		15	204	219	210	9	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	90<V<100	15				
N.S.-Med	M	6	Rodange	Rodange BB / Aubange	1,5	1		12	17	29	105	-76	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	90<V<100	15				
N.S.-Med	M	7	Luxemburg	Oetrange	12	1		0	79	79	105	-26	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	M	8	Luxemburg	Berchem Est	6,3	1		2	0	2	105	-103	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	M	9	Oetrange	Berchem	9,9	1		12	0	12	105	-93	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	F	10	Vasserbillig Ger Border	Oetrange	25,4	2		12	80	92	210	-118	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	B	11	Luxemburg	Pelange	20,4	2		9	86	95	210	-115	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
N.S.-Med	F	12	Rodange	Pelange	1,5	2		1	99	100	210	-110	1.435	Y	25KVAC	Y	Crocodile	740	GC - C80	100<V<120	10				
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										0		0													

SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS INTERCONNECTING THE MAIN STRATEGIC LOGISTICS HUBS AND INTERRELATED ZONES

SECTION				NUMBER OF TRACKS	MAXIMUM CAPACITY					TRACK GAUGE (mm)
					Trains / day					
NUM.	FROM	TO	Kms		Freight	Passenger	TOTAL	Acceptance	Saturation	
							0		0	
1	Kleinbettingen B Border	Luxemburg	18,8	2	8	89	97	210	-113	1.435
2	Luxemburg	Bettembourg	14,1	2	19	174	193	210	-17	1.435
3	Bettembourg	Bettembourg / F Border	2,5	2	20	56	76	210	-134	1.435
4	Bettembourg	Pelange	25,2	2	25	122	147	210	-63	1.435
5	Pelange	Rodange	2,6	2	15	204	219	210	9	1.435
6	Rodange	Rodange BB / Aubange	1,5	1	12	17	29	105	-76	1.435
7	Luxemburg	Oetrange	12	1	0	79	79	105	-26	1.435
8	Luxemburg	Berchem Est	6,3	1	2	0	2	105	-103	1.435
9	Oetrange	Berchem	9,9	1	12	0	12	105	-93	1.435
10	Vasserbillig Ger Border	Oetrange	25,4	2	12	80	92	210	-118	1.435
11	Luxemburg	Pelange	20,4	2	9	86	95	210	-115	1.435
12	Rodange	Pelange	1,5	2	1	99	100	210	-110	1.435
							0		0	

IMPROVEMENT ACTIONS UNDER WAY:

This is a document that compiles all projects currently under way or finished in the corridors belonging to the EU railway Core Network, with a description and start and end date. Moreover, the current situation in each project and their economic contribution are explained. The sources of information are the official reports that the European Commission produces annually on the subject.

SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS INTERCONNECTING THE MAIN STRATEGIC LOGISTICS HUBS AND INTERRELATED ZONES

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FERRMED STUDY OF TRAFFIC AND MODAL SHIFT OPTIMISATION - IMPROVEMENT ACTIONS - RHINE ALPINE CORRIDOR

COUNTRY	TRANSPORTATION MODE	CODE	ACTION	STATUS	PRIORITY	STARTING DATE	END DATE	INVESTMENT (in total €)
GERMANY	IWW	2014-DE-TA-0113-M	Safeguarding and adaptation of waterway access to the Rhine- Alpine and North Sea-Baltic corridors from the port of Cologne	Finished		1/1/14	31/12/17	9.167.575
FRANCE	IWW	2014-FR-TM-0260-W	New Multimodal Terminal of the Port of Strasbourg / Lauterbourg site	Finished		1/4/15	31/7/18	9.976.385
NETHERLANDS	IWW	2014-NL-TM-0241-W	Preparatory activities and project management for the new large Amsterdam lock	Finished		1/1/14	31/12/19	27.739.070
CORRIDOR LEVEL	IWW	2015-EU-TM-0038-W	River Information Services Corridor Management Execution (General Call)	Finished		15/2/16	31/12/20	3.163.737
GERMANY	**IWW**	**2017-DE-TM-0040-W**	**LNG Rollout in Central Europe - for a greener transportation sector**	**Ongoing**		**1/1/18**	**30/6/21**	**-**
NETHERLANDS	IWW	2018-NL-TM-0096-W	Upgrade of the Combined Cargo terminal rail infrastructure at the Port of Moerdijk	Finished		1/11/18	31/12/20	18.443.557
CORRIDOR LEVEL	MARITIME	2014-EU-TM-0095-W	ReaLNG: Turning LNG as marine fuel into reality in the North Sea- Baltic region	Finished		1/1/14	30/9/17	37.375.728
CORRIDOR LEVEL	MARITIME	2014-EU-TM-0451-M	Scrubbers: Closing the loop	Finished		21/4/14	31/12/18	10.041.500
CORRIDOR LEVEL	MARITIME	2014-EU-TM-0487-M	Biscay Line - Multiple port Finland-Estonia-Belgium-Spain long distance MoS, relevant to many core network corridors	Finished		1/1/14	31/12/16	6.641.974
ITALY	**MARITIME**	**2014-IT-TM-0276-W**	**INES - Implementing New Environmental Solutions in the Port of Genoa**	**Ongoing**		**1/7/15**	**30/6/21**	**12.100.000**
ITALY	MARITIME	2014-IT-TM-0450-S	GAINN4CORE	Finished		1/6/15	31/3/19	1.776.715
BELGIUM	MARITIME	2015-BE-TM-0248-W	Improving of the multimodal logistic platform of the port of Zeebrugge, in order to accommodate long freight trains	Finished		1/3/16	31/1/19	7.990.000
CORRIDOR LEVEL	MARITIME	2015-EU-TM-0098-M	DOOR2LNG - Upgrade of the maritime link integrated in the multimodal container transport routes	Finished		16/2/16	30/6/20	18.952.321
BELGIUM	**MARITIME**	**2018-BE-TM-0139-M**	**Secure Parking Opportunities for Trucks (SPOT) in Flanders**	**Ongoing**		**1/11/18**	**30/5/21**	**20.295.860**
BELGIUM	MARITIME	2018-BE-TM-0146-W	Extension and upgrade of combined transport Mercatordok Multimodal Terminal	Finished		24/10/18	31/12/20	10.777.000
NETHERLANDS	**MARITIME**	**2018-NL-TM-0007-W**	**Upgrade of the combined transport RSC terminal Rotterdam**	**Ongoing**		**24/10/18**	**31/12/22**	**8.797.750**
NETHERLANDS	**MARITIME**	**2018-NL-TM-0144-W**	**Upgrade of combined transport Rotterdam World Gateway terminal**	**Ongoing**		**25/10/18**	**31/12/22**	**27.945.000**
BELGIUM	RAIL	2014-BE-TM-0660-W	Deployment of ETCS Level 1 on the rail section Ans - Angleur	Finished		1/7/15	1/5/18	4.735.000
GERMANY	RAIL	2014-DE-TM-0057-W	ERTMS Deployment on the German part of the Core Network Corridor Rhine - Alpine	Finished		1/1/14	31/12/20	93.938.615
GERMANY / SWITZERLAND	**RAIL**	**2014-DE-TM-0094-M**	**Upgraded line / New-build line (ABS/NBS) Karlsruhe - Basel with partial upgrade measures on the existing line**	**Ongoing**		**1/1/14**	**31/12/21**	**768.362.234**
GERMANY	**RAIL**	**2014-DE-TM-0252-M**	**Upgraded line (ABS) (Amsterdam) D/NL border - Emmerich - Oberhausen**	**Ongoing**		**1/1/14**	**31/12/21**	**53.857.713**

Source: own elaboration according to EC data (2020)

SELECTION OF MAIN INTERCONNECTION LINKS, BACK-UP LINKS AND FEEDER LINKS

- Selection of the links interconnecting main strategic logistics hubs and interrelated zones in the EU Extended Backbone Network.

Status: Already done (First approach)

- Data collection of infrastructure characteristics and traffic saturation present conditions.

Status: Under way. To be finished by April 2021

- Data collection of agreed/existing improvement actions.
- Data collection from existing source of information (Transport Ministries and Main Core Network coordinators)

Status: Under way. To be finished by March 2021

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7. FORECAST TRAFFIC & SCENARIOS

Presented by Efrain Larrea

FORECAST TRAFFIC SCENARIOS

- Short term (2023) and Mid term (2025)

  Information recorded trough the Stakeholders Survey and FERRMED criteria (in 2025 at least 23% railway modal share).

- Long term (2030)

  Two scenarios are considered:

  a) Stagnant traffic with regard to 2019
  b) 20% increase in relation to 2019

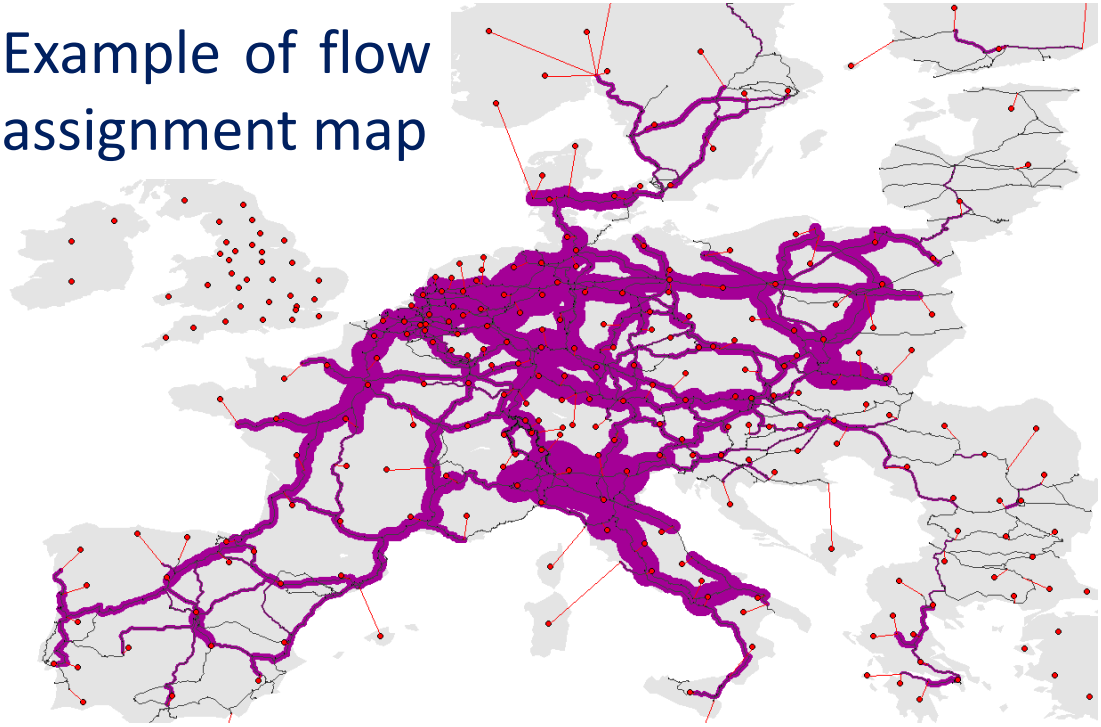
  Target: to move road traffic to railway and barge. Railway share: 30%, barge share: 7% +. IWW could be considered as back-up of railway and as a complementary mode to decrease the road share below 63%. A possible assumption could be IWW 10%, railway 30%, and road 60%.

FORECAST OF TRAFFIC IN INTERMODAL TERMINALS & MARSHALLING YARDS AND INTERCONNECTION LINKS (I)

❖ Origin – destination modelling

- Assignment of 2010 Origin-Destination matrices per mode at NUTS2 level (~300 nodes)
- Use of assignment flows for a pivot point exercise with collected data from 2015

Example of flow assignment map



FORECAST OF TRAFFIC IN INTERMODAL TERMINALS & MARSHALLING YARDS AND INTERCONNECTION LINKS (I)

❖ Stakeholders surveys/enquiries

Key issues

- To identify possible additional traffics in the routes served by the Stakeholders
- To indicate the obstacles to be removed to attain the possible additional traffics in intermodal terminals, interconnection links (both: infrastructure and operation)

Status:

- Number of Stakeholders to be asked: 65
- Requests sent: 80%
- Answers received: 10%

Identification of bottlenecks

❖ Intermodal terminals

- Applying the traffic assignment model to determine the volumes that will be routed through each terminal
- Comparing volumes against theoretical capacity according to present characteristics

❖ Interconnection links

- Applying the traffic assignment model to determine the volumes that will be routed through each section of rail
- Comparing volumes against theoretical capacity according to present characteristics

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8. ANALYSIS OF THE IMPACT OF TRAFFIC SCENARIOS ON INTERMODAL TERMINALS, MARSHALLING YARDS AND INTERCONNECTION LINKS

Presented by Efrain Larrea

Planned steps:

1. **Assignment of flows** for different scenarios using the **modelling tool**. The **intermodal terminals** are the **access points** to the railway network.
2. Results of modelling produce **forecasts of terminal traffic**
3. Identification of **present conditions** (terminal **characteristics** and **volumes** managed)
4. **Checking** whether the **foreseen volumes** can be handled in the terminals
5. **Definition** of **upgraded characteristics** (improvement of existing terminals / enlargement and/or new terminals)
6. **Economic evaluation and planning** of **actions** to be implemented

Status: To start in March and finish in June 2021

INTERCONNECTION LINKS (RAILWAY)

Planned steps:

1. **Assignment of flows** for different scenarios using the **modelling tool**.
2. Results of modelling produce **forecasts of traffic on railway sections**
3. Identification of **present conditions** (section **characteristics** and **volumes** managed)
4. **Checking** whether the **foreseen volumes** fit within the capacity limits of each section → **bottleneck** evaluation
5. **Definition** of **upgraded characteristics** (improvement of existing sections and/or new sections, implementation of FERRMED standards)
6. **Selection** of main **routes** interconnecting **EU strategic hubs** with neighbouring countries (Eurasian Outlook)
7. **Economic evaluation and planning** of **actions** to be implemented

Status: To start in March and finish on June 2021

INTERCONNECTION LINKS (BARGE)

Planned steps:

1. **Assignment of flows** for different scenarios using the **modelling tool**.
2. Results of modelling produce **forecasts of traffic on river sections**
3. Identification of **present conditions** (section **characteristics** and **volumes** managed)
4. **Checking** whether the **foreseen volumes** fit within the capacity limits of each section → **bottleneck** evaluation
5. **Definition** of **upgraded characteristics** (improvement of existing sections and/or new canal sections)
6. **Economic evaluation and planning** of **actions** to be implemented

Status: To start in February and finish on June 2021

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9. ITEMS TO BE CONSIDERED IN THE DETAILED ACTION PLAN

Presented by Josep Maria Ojea, Henry Maillard and Valentí Ambrós

INFRASTRUCTURE & OPERATION IMPROVEMENT

- Detailed list of actions **to be** carried out:
  - Intermodal terminals & Marshalling yards
    - → Existing terminals & marshalling yards
      - ✓ Additional modes to be served
      - ✓ Timetable improvement
      - ✓ Additional tracks
      - ✓ Increase in track length
      - ✓ Additional facilities and services
      - ✓ etc.
    - → Additional terminals & marshalling yards
  - Interconnection links
    - → Existing links
      - ✓ ERTMS implementation
      - ✓ Longer trains implementation
      - ✓ Loading gauge for piggyback
      - ✓ Additional tracks
      - ✓ Additional sidings
      - ✓ UIC track gauge implementation
      - ✓ Electrification
    - → New links

ROLLING STOCK IMPROVEMENT

1. The main challenges

DIGITALISATION

- Green Deal → the rail freight is a top priority, because rail is one of the most environmentally friendly modes of transport
- It will contribute to achieve the “30 by 2030” initiative

DIGITAL AUTOMATIC COUPLING (DAC)

- It is the central component in the extensive automation of the sector
- Could provide power supply, compressed air, and data communication to the entire train

LOCOMOTIVES (I)

1. Starting point: FERRMED Locomotive Concept Study, published in 2010

2. New concepts for freight locomotives
   - Locomotives with one main power system:
     - ✓ *electric*
     - ✓ *diesel-electric*
     - ✓ *diesel-hydraulic*
   - Dual locomotives:
     - ✓ *electric + motor diesel (2.400-2.800 kW)*
   - Last mile locomotives
     - ✓ *Hybrid = electric + motor diesel (200-400 kW)*
     - ✓ *Full Electric Last Mile = electric + batteries*

LOCOMOTIVES (II)

3. Future Requirements (I)

- Starting Tractive effort: at present 500 kN are achieved
- Limit effort of the coupling resistance: Willison couplers
- Tractive effort: Present=6.500 kW; Future:10.000 kW
- Electrical locomotives for Last Mile application:
  - ✓ Electrical – diesel
  - ✓ Fully Electrical: Main electrical motor + batteries
- Environmentally friendly
- Digitalisation

LOCOMOTIVES (III)

3. Future Requirements (II)

- Requirements related to the INFRASTRUCTURE

✓ Signalling system: ERTMS

Retrofitting: depends on

- Present equipment
- Countries to run: national systems
- Available space
- ….

✓ Voltage supply: 25 kV AC

FREIGHT WAGONS

1. Facing the future

- New designs: based mainly in light materials. FERRMED claims for a central beam.
- Innovative running gear, wheelsets, braking systems.
- Telematics devices
- Design innovations must ensure that wagons are according the “5L” concept (TIS):
  a. Low noise
  b. Lightweight
  c. Long running,
  d. Logistics-enabled
  e. Life-cycle-cost-oriented.

THE INTELLIGENT FREIGHT TRAIN
A step forward (I)

The first step:

- Considering locomotives and wagons separately is only the first step

A step forward:

- The real value of all these innovations only becomes apparent when we focus on the freight train as a whole.
- Combining the proposed stock into entire trains offers an enormous potential for increasing the efficiency and cost-effectiveness of the rail freight transportation.

THE INTELLIGENT FREIGHT TRAIN
A step forward (II)

- Apply all these innovations is only possible trough the DIGITALISATION.
- Digitalisation will allow the automation of operations, and it will be only possible with the use of DIGITAL AUTOMATIC COUPLERS

Functions needed

Individual Wagon Sensors	Electric Parking Brake	Condition Monitoring	Video Gates	Automation Shunting Yard
Automated Bleeding of the Brake Valves	Telematics and Sensors	**D**igital **A**utomated **C**oupler	Energy and Communication Systems	Autonomous Freight Wagon
Synchronous Brake	Train Integrity Check	Automated Brake Test	Train Initialisation and composition	(Semi-)Autonomous Driving

THE INTELLIGENT FREIGHT TRAIN
A step forward (III)

MIGRATION FROM SCREW COUPLER TO DAC

1. **Simultaneous migration**: It will be carried out during a rather short period of time (some days to a few months)

   A. Advantages:

      1. Very short phase of co-existence of DAC and SC
      2. Maximum reduction of additional risks for shunting stuff during migration
      3. Quick realization of full benefits of DAC

   B. Disadvantages

      1. Difficulty to agree among a high number of stakeholders on the data
      2. Very high investment during a short period of time
      3. Logistical and organizational challenge to execute the migration
      4. Risk of major disruptions of freight services

THE INTELLIGENT FREIGHT TRAIN
A step forward (IV)

MIGRATION FROM SCREW COUPLER TO DAC

2. **Progressive migration**: It would happen over a longer period of time (typically several years)

A. Advantages:

1. Certain flexibility for market actors to choose suitable migration date for their fleet or parts of it
2. Spreading out of investment over a longer period of time
3. Less demanding organization and logistics for exchange of couplers

B. Disadvantages

1. Long period of co-existence of AC and SC delays the realization of full benefits of the target system with Automatic Couplers only
2. Need to take mitigating measures to reduce risks for shunting stuff when building mixed trains AC+SC
3. Train operations may need to be adapted to reduce mixed coupling AC+SC

THE INTELLIGENT FREIGHT TRAIN
A step forward (V)

MIGRATION FROM SCREW COUPLER TO DAC

3. Mixed approach:

UIC planned a mixed approach, combining simultaneous and progressive migration:

1. to convert the conversion of the wagon fleet dedicated for international traffic was foreseen to be done within in a few days,
2. the rest in the following four years.

THE INTELLIGENT FREIGHT TRAIN
Length of the trains above 740 m (l)

1. Trains of 1500 m (l)

In the "*FERRMED Freight Locomotive Concept Study*", and "*FERRMED Wagon Concept Study*", edited in 2010, FERRMED ask for the use of trains of 1.500 m in the some corridors, mainly to absorb the Eurasian traffic. Currently:

1. The main entrance in Europe, until Duisburg, from Belarus,
2. From Duisburg to the main European hubs: Milano, Rotterdam, Barcelona, etc.

NOTE: the use of a DAC is necessary for trains of this length.

THE INTELLIGENT FREIGHT TRAIN
Length of the trains above 740 m (II)

1. Trains of 1500 m (II): the main advantages

Longer trains are one way to improve the effectiveness and efficiency of the rail freight system, allowing more efficient operation and an increase in transport capacity. They are a key approach to competitive rail freight.

Longer trains are one promising approach to strengthen the market position of the railway system, as far as quality of service is preserved. Enabling the operation of longer trains is a significant shift for the railway system that will improve the productivity of rail freight traffic. The amount (volume) of goods that can be transported by a single train can be increased and the cost per unit will decrease.

THE INTELLIGENT FREIGHT TRAIN
Length of the trains above 740 m (III)

2. Some considerations to be taken into account (I)

Operating Expenses:

- Independent from the length
  - *Locomotive*
  - *Driver…*
- Increasing with the length
  - *Energy costs*
  - *Marshalling expenses…*

Infrastructure impact:

- *Power stations capacity*
- *Catenary*
- *Security installation configurations*
- *Signalling systems*
- *Shunting yards*
- *…*

THE INTELLIGENT FREIGHT TRAIN

2. Some considerations to be taken into account (II)

Locomotives: systems to be updated

- Security speed control systems (some systems do not allow for surpassing a certain dimension)
- Some other control systems

Train without DAC

- Train dynamics: the behaviour of the train by itself must be taken into account
- Braking and de-braking signals delay: compressive and tensile forces must be evaluated to avoid derailment and/or coupling breaking

THE INTELLIGENT FREIGHT TRAIN

3. Long and heavy trains: two kinds

- ✓ Trains with one locomotive or double traction (one driver):consists in adding wagons within the traction capability of the locomotive(s). In this configuration, the train is heavier and less reactive, which can create adverse conditions in heavy traffic situations.
- ✓ Two locomotives: one loco leading (master), one or more slave locos in the middle or at rear, connected over remote control (via radio or cables) to let the master send the commands to the slave. The train reacts more or less like a single train, is better adapted to heavy traffic conditions, but the locomotives have to be upgraded with new equipment

THE INTELLIGENT FREIGHT TRAIN

4. Current activities and plans

- Countries that have planned to run trains longer than 740 – 800 m
  - Denmark, Sweden: until 1.000 m
  - Estonia: trains until 1.450 are allowed
  - Germany: at present 835 m. Studies done for 1.500 m.
  - Hungary: At present 750 m. Study done for 1.050 m.
  - Lithuania: 55% station tracks suitable for 1.500 m train's length
- Countries that not include such trains in its strategy
  - Austria: until 800 m
  - France: trains until 850 m. Projects for 1.000 m postponed
  - Italy: will move to 750 m on the main corridors

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10. TRANS-EURASIAN MAIN RAILWAY NETWORK ENHANCEMENT

Presented by Pierre Borgoltz & Thierry Vanelslander

Items to be developed for this chapter (I)

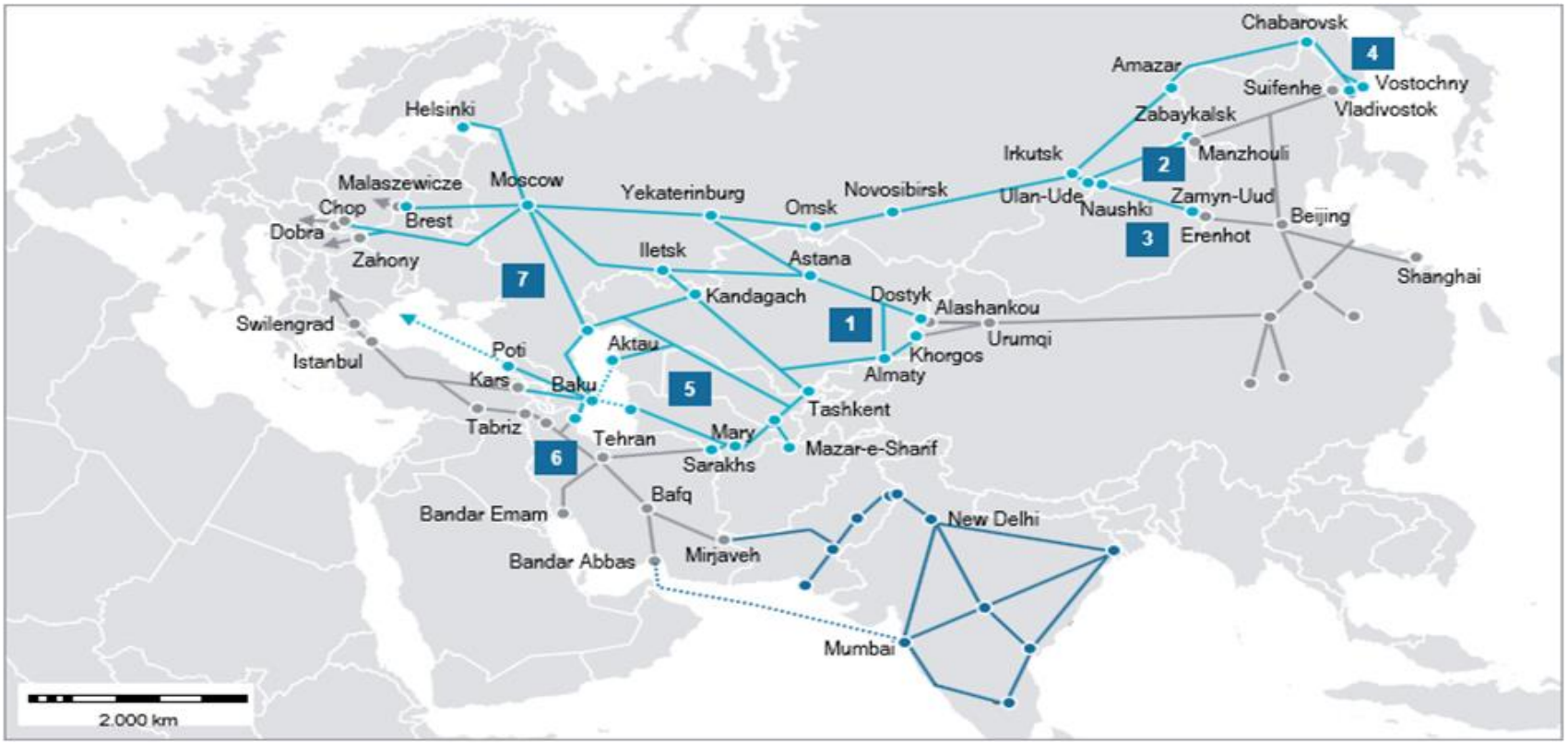
a. Introduction
b. General trends in Trans-Eurasian trade/traffic
c. Share of freight carried by the three main transportation modes: Vessel, Railway and Aircraft
d. Basic transportation costs and transit times. Vessel versus Railway versus Aircraft. Break-even points.

Status: To be entrusted to Antwerpen University. Start March / April. Finish July 2021

TRANS-EURASIAN MAIN RAILWAY NETWORK ENHANCEMENT

CORRIDORS

TRANS-EURASIAN MAIN RAILWAY NETWORK ENHANCEMENT



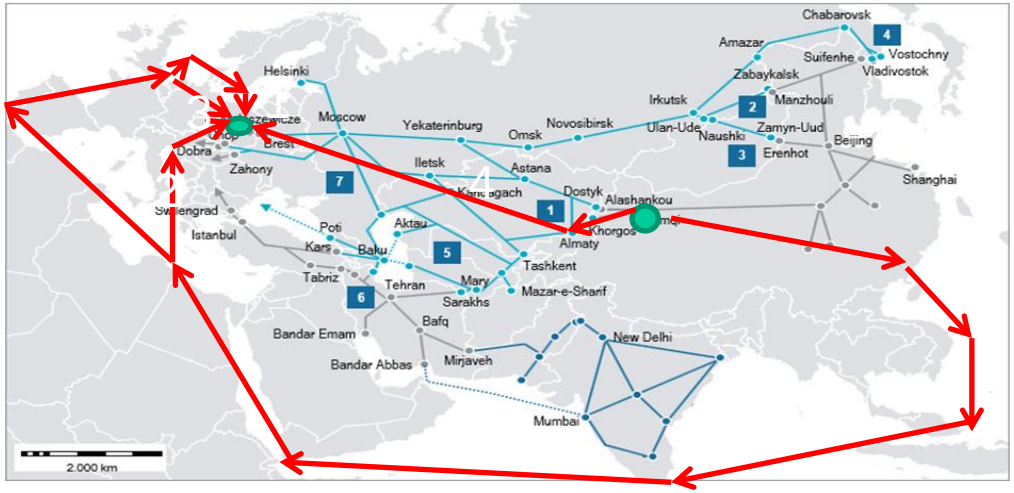
Southern route: problems

- Border crossings
- Caspian Sea

Land-Sea route

SCENARIOS

TRANS-EURASIAN MAIN RAILWAY NETWORK ENHANCEMENT CALCULATION RESULTS (I)



From Xinjiang Uygur (main city of Urumqi) to Lodz (Poland)

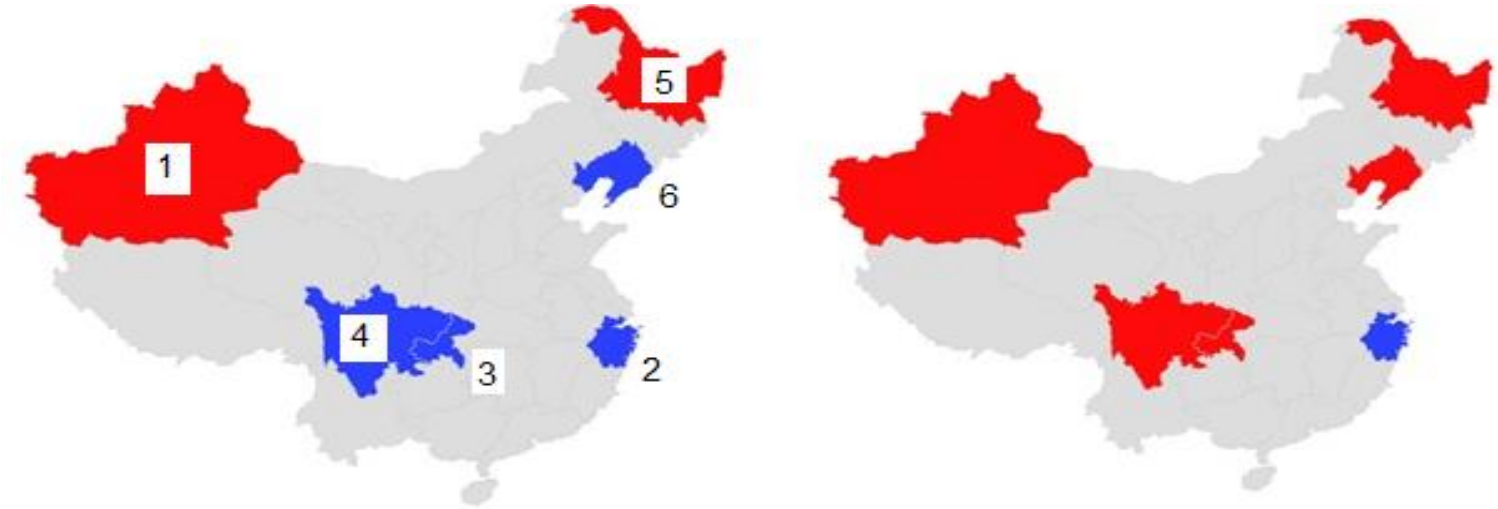
Total generalized chain cost ($/FEU)

Product type	Gdansk (1)	Koper (2)	Rotterdam (3)	Alashankou/Khorgos (4)
Capital equipment & Machinery	8,494	8,969	9,742	4,647
Chemical products	7,733	8,285	8,752	4,439
Consumer Fashion Goods	8,461	8,941	9,442	4,638
Consumer personal & household goods	6,766	7,031	7,435	4,058
High tech	12,982	14,100	14,864	6,206
Land vehicles & parts	7,636	8,020	8,474	4,358
Machinery and parts	7,904	8,325	8,795	4,451
Raw materials, industrial consumables & foods	6,983	7,277	7,693	4,133
Pharmaceutical goods	7,886	8,304	8,773	4,445

Different product types → different results

TRANS-EURASIAN MAIN RAILWAY NETWORK ENHANCEMENT CALCULATION RESULTS (II)

- For six different Chinese regions the calculations are made to the city of Lodz.
- Red means: lowest generalized cost via the land bridge, blue means lowest generalized cost via the maritime route.
- Generalized chain cost comparison between Chinese hinterland regions and Lodz (EU) (Left= household articles and right = high-tech equipment)



Items to be developed for this chapter (II)

e. Identification of Main Strategic Eurasian Socio-Economic Hubs and interrelated intermodal terminals

f. Determination of the appropriate core Railway Routes in the EU and at Eurasian level to interconnect the Main Eurasian Strategic Socio-Economic Hubs

g. Improvement of capacity/efficiency of the selected Railway routes

h. Implementation of Full FERRMED Standards in the main interconnecting Eurasian Railway links and intermodal terminals

i. Proposed Action Plan

j. Socio-economic and environmental results

Status: To be developed by Russian and Chinese partners

TRANS-EURASIAN MAIN RAILWAY NETWORK ENHANCEMENT

MAIN TRANS-EURASIAN ROUTES

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11. SOCIO-ECONOMIC AND ENVIRONMENTAL ANALYSIS

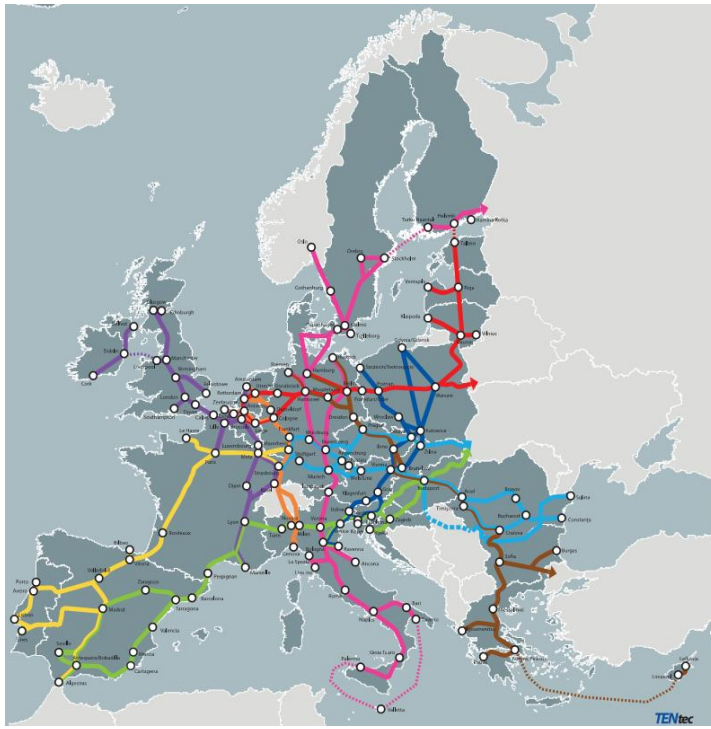
Presented by Eduard Gràcia

SOCIO-ECONOMIC & ENVIRONMENTAL IMPACT – PROGRESS UPDATE

The objective is to assess the impact of a set of socio-economic & environmental factors

We plan to estimate the economic and environmental impact of the recommended actions, including:

- Investment required
- Operating cost and benefits (lower transport cost, time & safety) vs. main alternatives (essentially road transport)
- Environmental impact (CO_2 and pollutant emissions)
- Net Present Value, Benefit-Cost Ratio and Internal Rate of Return
- GDP impact
- Potential financing (public vs. private) approach



SOCIO-ECONOMIC & ENVIRONMENTAL IMPACT – PROGRESS UPDATE

We have subdivided this work stream into five stages encompassing the required activities …

Final Infrastructure & Traffic Data Received

1 Develop Methodology

- Identify the parameters required
- Devise the potential sources and calculations to compute those variables
- Agree with other teams on the variables they can provide

2 Conduct Research for Data Values

- Research to obtain and compute the values to use e.g.:
  - Estimated EU road, rail & IWW transport costs
  - Externalities impact
  - Macroeconomic multipliers
  - etc.

3 Test Process on Template Spreadsheets

- Test the methodology against the (dummy) data received from the other teams
- Feedback on missing data items where required
- Adjust methodology where required

4 Apply Process to Final Data Spreadsheets

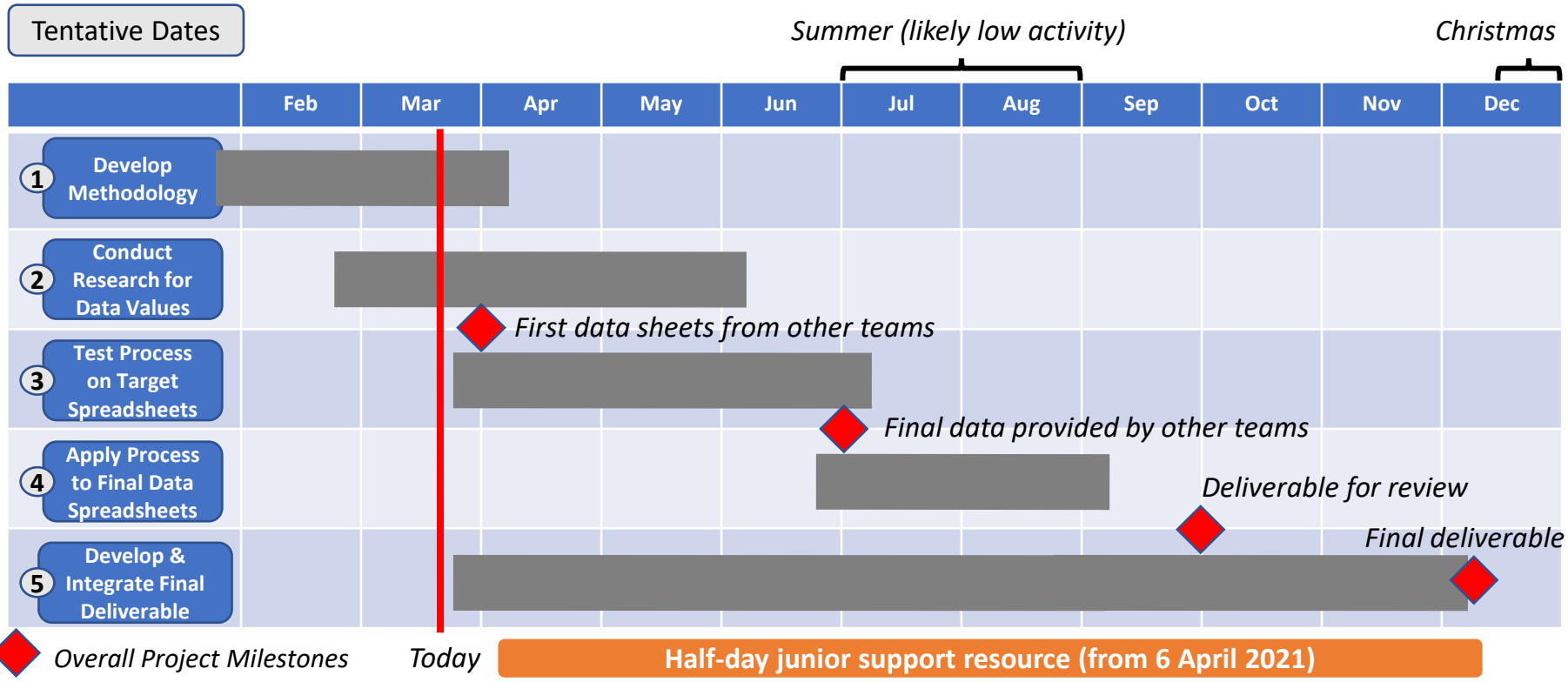
- Apply methodology to final data generated by other teams
- Sense-check results for plausibility and potential issues
- Correct issues as required

5 Develop & Integrate Final Deliverable

- Write up the methodology, analysis and conclusions
- Integrate with the overall report
- Fit the results into the interactive map

SOCIO-ECONOMIC & ENVIRONMENTAL IMPACT – PROGRESS UPDATE

… which we have tried to fit into a timeplan consistent with the overall project milestones



In Stage 1 (*Develop Methodology*) we have already identified the data we need to gather

1 Develop Methodology

- We have identified the specific variables required to derive the socio-economic and environmental metrics required
- For each one of the specific variables we identified the potential source, be it another team within the project or an external source
- For those variables to be provided by other teams we have closed the loop to agree on what will be delivered
- For the others we are conducting the corresponding research on the data values

As befits Stage 2 (*Conduct Research for Data Values*) we are now gathering external data

2 Conduct Research for Data Values

- We are gathering the data required from highly reputable sources such as:
  - European Commission reports and guidelines e.g.:
    - DG MOVE standards
    - CER data (fact sheets, handbook, data spreadsheets)
    - TEN-T and ERTMS studies and documentation
  - UIC database (Railisa)
  - Ferrocarrils de la Generalitat de Catalunya
  - Other expert and institutional sources

ISSUES ON TRAFFIC FORECASTING

STEPS

Trip Generation

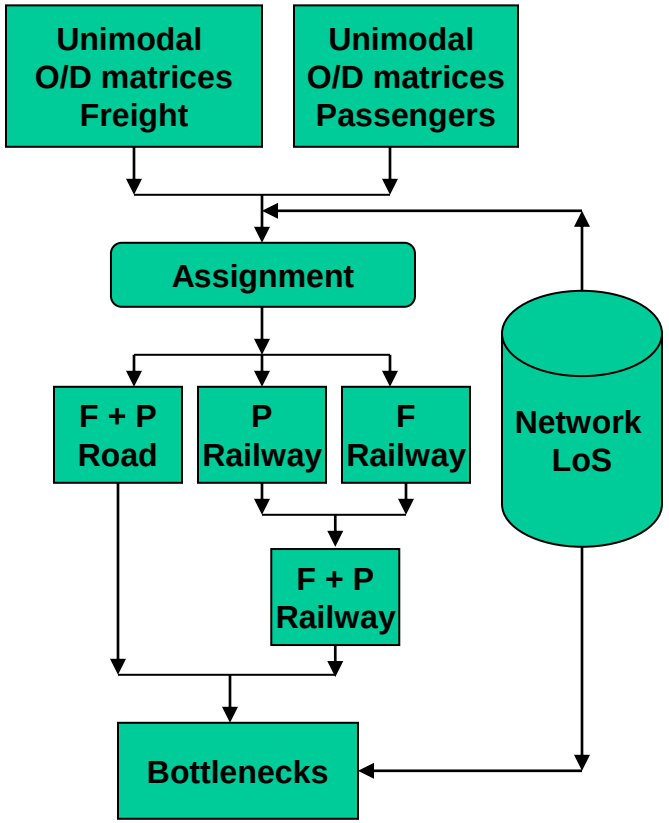
Spatial distribution

Modal choice

Route assignment

- Global trends: economy, Covid19 recovering, geopolitics, etc.
- Freight and pax demand (short, medium and long distance).
- KPI for freight forwarders.
- Modal choice. RUM.
- Perception (tolls). Administrative/organizational issues.
- Conversion from ton-km and pax-km to trains, buses and trucks.

ISSUES ON TRAFFIC FORECASTING



- Short term (2023) and Mid term (2025)
- Long term (2030) scenario

- Growth / stagnation scenarios.
- How can we increase the modal share of railway 1%? (similar to increase the commercial speed of urban buses by 1 km/h)
- Pack of measures.

- Functionality analysis: physical issues (time, space, info) & other issues

Concerns of RENFE customers are NOT money and time: *"Difficult dialogue, obsolete trade relations, stiff, few drivers, limited capacity of transportation, limited possibility to absorb peak hours"*

FERRMED

Promotion du Grand Axe Ferroviaire de marchandises
Scandinavie-Rhin-Rhône-Méditerranée Occidentale A.S.B.L

12. DISSEMINATION OF THE STUDY

Presented by Joan Amorós

FERRMED-EULER DECLARATION

- Launch: February 2021
- Main topic: To support the Action Plan related to the "FERRMED Study of Traffic and Modal Shift Optimisation in the EU"
- Supporters:
  - Employer associations
  - Chambers of Commerce
  - Companies
  - Institutions:
    - Universities
    - Regional Governments
    - Local Governments
  - Unions
  - Etc.

NOTE: EULER = EU/Eurasian Locomotive Economic Region

PRESENTATION OF THE STUDY DEVELOPMENT AND CONCLUSSIONS

- **FERRMED Conference:** November 16th 2021, Brussels
- **Meetings with European institutions**
  - European Commission
    - Presidency
    - DG MOVE
    - DG CLIMA
    - DG ENVIRONMENT
    - …
  - European Parliament
  - Eurasian Investment Bank
  - European Court of Auditors
  - …
- **Meetings with Transport Ministries of Member States**
- **Meetings with Transport Councillors of EU Regions**
- **Meetings with key stakeholders**
- **Press releases**

FERRMED Study of Traffic and Modal Shift Optimisation in the EU

THANK YOU FOR YOUR ATTENTION