



The NEAR² Project - Network of European – Asian Rail Research Capacities

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CERTH/HIT

3-4 of February, 2015

Geneva, UNECE



Project Profile

- Project number: 314254
- Call: FP7-SST-2012.2.5-2
- Funding Scheme: Coordination and Support Action
(Coordination)
- Project budget: 887.003 €
- Duration: 01/12/2012 – 30/11/2014
- 13 project partners from 9 countries and 2 continents



Project Partners

1. Centre for Research and Technology Hellas / Hellenic Institute of Transport, Greece;
2. EURNEX Association, Germany;
3. Technical University of Berlin, Germany;
4. Czech Technical University in Prague, Czech Republic;
5. Vilnius Gediminas Technical University, Lithuania;
6. Moscow State University of Railway Engineering, Russia;
7. A-TRANS LLC, Russia;
8. Petersburg State Transport University, Russia
9. Tongji University, China
10. EIRC Consulting Private Limited, India;
11. State Higher Educational Establishment Donetsk Railway Transport Institute of Ukrainian State Academy of Railway Transport, Ukraine;
12. INSTYTUT KOLEJNICTWA, Poland
13. TRAINOSE METAFORES-METAFORIKES YPIRESIES EPIVATON KAI FORTIOU AE, Greece



Major Project Objectives

- Identification of rail research centers along the relevant corridors and engagement of them in a cooperation forming a Trans-Eurasian Rail Research Network;
- Formulation of Working Groups, based on the categorization of the European Rail Research Network of Excellence (EURNEX) in Poles or fields of expertise;
- Development of a web inventory of Network members' capabilities;
- Identification of important technology issues, gaps in the existing knowledge and barriers to interoperability;
- Definition of future research needs and industry oriented policy recommendations;



Major Project Results

- Establishment of the NEAR² Rail Research Network.
- Formulation of Working Groups.
- Identification of:
 - important technology issues;
 - gaps in the existing knowledge;
 - barriers to interoperability.
- Definition of future research needs and industry oriented policy recommendations.
- Formulation and validation of the 10 Concept Documents.
- Networking and Dissemination actions.
- Formulation of the Final Project Publication.



The NEAR² Rail Research Network

- All of the NEAR² Network members were invited to become EURNEX members.
- Following the relevant EURNEX procedures, 13 became associated EURNEX members and 4 became full EURNEX members.

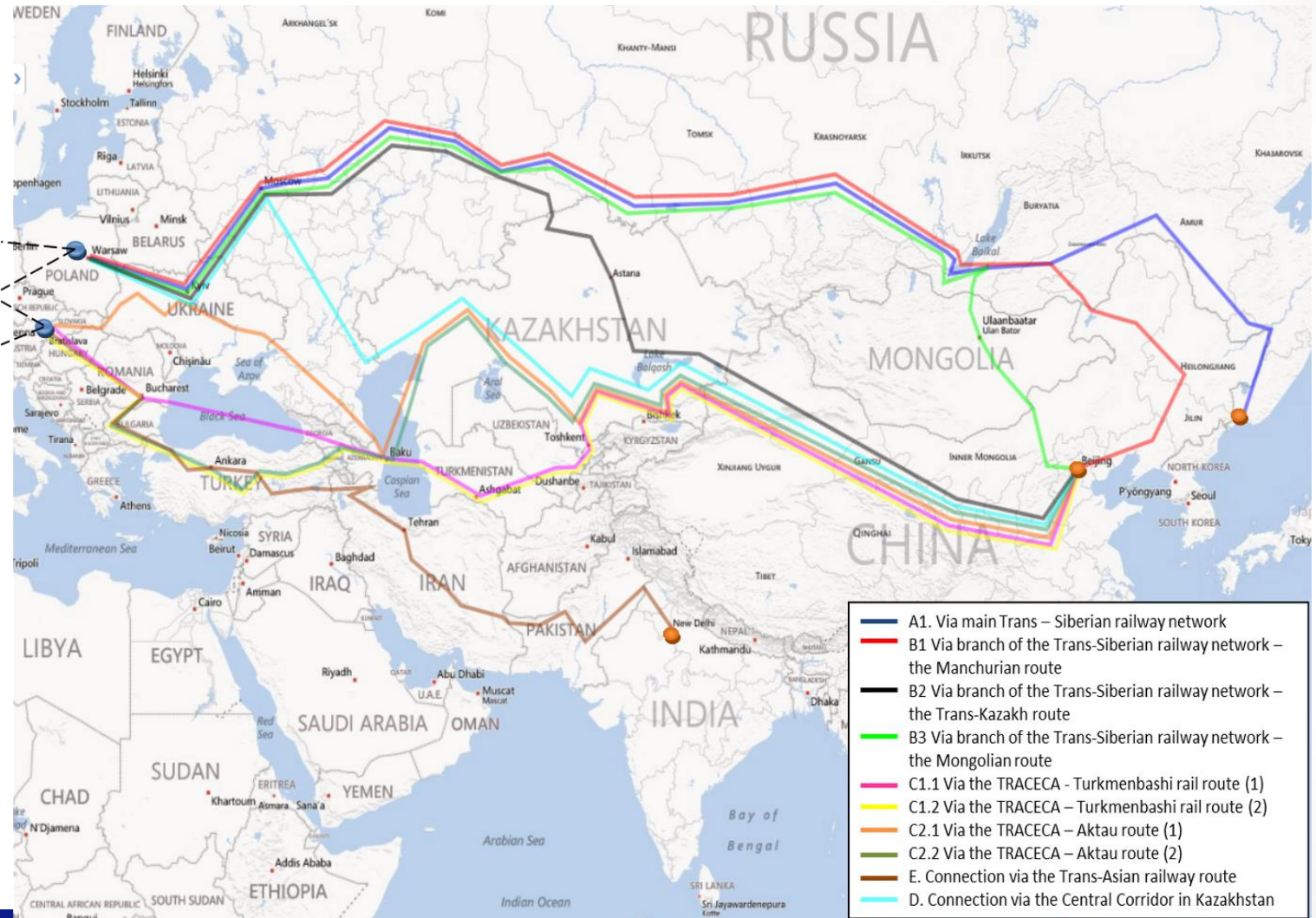
<http://www.near2-project.eu/en-us/near2network.aspx>

Institution Name	Institution full Name	Contact Person	Country, City	Patron, Pole Leader coordination
SIZI	National Technological Platform Interoperability of the Railway Infrastructure	Dohnal	Czech Republic, Praha	participation by CVUT&UPCE
VDEUNU	Volodymyr Dahl East Ukrainian National University	Chernetskaya-Beletska	Ukraine, Lugansk	Witold Olpinski
RWA	LLC SPE RAILWAYAUTOMATIC	Kuzmenko	Ukraine, Kharkov	Marina Aguado
USART	Ukrainian State Academy of Railway Transport	Lomot'ko	Ukraine, Kharkov	Riccardo Licciardello, Ricci + Pole9 Vanderhaegen
RDSO	Research Designs and Standards Organisation, Indian Railway	D. K. Agarwal	India, Lucknow	Markus Hecht Pole 8
IIT KGP	Indian Institute of Technology, Kharagpur	Mukhopadhyay	India, Kharagpur	Laurent Bouillaut
IIT Delhi	Indian Institute of Technology Delhi	Shahu	India, New Delhi	Stanislav Lenart
Xi'an	Xi'an Railway Scientific & Technical Research Institute	LUO	China, Xi'an	Anatoljjs Levchenkov
RSTU	State educational establishment of higher professional education "Rostov State Transport University"	Noskov	Russia, Rostov	Chris Nash Antwort da
FESTU	Federal state budget-funded educational institution of higher professional education «Far Eastern State Transport University»	Suy	Russia, Khabarovsk	Thomas Meißner
USURT	Ural State University of Railway Transport	Bushuev	Russia, Ekaterinburg	Manuel Pereira
OSTU	Federal state budget-funded educational institution of higher professional education «Omsk State Transport University»	Shantarenko	Russia, Omsk	Markus Hecht Pole 8
STU	State budget-funded entity of higher professional education "Siberian Transport University"	Bokarev	Russia, Novosibirsk	Sciutto/Saitto NITEL Pole 8, Marek Sitarz Pole 6

Institution Name	Institution full Name	Contact Person	Country, City	Patron, Pole Leader coordination
SRCRTU	State Research Center of Rail Transport of Ukraine	Kuzmensko	Ukraine, Kiev	Miklos Banfi BUTE/BME
DNURT	Dnepropetrovsk National University of Rail Transport	Kuznetsov	Ukraine, Dnepropetrovsk	Full member
BUT	Brno University of Technology	Seelmann	Czech Republic, Brno	Full member
ISURE	Irkutsk State University of Rail Engineering	Kargapol'tsev	Russia, Irkutsk	Tabiana Molkova



The NEAR² Corridors



- A1. Via main Trans – Siberian railway network
- B1 Via branch of the Trans-Siberian railway network – the Manchurian route
- B2 Via branch of the Trans-Siberian railway network – the Trans-Kazakh route
- B3 Via branch of the Trans-Siberian railway network – the Mongolian route
- C1.1 Via the TRACECA - Turkmenbashi rail route (1)
- C1.2 Via the TRACECA – Turkmenbashi rail route (2)
- C2.1 Via the TRACECA – Aktau route (1)
- C2.2 Via the TRACECA – Aktau route (2)
- E. Connection via the Trans-Asian railway route
- D. Connection via the Central Corridor in Kazakhstan



Formulation of the 10 CDs

The CDs that were created are:

CD1: Strategy and Economics

CD2: Operations and System Performance

CD3: Rolling Stock

CD4: Product Qualification Methods

CD5: Intelligent Mobility

CD6: Safety and Security

CD7: Environment and Energy Efficiency

CD8: Infrastructure and Signaling

CD9: Human Factors

CD10: Training and Education

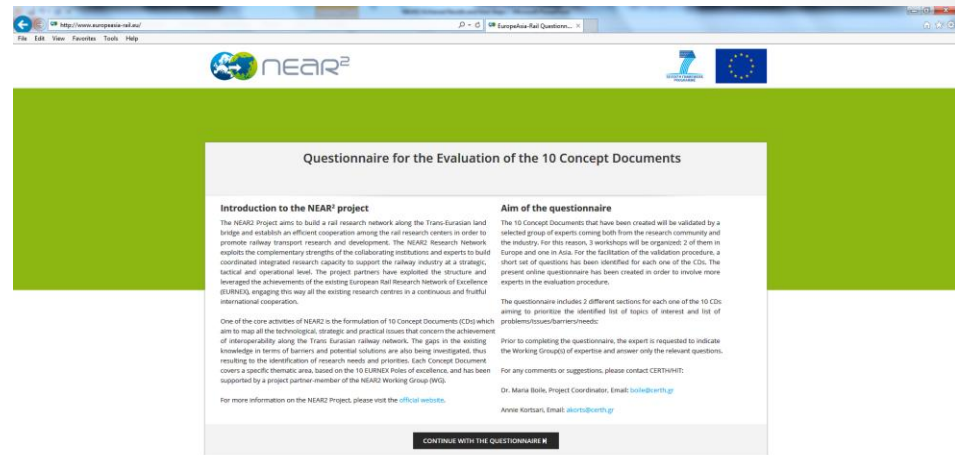
All of the CDs include the relevant topics of interest and their description; identification of existing issues and problems; interdependencies with other CDs and identification of future research needs.



Validation of the 10 CDs

The validation methods used included:

- Personal interviews;
- Online questionnaire (www.europeasia-rail.eu)
- Workshops.



THANK YOU FOR YOUR TIME

1st NEAR² Workshop: 04/02/2014 in Vilnius, Lithuania. Experts from the European research community. 17 experts and 21 project partners. Presentation and validation of the 10 CDs.

2nd NEAR² Workshop: 12/06/2014 in Warsaw, Poland. Experts from both the industry and research, mostly from Europe. 10 experts and 20 project partners. Discussion of issues and prospects of the Trans-Eurasian railway networks.

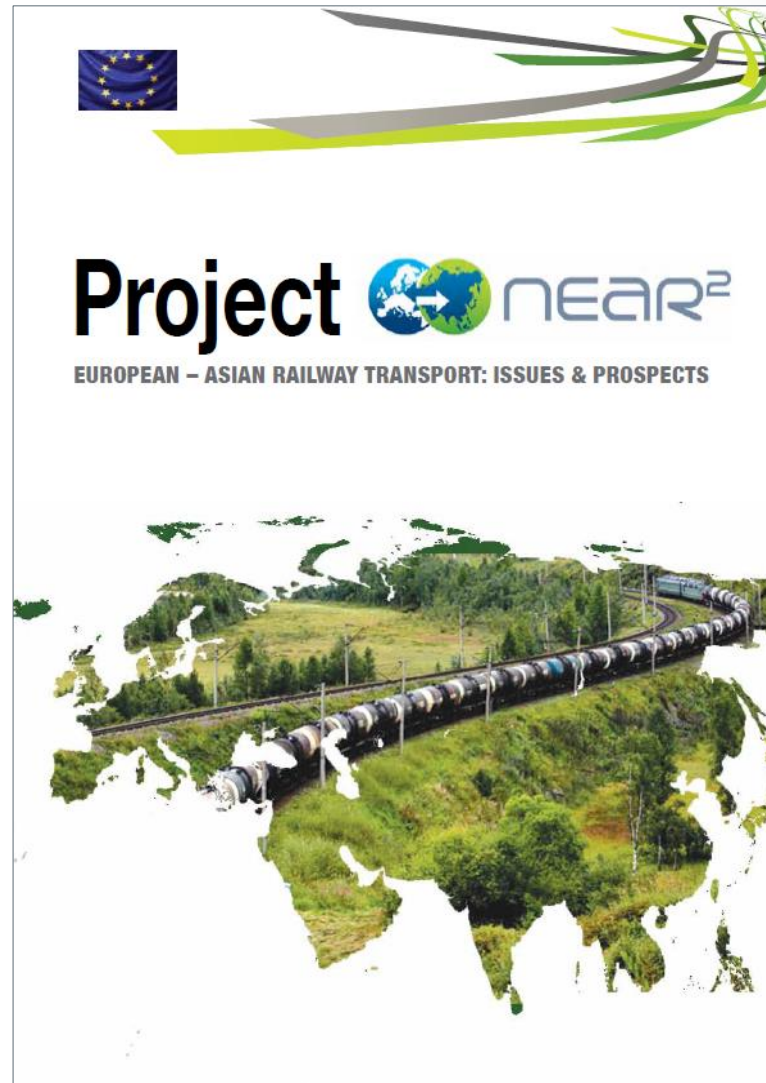
3rd NEAR² Workshop: 10/07/2014 in Shanghai, China. Experts from the industry and the research community, from Asia and the world. 16 experts and 23 project partners. Discussion on the Trans-Eurasian railway networks.

Final Conference (21/10/2014, Moscow, Russia).



Formulation of the Final Publication

- Historical Background and recent developments in Europe-Asia rail transport;
- The Trans-Eurasian railway policy context;
- Bilateral and multilateral agreements;
- Operating Europe-Asia railway lines;
- Projects Underway;
- Developments in World and EU-Asia trade;
- Needs of shippers and freight forwarders;
- Railway services
- Service providers and shippers' needs;
- Bottlenecks and associated solutions;
- Future research priorities.



Policy Context

POLICY CONTEXT

The review of relevant transport policies and strategies indicates that investment in railway infrastructure and efficient Europe-Asia rail operations is of high priority on the political agendas of the European Union, Russia, China and Kazakhstan to mention the most important ones. All countries along the railway corridors have signed bilateral and multilateral agreements on railway transport, providing a legal basis and an operational framework for cooperation. One of the major challenges will therefore be to push forward a legal and operational harmonisation.

POLICY CONTEXT

EUROPE

- 2011 White Paper "Roadmap to a Single European Transport Area-Towards a Competitive and Resource Efficient Transport System"
- 2013 Single European Railway Area
- 2013 (amending Directive 2008/57) Interoperability of the rail system within EU
- 2013 Opening of domestic passenger transport services and governance of railway infrastructure

KAZAKHSTAN

- The three main Kazakh railway lines are: the Trans-Kazakhstan railway from Petropavlovsk to Karaganda coalfield, the Turkestan – Siberian route from Semipalatinsk to the Kyrgyzstan and the Uzbekistan borders and the railway line linking Tashkent in Uzbekistan with Orenburg in the Russian Federation. The Trans-Aral Railway and the connection via Atyrau and Astrakhan Oblast go directly to European Russia.
- So far, the land bridge via Kazakhstan can be considered as the best organised land bridge in comparison to the other China – Europe land bridges.
- The Government has set a plan for a "New Silk Road" strategy to exploit the country's potential as an east-west and north-south transit hub by 2020. In 2013 Russia, Kazakhstan and Belarus decided to establish United Transport & Logistics Co for Intermodal Services including transit routes between Europe - Asia.

RUSSIAN FEDERATION

- Enhance its activities in the Eurasian land bridge and focuses on increasing trade between Europe, the CIS countries and the Asia-Pacific region
- Complex development of the international transport corridors infrastructure (the Trans-Siberian in particular) providing direct multimodal transportation of goods, and effective logistic chains.
- Legal harmonization in the field of transport, including operational compatibility and safety.
- Facilitation of international transport and simplification of border crossing procedures, processing of goods in transit, development of technological schemes of interaction between different modes of transport and rules of international transit.

Kyrgyzstan

- Announced the elaboration of a railway rehabilitation strategy by 2014

Tajikistan

- Plans to develop the TRACECA Corridor by 2014
- Create a new logistics center

Azerbaijan

- Ongoing Railway Trade and Transport Facilitation Project
- Rehabilitation of the Baku-Georgian Border railway section

Georgia

- Working on "Fast Railway" project
- Aims to increase the speed and volume capacity of the network

Uzbekistan

- Building of a new railway line is in force, linking Turkey to Persian Gulf via Iran
- Plans to build railway connections with Afghanistan and Turkmenistan

Iran

- Connected to the Pakistani rail network
- MoU with Afghanistan to provide to Afghanistan Railway Authority with trainset to support its plans for railway development and expansion (June 2014)
- Last step: the rail connection from India, to Bangladesh, to China, to Southeast Asia

INDIA

- It comes as a successor of the RCI (Railway's Infrastructure for Industry Initiative) and R2CI (Railways Policy for Connectivity to Coal and Iron Ore Mines) policies developed during 11th five-year plan (2007-2012).
- Another new policy that was introduced is the Automobile Freight Train Operator (AFTO) Scheme 2013, which aimed to increase the rail share in automobiles transportation.
- Undertake a series of PPP projects for the railway sector for developing multi modal transport logistics infrastructure, to provide broad gauge rail link to Port of Pipavav in Gujarat, for Port connectivity works.

CHINA

- The Eurasian Land Bridge has been, since 1996, at the forefront of the strategic long-term policy for the Chinese government. The policy for the extension to Europe included the construction of a railway line across Kazakhstan and other countries of Central Asia
- China's strategic plans, beginning in 2010, were completely focused on the extension of the railways to Central Asia near the borders.
- One of the lines, which entered into service in 2011, runs from East China's Sea, specifically port of Lianyungang, to Kazakhstan's province Druzhba and then via Russia and Belarus through Poland to reach European markets, ending at the Port of Rotterdam in the Netherlands.
- Another line that began operation in 2011, starts at Chongqing and goes through the Xinjiang Province into Kazakhstan. The route continues through Russia, Belarus and Poland with a final destination in Duisburg, Germany.
- In 2013, China and Kazakhstan, as part of their strategic plan to enhance their railway connection and to link it with a trans-continental transport route between Europe and China, opened a new cross-border rail link at Korgas Pass between Almaty (Kazakhstan) and Khorgos (China)



Existing Bilateral & Multilateral Agreements

2.7 Existing bilateral and multilateral agreements among countries along Europe-Asia Corridors

The countries along the railway corridors have signed several international and bilateral agreements on railway transport and other relevant topics that provide a legal basis, as well as an operational

framework for the cooperation in the region. Table 2 presents a list of key the agreements among the countries in the Eurasian land bridge that have been signed since 1993.

Table 2: Bilateral and Multilateral Agreements

YEAR	COUNTRIES	AGREEMENTS
1993	Georgia, Azerbaijan	1. General Principals in the field of customs, on the opening of Customs Checkpoints on the Border of the Two States [46], [47] 2. On railway transport [48]
	Azerbaijan, Kazakhstan	1. Main principles in the transport sphere relations [49] 2. Transit cargoes, customs clearance and communication of customs authorities [49]
	Kazakhstan, Turkmenistan	General principles of relations in the transport and communication fields [49]
	Georgia, Kazakhstan	Bilateral railway agreement [49]
	Georgia, Turkmenistan	Bilateral railway agreement [48]
1996	Azerbaijan, Georgia, Turkmenistan, Uzbekistan Georgia, Kazakhstan	Coordinating Railway transportation and cooperation in Transit Carriages [50] On order of Transit [49]
	Azerbaijan, Georgia, Uzbekistan	Cooperation in establishing and function of international Euro-Asian transport corridor [51]
1997	Afghanistan, Azerbaijan, People's Republic of China, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan and 6 multilateral institutions	Promotion of the members' development aiming to achieve regional cooperation in transport, trade facilitation, trade policy and energy [52]
1998	Armenia, Azerbaijan, Bulgaria, Georgia, Iran, Kazakhstan, Kyrgyzstan, Moldova, Romania, Tajikistan, Turkey, Ukraine, and Uzbekistan	The UN-registered Basic Multilateral Agreement (MLA) on International Transport for Development of the Europe – Caucasus - Asia Corridor [53]
2001	Azerbaijan, Kazakhstan	Between railway administrations on coordination of railway transport [49]
2004	Georgia, Azerbaijan	On coordination of railway transport [48]
2006	17 Asian nations as part of a United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)	The Trans-Asian Railway Network Agreement (1)

YEAR	COUNTRIES	AGREEMENTS
2007	Turkey, Georgia and Azerbaijan, Armenia left out	Construction of a railway improving cargo transportation linking Europe and Asia [1]
	India ratified an intergovernmental agreement	On the railway network connecting 32 Asian countries to Europe [54]
	Kazakhstan, Turkmenistan	Cooperation Treaty in trade and economic, scientific and technical, also in cultural spheres till 2020 [49]
	China, Kazakhstan	Promoting the construction of the international transport corridor for protecting transport between China and Europe through China and Kazakhstan [55]
	Azerbaijan, Tajikistan	On cooperation in the field of railway transport [47]
	Azerbaijan, Georgia, Turkey	On Coordination of the Activity for the realization of the Railway Connection Baku – Tbilisi – Kars [47]
2008	China, Mongolia, Russia, Belarus, Poland and Germany	Memorandum on expanding cooperation on railway transport to boost trade and cargo flows between Asia and Europe [56]
	Azerbaijan, Turkmenistan	On international combined transport [3]
2012	Tajikistan, Afghanistan, Iran	Develop projects for the construction of a railway line connecting the three countries [57]
	International Union of Railways (UIC), the Coordinating Council (CCTT) including more than 100 rail and maritime companies	Trans-Siberian Railway Agreement [58]
2013	37 countries	Joint declaration to create a unified set of transparent and predictable legal conditions for international rail freight transported between Europe and Asia [59]
	Turkmenistan, Tajikistan, Afghanistan	For rail link coordination, railway connection through northern Afghanistan [60]
	Russia, Kazakhstan, Belarus	To establish United Transport & Logistics Co for intermodal services including transit routes between Europe and Asia [61]
2014	Russia, Bulgaria	To undertake collaborative projects for enhancing the Bulgarian and Russian rail transport systems with focus on using the rail-ferry service between the ports of Varna and Caucasus [62]
	China, India	Part of 12 agreements. Investment from China to upgrade India's railway system with high-speed links and upgraded railway stations [63]
	China, Russia	Part of 39 agreements. China will design, finance, supply facilities and construct of a 770-km high-speed line connecting Moscow and Kazan under the Moscow- Beijing railway project [64] [65]

Projects Underway

Projects Underway

Name	Countries Involved	Description	Other Information
The Vienna wide-gauge project	Austria, Slovakia, Ukraine	Construction of broad-gauge rail line from Košice (SLO) to Vienna (AUS) in order to attract freight traffic on transit routes to Asia.	-Construction was planned to be finalized in 2015 and commercial train services to be offered in 2016. Delays are expected as the project hasn't started yet.
The Khosan – Rajin project	Russia, North Korea, South Korea	1st part of Trans-Korean Main Line reconstruction project and its integration into Trans-Siberian Railway	-The development of transit route depends on the main project and the completion of direct rail link between Europe and South Korea
The Zhetygan-Kongas Project	Kazakhstan, China	Important step in the formation of shortest rail lines from Chinese border to southern regions of Kazakhstan, Central Asia and port of Aktau.	-One of the largest projects in Kazakhstan.
The Railroad Vahdat – Karamlik (Kyrgyz border)	Kyrgyzstan, China, Afghanistan, Iran	Connection of Kyrgyz Republic with neighbor states of China through Tajikistan, Afghanistan and Iran.	-MoU signed in 2010. -Planned to be completed by 2025.
The Silk Wind Project	China, Kazakhstan, Turkey and Europe	Route creation of block-train multimodal transport (container/RORO/RO-RA) with system of prior information exchange between customs services and rail transport operators of project's member-countries. Transport of containers between China- Kazakhstan-Caspian Region-Caucasus-Turkey-Europe	-Proposed by Kazakhstan as part of the TRACECA project. -First high-speed train Silk Wind project was estimated to run in summer 2014 but there is no progress. -The multimodal block-train expected to accelerate the delivery of goods from China to Europe. -Total route length: 4192 km -Estimated transit time: 12 days
Moscow- Beijing railway project	Russia, China, Kazakhstan	Construction of 7,000 km rail line to connect Moscow with Beijing. First part of the project the construction of 770km high speed line to connect Moscow and Kazan.	- MoU signed between China and Russia in October 2014. -Estimated reduction of travel time between Moscow and Kazan from 11.5hr to 3.5hr
Rail Trade and Transport Facilitation AF (Alternative Funding)	Azerbaijan	Rehabilitation of track and replacement of signaling, electric power supply and locomotives for the East-West corridor from Baku to the Georgian border.	-Funding from World Bank in 2013. -Planned to be completed through the AF funding in 2017.
The Baku-Tbilisi-Kars railway project	Azerbaijan, Georgia, Turkey	Construction of Kars-Akhalkalaki branch with 98 kms length, of which 68kms will be laid through Turkey and 30 kilometres through Georgia	- Inter-governmental agreement between the three countries - expected to increase the flow of containers and other types of cargo from Asia to Europe -Estimated completion by the end of 2014

Relevant to agenda item No.5



Developments in Trade

Figure 16: Growth in container traffic between Asia and Europe [22]

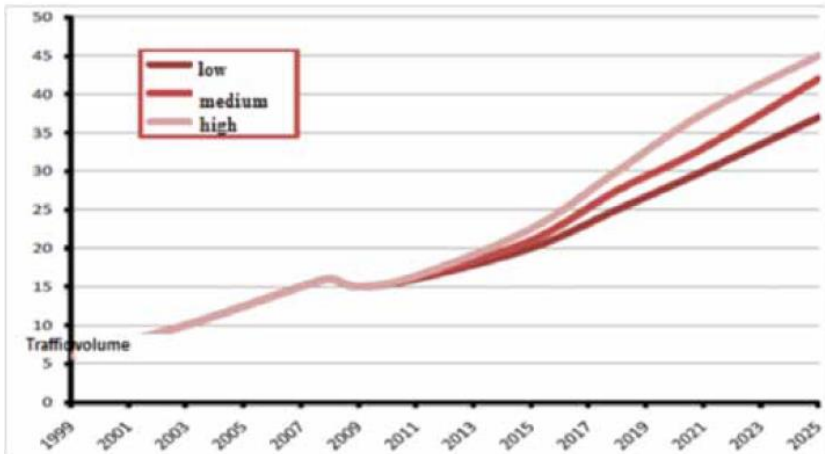


Figure 18: Freight traffic in China from 1980 to 2012, by transport carrier [98]

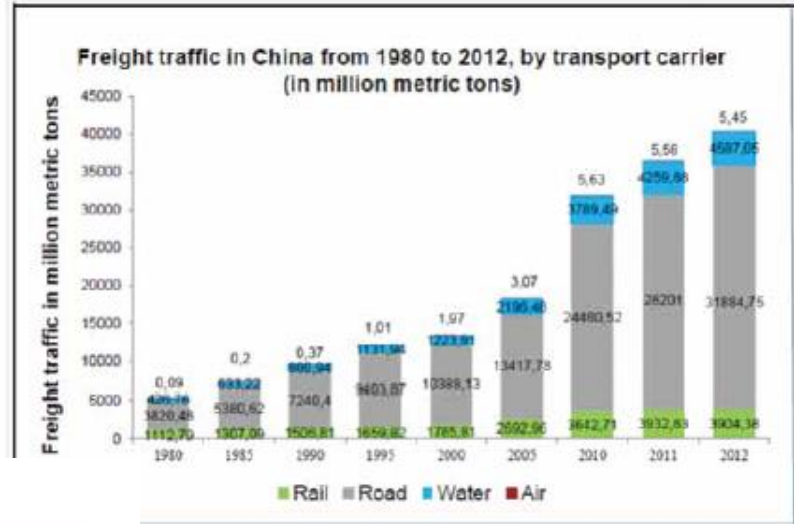
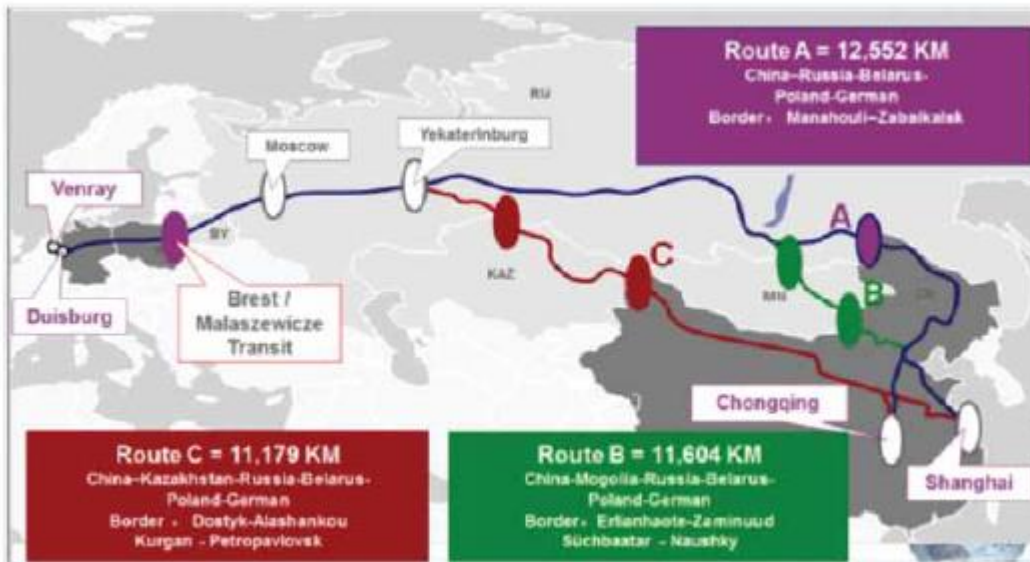
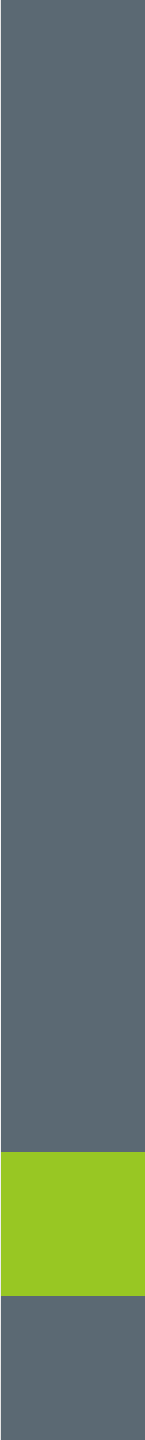
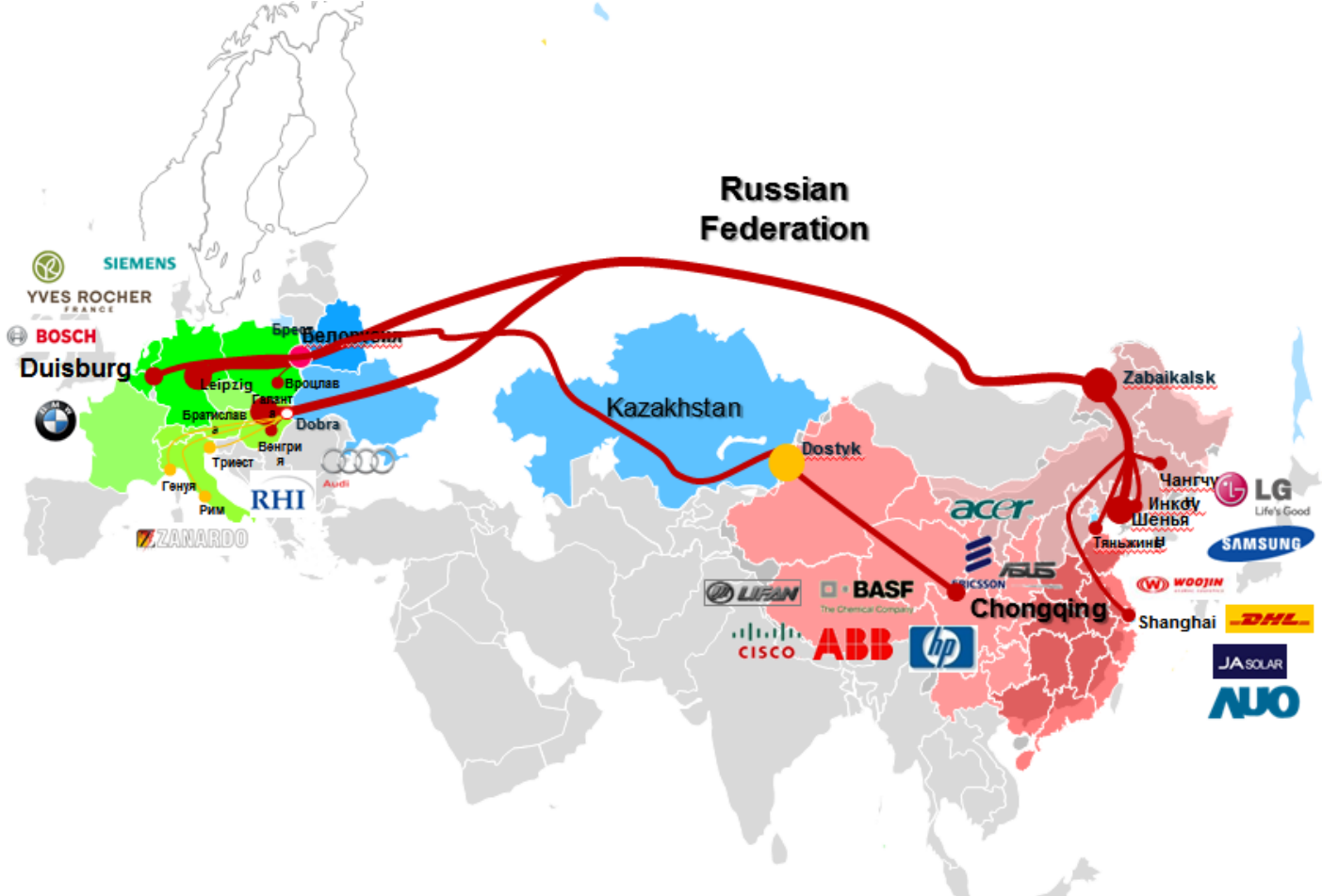


Figure 20: Trans-Eurasian railway corridors used by COSCO Logistics [101]



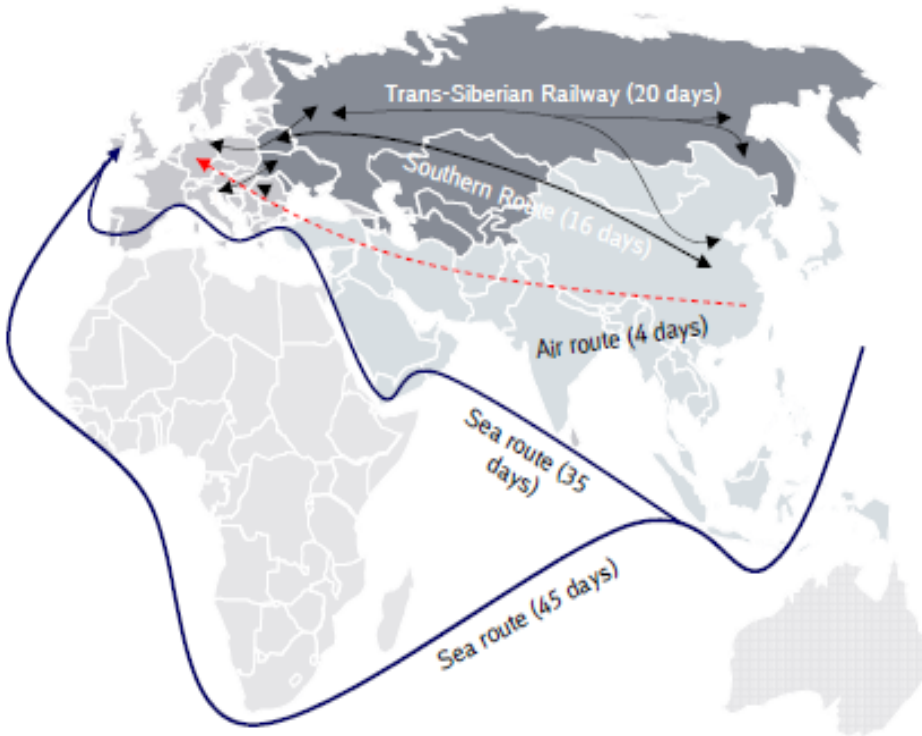
Relevant to agenda item No 2

Companies operating in the Trans-Eurasian Railway Corridors

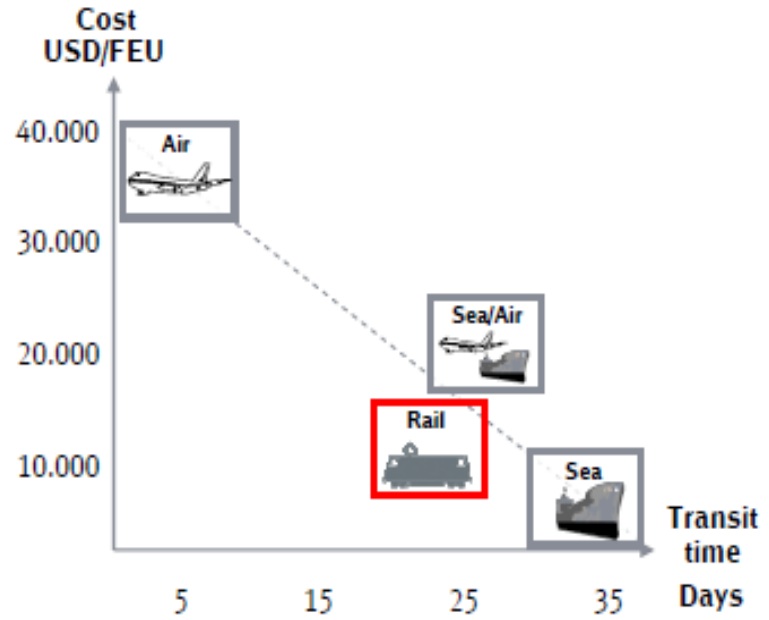


Comparison to other transport modes

Available trade lanes Asia-Europe (lead times¹⁾)



Comparison of transport modes CN-EU



Relevant to agenda item No.3



Bottlenecks along the Trans-Eurasian railway corridors

- Lack of interoperability in both infrastructure and rolling stock
- Missing links;
- Significant delays at border crossings;
- Lack of harmonization in safety requirements;
- Safety issues occurring due to the length of the railway routes and the lack of adequate monitoring;
- Misbalance in trade loads from Europe to Asia and vice versa resulting to empty runs;
- Different policies and legislation applied in the various countries leading to lack of harmonization in procedures;
- ...



Concluding Remarks

- Maritime transport is the dominant freight transport in EU-Asia trade and air transport is the mode of choice for high-value goods.
- Rail transport presents an increasingly attractive alternative for trade between these areas.
- To improve the attractiveness and competitiveness of rail transport, several issues need to be resolved.
- EC places great emphasis on railways due to its environmental friendliness and potential for increased cost and time efficiency.
- Important to start with the legal step-by-step harmonization in the states participating in the trans-Eurasian corridors before the land bridge can become competitive.
- The attractiveness of maritime and air transport lies in the fact that they do not cross nations once they have left the ports.
- The use of railways has the potential to contribute to the economic growth of landlocked regions and countries such as Azerbaijan, Uzbekistan and Kazakhstan.



Concluding Remarks

- Any measures taken now to enable rail to present a viable alternative to maritime and air transport and a more prominent option in intermodal transport corridors, should be assessed considering the future conditions, including conditions of the maritime and air transport systems.
- Cyclical phenomena, like port congestion, should be considered as well, along with the question around when and how these phenomena reach an inflection point and become structural changes.
- Trends in intermodality and the tendency for containers to become more voluminous should also be assessed, along with their repercussions on rail infrastructure design, including electrification and axle load in rails and permanent way.



Concluding Remarks

- Target priorities that should be set while designing a modern rail transport product include improvement of the regulatory framework, service regularity, stable and competitive tariff, new infrastructure opportunities and introduction of new technologies.
- Research priorities may be categorized in : 1) policy and legal issues, and 2) technical and operational issues.
- If the policy and legal issues are not addressed, technical and operational issues – even if solved – will not ensure a cost-effective and competitive freight rail service
- Research agendas should include relevant research priorities both on policy and legal matters and on technical and operational matters.





The NEAR² Project - Network of European – Asian Rail Research Capacities

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