

**Project “East West Transport Corridor II” (EWTC II)
WP 4 – Business Opportunities in Railway Transports
Task 4A – EWTC Joint Rail Freight Concept**

**REPORT
on Policies/Indicators in the Greening of EWTC**

Vilnius, 20-09-2010
Revised 30-09-2011

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Work Package 4 and the 4A task Leader:

JSC “Lithuanian Railways”, Vilnius, Lithuania

Author:

Stasys Zurba, Chief specialist of Development Department of JSC “Lithuanian Railways”

Note: The report is based on the overview of literature and results of other projects, discussions in workshop and interview with the experts. The report contains opinions and summaries as target data for the development of the task 4A -EWTC Joint Railway Concept and contribution to the task 3B – Development of an EWTC Green Corridor Manual in the early stage of the EWTC II project.

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1. Summary

East West transport corridor is an important link between Europe and Asia which covers the EU and non-EU countries. The development of EWTC Railway Joint Concept is one of the most important tasks in implementing the EWTC II project. Ecologically rail transport is more attractive in comparison to road transport. In addition, the railway is much more effective when one needs to carry large volumes of cargo over long distances. The aim of EWTC Joint Railway Concept is to offer solutions to enable more efficient, sustainable and ecological rail freight services. Enhancing the interaction between rail and other modes of transport is also relevant for the efficiency of the whole logistics chain. The implementation of the transport policy for greening the EWTC is very important in this case.

The methodology includes design of the tools needed for the analysis of railway business development in the context of green transport corridors. A system of criteria for greening EWTC from the position of Joint Railway Concept was selected for the evaluation of the EU provisions on transport policy in the areas of rail freight business, logistics and the green corridor development. KPI System for greening rail freight services was designed on the basis of the analysis of the new EU transport policy initiatives, assessment results of the best practice examples, discussions in partner meetings and workshops with experts of the railway business.

For EWTC Joint railway concept it is necessary to evaluate the development of sustainable and green transport system in the EU transport policy and its implementation as well as to consider positive collaboration experience in 1520 mm width gauge railway transport.

During the overview of the EU transport policy guidelines and experience of the best practice projects, concerning the implementation of these guidelines, a set of KPI's system for greening transport was presented. Two levels are important: authority/societal (EU and national administration) and business. On the authority level of the EU countries, it is necessary to prepare the required legal, economic and direct regulatory mechanisms for the implementation of the EU transport policy legislation. It is very important to know how these mechanisms for the implementation of the sustainability principle and orientation of the green transport corridor are or will be implemented. On the national level the KPI indicates the government strategy and environmental conditions (political, economic, social, legal, regulatory, etc.) of the rail business development. The implementation of Transport policy initiatives on the railway transport business level embodied the deployment of the government strategy into planning concrete measures and actions of the infrastructure enhancements, traffic management improvements, rolling stocks update, IT and communication systems implementation, etc. Transport policies are aimed to ensure good rail link to ports, implement innovative handling technologies in cargo terminals, harmonize exchange information with port companies, Customs Authority, rail companies of neighbouring countries, road companies, etc. Intermodal freight transportation services require close collaboration among all stakeholders of the logistics chain.

The introduction of transport policy incentives is often used as a cooperative mechanism of the rail business. The establishment inter-firm alliances serve as a coordinating method in which resources are provided for general use. Vertical or horizontal integration is carried out when a company decides to expand the scope of establishment associations, intermodal transport platforms, implementation of pilot projects and collective actions in coordinating manner. The establishment of the EWTC association is one of them.

KPI system is intended to show the state and the level of service of the transport chain described in the pilot route, design EWTC Joint Railway Concept and develop an action plan to implement the Concept. The domains, which are important for the smooth movement of freight by rail of the corridor and selection KPIs, were identified and the KPI system, which includes the interests of all stakeholders of rail transport services in the corridor, was developed. The set of KPI was split into the following domains:

- Set of KPI for infrastructure includes the indicators of rail tracks, intermodal terminals, as well as the associated ports and shipping lines;
- Set of KPI for technology includes the indicators of rolling stocks, operations, information technologies, standardization;
- Set of KPI for business development includes the indicators of quality of services, scope of services, services design, economy, charges and taxes, marketing, route management and coordination activities;
- Set of KPI for administration includes the indicators of customs and border crossing procedures, documentation;
- Set of KPI for transport policy includes the indicators of common vision, strategy, legislation, investment policy, spirit of cooperation;
- Set of KPI for Green transport corridor approach includes the indicators of social and environmental impact of transport;
- A few KPI are intended for co-modality.

2. Background to the project

EWTC II project includes the EU country in the Southern Baltic Sea region, Lithuania, non-EU countries Belarus, and Kaliningrad region as an associated member of Russia. Moreover, the project aims to implement the green corridor, which geographically is a continuation to Russia, Central Asian countries, China, Ukraine and the Black Sea region.

The concept of the green corridor gives the priority to sustainable water and rail transport modes for cargo transportation, ITS solutions for road transport, effective technologies of handling cargo in transport hubs and co-modal terminals, modern technologies for information exchange among all stakeholders throughout the corridor.

The railway net in each country was created by their strategic needs, the existing legal norms, standards, etc. Therefore, a huge diversity of railway systems and rail freight business models has formed in EWTC. The aim of EWTC Joint Railway Concept is to offer solutions to enable more efficient, sustainable and ecological rail freight services. Enhancing the interaction between rail and other modes of transport is also relevant for the efficiency of the whole logistics chain. The implementation of the transport policy for greening the EWTC is very important in this case.

For about twenty years the European Union transport policy has been focused on the competitiveness of the transport systems. The introduction of rail transport market liberalization in the EU has not been smooth [18]. For its specifics, rail market is closer to natural monopoly; thus, the market liberalization reform was a questionable success. The amount of carriers in the market of railway transport services was limited because of large constant costs in rail business and limited scope of transport service needs, as the share of the road transport service remained greater. The limited scope of services did not allow reaching the critical point of profitability for most of small rail freight carriers. Hence, rail services market is not perfect and for this reason the legislation of liberalization of rail freight market cannot act effectively. Because of this, the aims of national transport policies of different member states opposed the EU liberalization policy of rail market. The liberalization process of rail market took almost 20 years and the results of the reform are ambiguous. At first, the main argument was that market liberalization increased the volume of container transport by rail. However, this is the result of cargo containerization trend. Freight transportation in containers by road and sea has increased much more than by rail. Secondly, the liberalization of rail market did not increase the share of rail freight services in the freight services market.

The liberalization of rail freight market increased the amount of participants responsible for the operations in the same infrastructure. Therefore, transportation operations and management has become more complex. The applied models of liberalization highlighted this complexity. There were more operational and management problems when the countries were carrying out the liberalization of rail market in the framework of a separate structure. It

was necessary to integrate governing mechanisms to overcome the complexity which was faced. Thus, less operational and management problems were encountered when the countries carried out the liberalization of rail market in the framework of an integrated structure.

The liberalization of rail transport market has not eliminated the unequal conditions of competition among different modes of transport, and rail transport services in separate countries. Tax exemption and taxation regulation preferences in separate countries were introduced without wide coordination of the EU. For example, in Germany rail freight transport is charged the fuel tax, while Dutch railway operators are fully exempted from this tax. Competition disparities for German companies competing internationally are caused by different social insurance contributions, motor vehicles tax rates and specific subsidies [19]. In Lithuania the fuel excise tax, including the tax paid by Lithuanian Railways, is used only for road infrastructure development.

It is clear that only competition will not solve all problems. “Green” transport corridors require measures of transport policy which promote harmonization of competitive conditions for all modes of transport, incentive collaboration and cooperation of all stakeholders of the transport chain. It is especially important to greening transport services and increasing the efficiency of intermodal transport.

3. Aim of the task

The objective of the task “EWTC Joint Railway Concept” is to create a concept of smooth movement of cargo by rail in the EWTC. Therefore, it contributes to a better integration of the European market to Russia, Belarus, Ukraine, Caucasus, Central Asia and Far East markets. These activities should have a focus on the growth of cargo volumes in the corridor on the basis of improved quality railway services as more environment-friendly mode of transport.

The task promotes cooperation and exchange of experiences related to the development of seamless rail cargo flows in the corridor. It will contain some benchmarking activities with other transport corridors to find the best practice examples in such areas as: tariffs, border crossings, harmonization issues, one stop shop concepts and transport co-modality issues. Furthermore, it will demonstrate the use of ITS in a green context based on the information broker concept developed in task 3C.

The report on transport policies and indicators, reviewing the EU transport policy of rail transport development in the context of Green Transport Corridor development, offers using a KPI system in the initial period of the project as aid in assessing the quality of rail services and designing the necessary measures for the smooth transport of goods by rail.

4. Methodology and pilot route for the EWTC Joint railway concept

The methodology includes a survey of the EU transport policy provisions and implementation of these provisions on the level of authorities and rail transport business. The design of tools for the analysis of the EWTC Joint Railway Concept development in the context of green transport corridor provides a need to set the Key Performance Indicators (KPI). The KPI for greening rail freight services was designed on the basis of the analysis of the new EU transport policy initiatives, assessment results of the best practice examples, discussions in partner meetings and workshops with experts of the railway business.

From the position of Joint Railway Concept, the system of criteria for greening EWTC was selected considering the evaluation provisions of the EU transport policy in the areas of rail freight business, logistics and green corridor development (Figure 1).

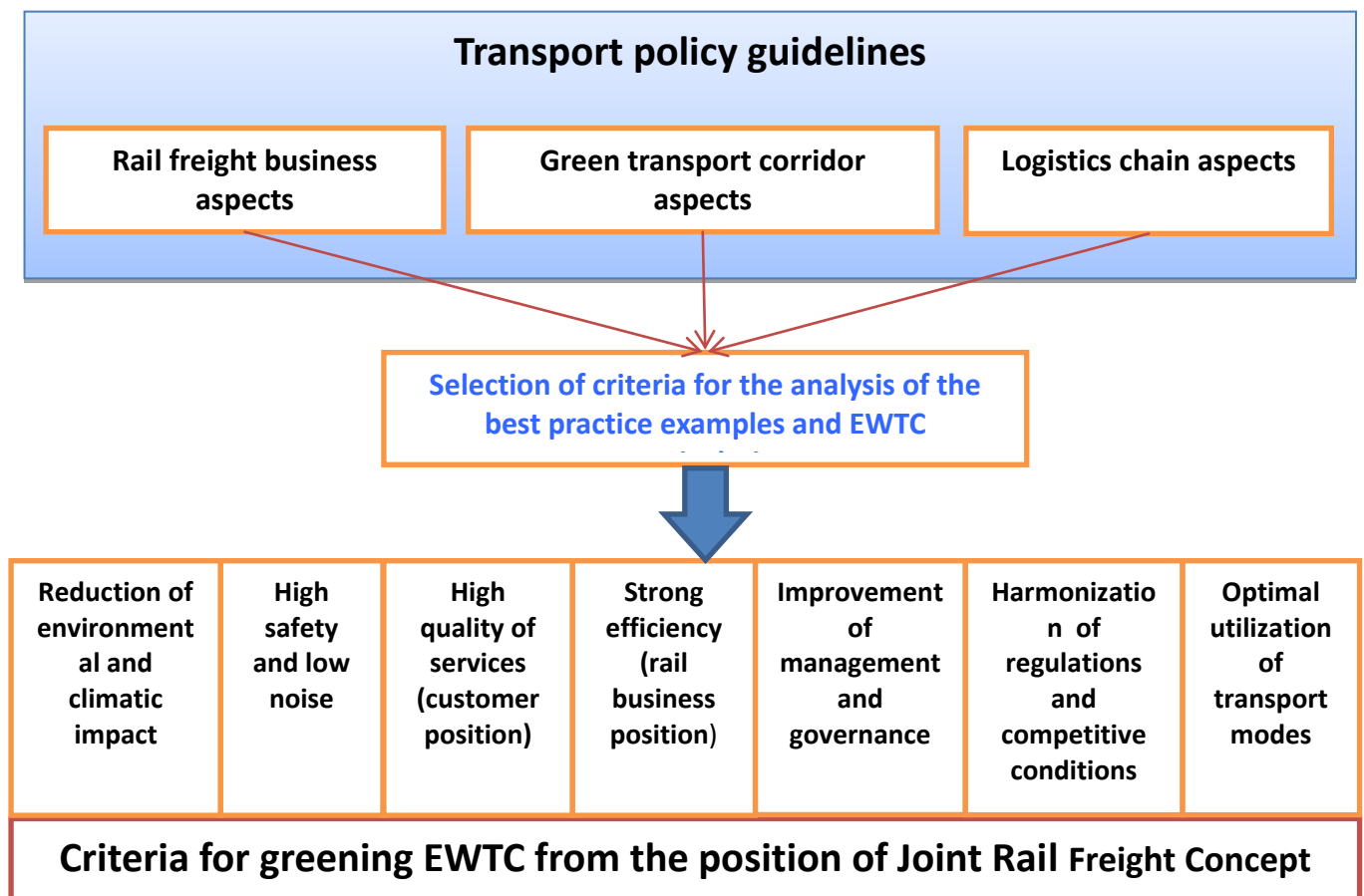


Figure 1. Criteria for greening EWTC

The development of the Joint Railway Concept for sustainable and Green transport corridor is based on the criteria of environmental and climatic impact reduction, high safety and low noise, high quality of services (customer position), strong efficiency (rail business position), improvement of management and governance, harmonization of regulations and competitive conditions, as well as optimal utilization of transport modes.

The EWTC Joint Railway Concept requires highlighting the essential features of the railway business and specifically of EWTC. It is better to focus on the pilot route (Figure 2) for the exact and comprehensive analysis because the corridor encompasses a huge territory. Therefore, it was limited to the pilot railway route which runs through Denmark, Sweden, then through the Baltic Sea, Lithuania, Belarus and Ukraine, and a branch from Germany through the Baltic Sea to Lithuania.

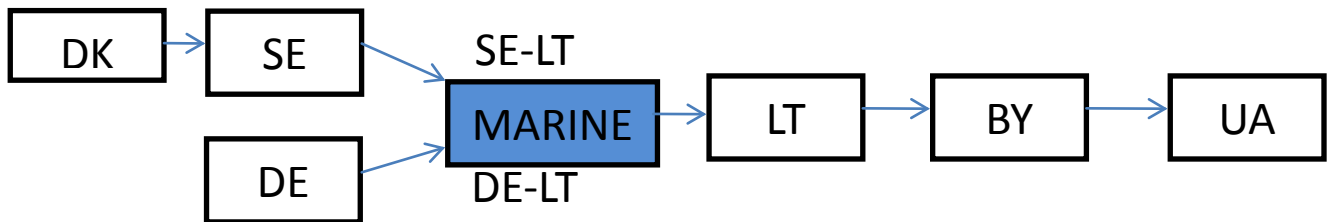


Figure 2. A pilot route of the EWTC

The selected KPIs will aid in designing the EWTC Joint Rail Freight concept model. This model is a system intended to express the domains and elements of interaction of railway transport on the different shores of the Baltic Sea. The analysis made on the basis of the KPI system will help to provide actions ensuring smooth, efficient and environment-friendly rail freight services along the Green EWTC.

The starting point is the objectives and indicators in greening or sustainability regarding economic, social and environmental aspects based on the policies that are decided on different levels in the EWTC framework.

5. Experience of the best practice projects in rail business

A number of projects have been tested in practice for the transport policy ideas carried out in Europe. These projects helped to accumulate data for further development of transport policy, selecting criteria and indicators for implementing the policies. Some of the projects designed to verify the ideas for the sustainable transportation of goods and development of green corridors. On the basis of the overview of the projects listed below, a set of KPI (key performance indicators) for greening East West Transport Corridor was proposed. The set of the proposed KPI was designed as the target data for the development of the task 4A -EWTC Joint Railway Concept.

List of the overviewed projects:

TEN-T revision approach.

Planning the core network involves four successive major steps:

- Identifying the main nodes, which configure the overall layout of the network.
- Linking the main nodes and selecting intermediate nodes for inclusion into the network.
- Determining the relevant technical parameters to be applied, according to functional and capacity needs.
- Including relevant *complementary or auxiliary* hard or soft infrastructure, so as to meet the requirements of operators and users, in line with specific policy objectives, and to enhance efficiency and sustainability.

Project PROMIT analyzed the barriers in Europe railway network and used KPI's (key performance indicators) in the following areas:

- track gauge (6 different width track gauges),
- electric systems (5 different electric power systems),
- signalling systems (20 different signalling systems),
- vehicle equipment,
- operational barriers.

Project INTEGRAIL considered railways as a single system to be optimized globally, according to the holistic view. The standardized structure of the KPI was proposed:

- KPI on rolling stock – availability, reliability, life cycle cost;
- KPI on infrastructure – availability, reliability, capability, life cycle cost;
- KPI on traffic management – quality of train plan, regulation rescheduling, information;
- KPI on operations – customer satisfaction, number of trains, punctuality, transported pay-load, cost of operation.

Project RAIL NET EUROPE examined one stop shop services, network access, train information system, network statement, pricing information, international train path management, transport planning and operations monitoring. The established association

proposed harmonization of conditions and procedures in the field of international rail infrastructure management providing benefit for the entire rail industry.

Project BRAVO - Brenner Rail Freight Action strategy aimed at achieving a sustainable increase of intermodal transport volume by enhancing quality, efficiency, and system technologies. A range of innovative methods were developed in the BRAVO-Project; they are a part of the Brenner Rail Freight Action Strategy, i.e. innovations were applied to a corridor management scheme and train path re-scheduling, cross-border operation of multisystem-locomotives and loco drivers for efficient and reliable rail transportation of radio-remote control, quality manual, online train monitoring, improvement of existing and extension of new intermodal services, internet timetable displaying, use of mega trailer-pocket wagon, etc.

Some lessons of the project BRAVO are useful for the development of the governing system of the EWTC corridor. First, “full integrator model” for the complex transport corridor was not feasible due to different legal and institutional framework and competition among transport chain actors. Second, an integrating management structure, i.e. the consortium involving all stakeholders of the Brenner corridor was established. Third, the corridor management scheme was based on open and restricted platforms. The open platform was intended for the coordination strategy of the developed infrastructure, harmonization of the institutional environment, IT systems and etc. The restricted platform is for business driven co-operations that serve to improve transport service operations and quality management.

Project REORIENT assessed the progress in the implementation of the European rail legislation and its subsequent impacts on the market behaviour of the European rail freight industry. Areas of assessment areas: the differences among the countries in the implementation of the EU directives, economic and social benefits, environmental issues, implementation conditions to seamless flow, business model alternatives, criteria for investors, service quality requirements and gaps between the expected and delivered quality, relation between deregulation and market dynamics, social support for rail freight, countermeasures to overcome barriers.

Project CORRIDOR B aims to remove the bottlenecks in ETCS implementation and to harmonize operational rules along the Stockholm–Hamburg–Munich–Naples route. The corridor will be progressively equipped with ERTMS.

Project FREIGHTWISE framework sought to integrate three domains: transportation infrastructure and traffic management, transport management, legislation and regulation. The aim of the project was to achieve efficient cooperation among well-defined roles of transport user, transport service provider, transportation network manager and transport regulator.

Project BE LOGIC aimed to improve the efficiency within and across different modes of transport and support the development of a quality logistics system. The best practices within co-modality as well as promotion and spread of new ideas to support the system of green co-modal transport were examined. A very comprehensive set of key performance indicators was proposed for the evaluation of transport policy and transport business.

6. Policies/indicators in the greening transport on authority/societal (EU and national administration) level from rail business position

The European Union transport policy is focused not only on the competitiveness of the transport system, but also on reducing the costs of the transport system to avoid the negative impact on society. To achieve these objectives, the European Commission provides a range of initiatives, issuing communications and using a wide range of policy tools.

The EU Communication on Greening Transport (COM (2008) 433 final) underlines "Sustainable mobility" and "Getting the prices right" transport policies links.

The aim of sustainable mobility is to separate the mobility from harmful effects of the transport system. This has been in the EU transport policy focus for several years (2006 review of the 2001 White Paper (COM(2006)) 314; Freight Transport Logistics Action Plan (COM (2007) 607); Towards a rail network giving priority to freight (COM (2007) 608); A sustainable future for transport: Towards an integrated, technology-led and user friendly system (COM(2009) 279); GREEN PAPER: Towards a better integrated trans-European transport network at the service of the common transport policy (COM(2009) 44)); White paper (COM (2011) 144 final): Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system.

The objectives of the EU Transport policy for sustainable future of transport include the requirements for the transport safety and security, support of transport units and modes corresponding to the environmental conditions, assessment of all costs of services at market price, use of the most recent technologies in the transport systems and services, development of skills of transport and logistics specialists, development of well-served and fully-integrated transport network, setting right prices on the basis of the evaluation of external costs, establishment of the common European space of transport, etc. For EWTC Joint railway Concept it is important to highlight the rail transport business conditions through the corridor. It is necessary to evaluate the possibility for harmonization of transport policy on authority/societal (state) level in order to establish green corridor concept.

"Getting the price right" policy objectives are to help for all stakeholders of market to adopt less costly behaviour, choose realistic, environment-friendly and affordable services offered in the market. The need to use a broad range of greening policy tools in order to achieve sustainable mobility and "getting the price right" are declared in the Communication of Greening Transport. It includes economic instruments (taxes, charges, emission trading schemes), regulatory measures to infrastructure investment and new technologies.

The EU has already done a lot in greening transport services in separate areas of transport policy. The measures for greening transport services are grouped according to their negative impact as follows:

- 1) Climate change;
- 2) Local pollution;
- 3) Noise pollution;

- 4) Congestion;
- 5) Accidents.

The EU encourages the greening transport corridors even more by declaring that "getting the prices right" is an especially effective way of doing this and is central to the Commission approach. The Commission presented two initiatives along with this communication that aim at green and sustainable transport: a communication on internalizing the external costs of transport and a proposal to revise the existing directive on the infrastructure charging the heavy goods vehicles (2006/38/EC). On the basis of the estimations, a methodology and handbook will be prepared for practical use on internalizing the external costs (Strategy for the internalization of external costs (COM (2008) 435). The revised directive on the charging of heavy goods vehicles will encourage Member States to implement differentiated charging systems, which in turn will improve the efficiency and environmental performance of road freight transport. These initiatives must encourage shifting cargo transportation from road to rail. A complementary measure of the greening effect is the reduction of rail noise. It will have a positive effect on the development of rail transport where lower noise wagons will be used.

On the authorities level of the EU countries, it is necessary to prepare the required legal, economic and direct regulatory mechanisms for the implementation of the EU transport policy legislation. It is very important to know how these mechanisms for the implementation of the sustainability principle and orientation of the green transport corridor are or will be implemented. The indicators are required to show the efforts put in greening transport corridor at the country level. The KPI of the national level indicates the government strategy and environment conditions (political, economic, social, legal, regulatory, etc.) of the rail business development.

EWTC joint rail freight concept is based on railway route model. Therefore, it is important to evaluate the strategies and measures of rail business organizations on greening of the EWTC, i.e. the policies on business level.

7. Policies/indicators in the greening transport on the business level from rail business position

The implementation of transport policy on the business level required to provide and put into practice an action plan in line with the latest transport policy initiatives. The development of Green transport corridor must ensure smooth movement of goods by all logistics chain on the basis of sustainability and environmental protection principles. The implementation of Green transport corridors is favourable to the development of rail transport services, especially when goods are transported over long distances and in large quantities.

Companies of rail business were accustomed to act as a natural monopoly. Rail market liberalization reforms introduced market elements in providing rail transport services. Companies had to adapt to work in a competitive environment and change their business strategies. The greening of the transport corridor requires providing transport services in the most effective manner by each mode of transport. Thus, railway companies must combine the logic of competition and collaboration in their developmental strategies. This means that the rail business companies must improve its service efficiency, environmental and quality indicators, and ensure interaction with other modes of transport involved in the joint logistical process in this way aiming at smooth movement of goods in the green transport corridor.

The implementation of Transport policy initiatives on the railway transport business level embodied the deployment of the strategy into a plan of concrete measures and actions of the infrastructure enhancements, traffic management improvements, rolling stocks update, IT and communication system installation, etc. The introduction of the transport policy incentives is often used as a cooperative mechanism of rail business. Service agreements are signed between infrastructure managers and railway undertakings, carriers and shippers or forwarders. Favourable tariffs, quality level and other mutually acceptable terms of services to promote freight transport by rail are included in the agreements. For example, tariff for the Viking shuttle service is very competitive and the same holds for all routes from Klaipeda to Odessa (Ilyichevsk).

Transport policies are aimed to ensure good rail links to ports, implement innovative handling technologies in cargo terminals, harmonize exchange information with port companies, Customs Authority, rail companies of neighbouring countries, road companies, etc. Intermodal freight transportation services require close collaboration among all stakeholders of the logistics chain.

The establishment inter-firm alliances serve as a coordinating method in which resources are provided for general use. Agreements on common use of wagons, launch dedicated shuttles illustrate it.

Vertical or horizontal integration is carried out when a company decides to expand the scope of services. Deutsche Bahn holding development is an example of expanding the service scope to all logistics chain.

Establishment of associations, intermodal transport platforms and implementation of pilot projects are collective actions based on coordination method. The establishment of the EWTC association is one of them.

Key performance indicators which reflect the specifics of rail transport business are more suitable for the description of Railway route model. Therefore, it means the use of indicators of business level. The continuation of EWTC to non-EU countries requires an assessment of the rail business condition and interaction with local rail companies. For this purpose, international agreements are important on the national and individual corporate levels. Appropriate indicators for international agreements are needed.

8. System of the KPI indicators for greening EWTC

EWTC Joint Railway Concept is based on the implementation of the EU transport policy in the rail freight services. The pilot route model was selected to design the concept. The set of criteria for greening EWTC from the position of Joint Rail Freight Concept were also identified. A set of proposed KPI was designed as target data for the development of the task 4A -EWTC Joint Railway Concept.

A series of projects carried out in the EU are considered to be the best practice examples. These projects assessed the progress in the implementation of the European rail legislation and its subsequent impacts on the market behaviour of the European rail freight industry. The areas of assessment: differences between countries in the implementation of the EU directives, economic and social benefits, environmental issues, implementation conditions to seamless flow, business model alternatives, criteria for investors, service quality requirements and gaps between the expected and delivered quality, relation between deregulation and market dynamics, social support for rail freight, and countermeasures to overcome barriers. The best practices within co-modality as well as promotion and spread of new ideas to support the system of green co-modal transport were examined. A very comprehensive set of key performance indicators was proposed for the evaluation of transport policy and transport business. The results of these projects were useful for the design of the set of KPI for implementing EWTC Joint Railway Concept on the basis of sustainable and green transport policy provisions.

KPI system is intended to show the state and level of service of the transport chain described in the pilot route, design EWTC Joint Railway Concept and develop an action plan to implement the Concept.

The domains that are important for smooth movement of freight by rail of the corridor and selection of KPIs in a single system (Figure 3) were identified as political, social, technological, administrative and business.

The participants of the task 4A workshop, which took place in Malmö on 2011-05-24, ranked key performance of the Joint railway concept indicators. The representatives of business designated the 1st place to the cost of transport, service quality and transportation time. However, it was recognized that a number of indicators from all domains are very important for greening transport corridors.

DOMAIN	ELEMENTS	APPEARANCE
POLITICAL	Common vision, strategy	
	Interests	Nodes, links
	Legislation	
	Investment policy	PPP State aid
	Spirit of co-operation	International R&D projects Common projects
SOCIAL	Perssonel	Training
	„Green“ approach	
TECHNOLOGICAL	Rolling stock	Wagons Vehicles Availability Interoperability Reliability Charges
	Operations	Quality agreements Customer satisfaction Flexibility Loading and carriage Transported payload Cost s
	Infrastructure	Safety Security Monitoring Tracking/tracing After sale operations
		Availability Reliability Capability Track Gauge Electric Systems
	Traffic management	Border and Nodal Stations Access to terminals, junctions, yards Charges
	Information technologies	Number of trains (frequency) Path description/identification – parameters Placement Scheduling
	Comodality	Rescheduling Punctuality Quality of train plan Corridor management scheme
	Coordination with extended systems	Manual/description/instructions Quality management system Information Schedule for extending systems (across the sea) Long-Term Planning
	Standardization	Signal and Security Systems Telematic applications ERTMS TAF-TSI
		Customer information system Online monitoring
ADMINISTRATIVE	Documentation	
	Customs	
	Border crossings	
BUSINESS	Economy	Tarrifs, pricing, charges
	Corridor partners	Governments Transport network manager traffic, infrastructure Transport user: demand Transport service provider: supply Transport regulator: regulation
	Marketing	
	Scope of services, service design	
	EWTC Association	
	Corridor management scheme	
	Co-ordination activities	

Figure 3. Domains for selection of KPIs.

The workshop and additional information gathered during the interview with experts of rail business enabled improving the initial set of KPIs. A system which includes the interests of all stakeholders of rail transport services in the corridor was developed. The set of KPI was split into domains:

- Figure 4. KPI for Infrastructure;
- Figure 5. KPI for Technology;
- Figure 6. KPI for Business Development;
- Figure 7. KPI for Administration;
- Figure 8. KPI for Transport Policy;
- Figure 9. KPI for Green Corridor Approach;
- Figure 10. KPI for Co-modality.

Domain 1 INFRASTRUCTURE

DOMAIN INFRASTRUCTURE			
ELEMENTS	TRACK	INTERMODAL TERMINALS	PORTS SHIPPING LINES
KPI name	Objective	Description	Dimension
TRACK			
Track capacity	Ability to move trains along the mainline	Number of trains per day in both directions	Trains/day
Track capacity consumption	Consumption of the mainline	Trains moved/track capacity per dayx100%	%
Rail infrastructure limitation	To assess the seamlessness of the mainline for trains	Length of limitation (e.g. profile, weight, length, electricity) and share in the total main rail network	=km of rail network with every specific limitation =% of total main network"
Track Gauge	To identify rail track gauge in a country	Distance between load bearing rails	mm
Electric Systems	To identify rail electrification system in a country	Voltage, type of current , frequency	Voltage (V) Direct current(DC) or Alternating current (AC) Frequency (Hz)
INTERMODAL TERMINALS			
Terminal supply	To assess the availability of intermodal terminals along the mainline	Number of intermodal terminals	Number of terminals
Terminal capacity	To assess the capacity of intermodal terminals along the route	Number of ITU possible to handle	Number of ITU (Intermodal Transport Unit)
Terminal capacity consumption	Consumption of intermodal terminals along the route	ITU handled/ capacity (per day)x100%	%
Terminal opening hours	Legal restrains for opening a terminal (per day, weekend)	Accessibility of terminals	h. per workday days per week
Public Logistic centres (PLC)	To assess the availability of PLC along the mainline	In PLC the operator may develop own capacities	Number of PLC
PORTS			
Port opening hours	Legal restrains for opening a port (per day, weekend)	Measuring the legal framework on the accessibility of ports	h. per workday days per week
Capacity of rail access to port	Ability to move trains along the rail access to the port	Number of trains per day in both directions	Trains/day
Intermodal terminal, serving the port	To identify the availability of intermodal terminals in the port	Number of terminals Distance from the port	Number and km for each terminal
Maximal depth pf the port	To assess the size of vessels to be served in the port	Maximal depth at the quays	m
SHIPPING LINES			
Availability of shipping lines	To assess the availability of regular shipping lines for the main types of cargo	Frequency/week	Number of calls/week per cargo type

Figure 4. KPI for Infrastructure

Set of KPI for infrastructure includes indicators of rail tracks, intermodal terminals, as well as the associated ports and shipping lines.

Set KPI for technology includes indicators of rolling stocks, operations, information technologies and standardization.

Domain 2 TECHNOLOGY, INTEROPERABILITY

DOMAIN TECHNOLOGICAL INTEROPERABILITY			
ELEMENTS ROLLING STOCK; OPERATIONS; INFORMATION TECHNOLOGIES; STANDARDIZATION			
KPI name	Objective	Description	Dimension
ROLLING STOCK			
Availability of wagons	To assess problematic types of wagons for freight carriage	Types of wagons with problems in supply	Number per type
OPERATIONS			
Number of trains (frequency)	To assess the capacity of the route	Trains per week	Number
Flexibility	Ability of transport chain to adapt to changes in demand (volume, size, time table)	measured on at 5 point scale	From 1 (very difficult to adapt) to 5 (very easy to adapt)
ICT			
ERTMS	To identify the level of implementation of the ERTMS	Measured on a 6 point scale	0 (not started) to 5 (fully implemented)
TAF TSI	To identify the level of possibility to apply TAF TSI	Measured on a 6 point scale	0 (no application) to 5 (full application)
Real time information	Ability to inform customers in real time	Measured on a 6 point scale	0 (no possibilities) to 5 (high possibilities)
Tracking/tracing	To identify the possibilities of T&T	Availability	Yes/no
One Stop Shop	To identify the existence of OSS	Availability	Yes/no
Information broker system	To identify the existence of IBS	Availability	Yes/no
STANDARDIZATION			
Minimal terminal equipment	To identify the minimal composition of terminal equipment	Existence of definition	Yes/no
Quality agreements	To identify the existence of quality agreements in a route	Agr. infrastructure manager-operator	Yes/no
ITU (intermodal transport unit)	Acceptance of a single standard of ITU along the route	Definition by type of standard ITU	Yes/no

Figure 5. KPI for Technology

Set of KPI for business development includes the indicators of quality of services, scope of services, services design, economy, charges and taxes, marketing, route management and co-ordination activities.

Domain 3 BUSINESS DEVELOPMENT

DOMAIN BUSINESS DEVELOPMENT			
ELEMENTS QUALITY OF SERVICES; ECONOMY; CHARGES/TAXES; SCOPE OF SERVICES, SERVICE DESIGN; ROUTE MANAGEMENT ; CO-ORDINATION ACTIVITIES; MARKETING			
KPI name	Objective	Description	Dimension
QUALITY OF SERVICES			
Punctuality	To assess the ability to arrive on time	Trains moved/arrived in contract timex100%	%
Customer information system	Inf. constancy to customer on the status of the performance	Measured on a 6 point scale	0 (none) to 5 (at every moment in time)
Safety	Damage during transportation	Incidents/total shipments	%
Security	Assess thefts, robberies, etc.	Incidents/total shipments	%
Complaints	Understanding about the reliability of a service.	Number of complaints/total shipmentsx100%	%
Quality system	Presence of quality system	ISO certification at : 1. Infrastr manager; 2. Rail operators	1.Yes/no 2.Yes/no
ECONOMY			
Tariffs,	To benchmark service tariffs	Carriage tariffs	EUR/TEU tkm
CHARGES/TAXES			
Average pricing level	Overall average level of charge of infrastructure users in a country	Average charge costs of infrastructure user for freight transport on rail	EUR / tkm Total charge revenues of rail infrastructure users (from freight trains) divided by total tkm on rail in a country
Average tax level	Overall average freight rail specific tax per km (all taxes to be considered)	"Governmental" costs (beside infrastructure pricing) of rail transport	EUR / tkm Total rail tax revenues from freight transport divided by total rail freight tkm in a country
Toll (roads)	Overall average toll tariff in a country	Measuring the average toll costs for freight transport on roads	EUR / km
SCOPE OF SERVICES, SERVICE DESIGN			
Scope of services	To identify the list of services in a route	Listing of services	A list
ROUTE MANAGEMENT			
Governmental agreements	To identify governmental attitude to the route	If any agreements exist with neighbouring countries of route	Yes/no
Route network manager	To identify responsibilities	If network manager is appointed	Yes/no
Route management scheme	To identify organization	If route management scheme exists	Yes/no
Manual/description/instruction	To improve performance	If manual exists	Yes/no
Long-Term Planning	Consistent development of the route	If long-term plan along the route exists	Yes/no
CO-ORDINATION ACTIVITIES			
Stakeholder integration	Measuring the participation of stakeholders in the development of transport and logistics policies	Degree of participation of the representatives of transport and business sector in the development of transport and logistics policies	0 (no participation) to 5 (very high)
International R&D projects	To identify R&D activities for the route	Performed and ongoing projects	List of projects
Personnel training	To assess the efforts in personnel cooperation	Number of international trainings	Number
MARKETING			
Common marketing activities	Promotion of the route	If proceeded	Yes/no

Figure 6. KPI for Business Development

Domain 4 ADMINISTRATION

DOMAIN ADMINISTRATION			
ELEMENTS DOCUMENTATION; CUSTOMS; BORDER CROSSINGS			
KPI name	Objective	Description	Dimension
DOCUMENTATION			
Electronic document	Possibility to submit electronic freight documentation for the entire route	Possibility	Yes/no
Single freight document	Acceptance of CIM/SMGS consignment note along the route	Acceptance	Yes/no
CUSTOMS			
Customs clearance procedure	Average necessary time and forms	Complexity of customs procedures, which can be time intensive	=h per clearance procedure =number of forms per clearance procedure"
e-clearance	Existence of e-clearance possibility	E-clearance decreases customs time	Yes/No
BORDER CROSSINGS			
Waiting time	To assess the waiting time at the border	Total waiting time before the cargo may be moved further	hours
Procedures time	To assess the duration of procedures	Time, required for each procedure at the border	hours

Figure 7. KPI for Administration

Set of KPI for administration includes indicators of customs and border crossing procedures and documentation.

Set of KPI for transport policy includes indicators of common vision, strategy, legislation, investment policy and spirit of co-operation.

Set of KPI for Green transport corridor approach includes indicators of social and environment impact of transport.

A few KPI are intended for co-modality.

Domain 5 TRANSPORT POLICY

DOMAIN		TRANSPORT POLICY	
ELEMENTS COMMON VISION, STRATEGY; LEGISLATION; INVESTMENT POLICY; SPIRIT OF CO-OPERATION			
KPI name	Objective	Description	Dimension
COMMON VISION, STRATEGY			
Rail Freight priority	Identification of priority of rail freight transport	Existence of corridors or rail lines where rail freight transport has a priority	Yes/No % of international corridor length within a country
Status of transport modes	Measuring the importance of the different modes within the transport policy	Relevance and status of different modes of transport within the transport policy	From 1 (not important) to 5=very important for freight transport: = road , = rail, =air =marine, =inland waterways , =combined
Master plan	Existence of transport master plan	Identification of national transport planning concepts	Yes/No
LEGISLATION			
The First Railway Package: Separation of functions	Measuring the existing separation of rail regulation, infrastructure management function, commercial rail operation	Separation and independence of rail regulation, infrastructure management function, commercial rail operation	Existence - Yes/No Separate account and operation of these entities - Yes/No Degree of independence of these entities on a 6 point scale 0=no independence to 5=full independence
The Second Railway Package: Market access	Description of national and international market opening, possibilities and barriers for operators	Market opening of railway sector to all licensed operators 5 point scale	Network statement availability on a 5 point scale: 1=published more than 2 years ago, 2=irregularly, 3=bi-annual, not online, 4=annually not online, 5=annually online open and transparent path approval and allocation procedure on a 5 point scale: from 1=long approval period, no justifications, to 5=very short approval period, clear justifications
The Third Railway Package	Market opening to international operators	Market opening to international operators of freight traffic	Whether international operators are active Yes/No, Approximate share of rail market they have %
INVESTMENT POLICY			
Total transport funding	Amount of governmental transport funding for all modes and per mode	Measuring the share of funding ,funding intensity per country	EUR EUR / GDP % per mode
Other subsidies then funding	Amount of governmental transport subsidies for all modes and per mode	Measuring the share of subsidies	EUR EUR / GDP % per mode
PPP	Usage of PPP	PPP projects in rail sector	Number of projects
SPIRIT OF CO-OPERATION			
Stakeholder integration	Measuring the participation of stakeholders in the development of transport and logistic policies	Stakeholder integration	0 (no participation) to 5 (very high)

Figure 8. KPI for Transport Policy

Domain 6 GREEN CORRIDOR APPROACH

EXTRA FACTOR		GREEN CORRIDOR APPROACH	
ELEMENTS SOCIAL IMPACT; ENVIRONMENTAL			
KPI name	Objective	Description	Dimension
SOCIAL IMPACT			
Freight traffic safety	Measuring freight transport safety of a country in total and per mode	Number of fatalities and injured persons due to accidents with involvement of freight transport vehicles in relation to transport performance in total and per mode	=Number of incidents per freight transport/Total number of incidents =Number of incidents per freight transport/Total number of incidents per mode
Noise	Mitigation of negative noise impact	Attention to rail noise mitigation in the national plan	Yes/No
GREEN CORRIDOR			
Relative air pollution	Emission of air pollutants in rail transport performance	Measuring the ecological efficiency of the transport system	g SO ₂ / tkm
Relative greenhouse gas emission	Greenhouse gas CO ₂ emissions in relation to the transport performance	Measuring climate efficiency of the transport system mode	"g CO ₂ / tkm
Environmental tax	Amount of additional taxes intended for environmental protection	Measuring the environmental tax rate	EUR / year

Figure 9. KPI for Green Corridor Approach

EXTRA FACTOR CO-MODALITY

EXTRA FACTOR		CO-MODALITY	
ELEMENT			
KPI name	Objective	Description	Dimension
Modal split	To understand the role of transport modes in the national transport system	Measuring the performance of different modes of transport	Transport volume of each mode of transport (road, rail, iww, sss)/total volume
Intermodal transport	Freight volume and performance with intermodal transport units	Measuring the transport performance of intermodal transport	=No. of shipped ITU =% of ITU tonnage per total freight tons
Specific tariffs for combined trains	Specific infrastructure pricing regulations for combined trains	Existing of infrastructure charging system with privileges for combined transport	Yes/No
Priority to CT-trains	Measuring the legislative assistance to ensure punctuality and speed of CT trains	Existence of a legal act giving priority to CT trains concerning track allocation and track use	Yes/No

Figure 10. KPI for Co-modality

9. Conclusions

The objectives of the EU Transport Policy aiming at sustainable future of transport include the requirements for the transport safety and security, support of transport units and modes corresponding to the environmental conditions, assessment of all service costs at market price, use of up-to-date technologies in the transport systems and services, development of skills of the transport and logistics specialists, development of a well-served and fully-integrated transport network, setting the right prices on the basis of the evaluation of external costs, establishment of the common European space of transport, etc.

It is important to highlight the rail transport business conditions through the corridor for EWTC Joint railway Concept. It is also necessary to evaluate the possibility harmonizing the transport policy on authority/societal (state) level to establish the green corridor concept.

Intermodal freight transportation services require close collaboration among all stakeholders of the logistics chain. Transport policies are necessary to ensure good rail link to ports, implement innovative handling technologies in cargo terminals, harmonize exchange of information with port companies, Customs Authority, rail companies of neighbouring countries, road companies, etc. Various forms of cooperation are needed to achieve the most effective interaction.

For better integration of the EWTC railway markets, it is necessary to enhance the collaboration of transport business stakeholders for smooth movement of cargo by rail in the established routes. Business level strategies and indicators are needed for greening EWTC.

The implementation of Transport policy initiatives on the railway transport business level embodied the deployment of the strategy into a plan of concrete measures and actions of the infrastructure enhancements, traffic management improvements, rolling stocks update, IT and communication system installation, etc. The introduction of the transport policy incentives is often used as a cooperative mechanism of rail business. Service agreements are signed between infrastructure managers and railway undertakings, carriers and shippers or forwarders. Favourable tariffs, quality level and other mutually acceptable terms of services to promote freight transport by rail are included in the agreements. For example, tariff for the Viking shuttle service is very competitive and the same holds for all routes from Klaipeda to Odessa (Ilyichevsk).

The establishment inter-firm alliances serve as a coordinating method in which resources were provided for general use. Agreements on common use of wagons, launch dedicated shuttles illustrate it.

Vertical or horizontal integration is carried out when a company decides to expand the scope of services. Deutsche Bahn holding development is an example of expanding the service scope to all logistics chain.

Establishment of associations, intermodal transport platforms and implementation of pilot projects are collective actions based on coordination method. The establishment of the EWTC association is one of them.

The EWTC Joint Railway Concept requires highlighting the essential features of the railway business and specifically of EWTC. It is better to focus on the pilot route (Figure 2) for the exact and comprehensive analysis because the corridor encompasses a huge territory. Therefore, it was limited to the pilot railway route which runs through Denmark, Sweden, then through the Baltic Sea, Lithuania, Belarus and Ukraine, and a branch from Germany through the Baltic Sea to Lithuania.

A series of projects carried out in the EU are considered to be the best practice examples. These projects assessed the progress in the implementation of the European rail legislation and its subsequent impacts on the market behaviour of the European rail freight industry. The areas of assessment: differences between countries in the implementation of the EU directives, economic and social benefits, environmental issues, implementation conditions to seamless flow, business model alternatives, criteria for investors, service quality requirements and gaps between the expected and delivered quality, relation between deregulation and market dynamics, social support for rail freight, and countermeasures to overcome barriers. The best practices within co-modality as well as promotion and spread of new ideas to support the system of green co-modal transport were examined. A very comprehensive set of key performance indicators was proposed for the evaluation of transport policy and transport business. The results of these projects were useful for the design of the set of KPI for implementing EWTC Joint Railway Concept on the basis of sustainable and green transport policy provisions.

KPI system is intended to show the state and level of service of the transport chain described in the pilot route, design EWTC Joint Railway Concept and develop an action plan to implement the Concept. The domains that are important for smooth movement of freight by rail of the corridor and selection of KPIs in a single system (Figure 3) were identified as political, social, technological, administrative and business. The workshop and additional information gathered during the interview with experts of rail business enabled improving the initial set of KPIs. A system which includes the interests of all stakeholders of rail transport services in the corridor was developed. The set of KPI was split into the following domains:

- Set of KPI for infrastructure includes the indicators of rail tracks, intermodal terminals as well as the associated ports and shipping lines;
- Set of KPI for technology includes the indicators of rolling stocks, operations, information technologies, standardization;
- Set of KPI for business development includes the indicators of quality of services, scope of services, services design, economy, charges and taxes, marketing, route management and co-ordination activities;
- Set of KPI for administration includes the indicators of customs and border crossing procedures, documentation;

- Set of KPI for transport policy includes the indicators of common vision, strategy, legislation, investment policy, spirit of cooperation;
- Set of KPI for Green transport corridor approach includes the indicators of social and environmental impact of transport;
- A few KPI are intended for co-modality.

The presented report on the policies/indicators is a target data for the development of the task 4A -EWTC Joint Railway Concept and a contribution to the task 3B – Development of the EWTC Green Corridor Manual in the early stage of the EWTC II project. Using the KPI system the action plan for the implementation of transport policy in rail transport business will be developed and presented in the final report of the task EWTC Joint Railway Concept.

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