



**Blekinge Institute of Technology  
Department of Spatial Planning**

European Spatial Planning and Regional Development  
Master thesis

# **The European Concept of Green Corridors in Sustainable Transport Systems:**

## **Case of East-West Transport Corridor in the Baltic Sea Region**

Author: Baiba Thomaeus

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## **Abstract**

A new European concept - Green Corridors - has been introduced to the EU member states defining them as long-distance freight transport corridors where advanced technology and co-modality are used to achieve energy efficiency and reduce environmental impact.

Key objectives of the thesis are the development of the European concept of Green Corridor regarding the theory of sustainable transport and EU transport policy, the implementation level of the concept within the East-West Transport Corridor and the relation of a 'greener' East-West corridor to sustainable transport solutions in the Baltic Sea Region as well as towards more sustainable transport system in the EU.

The analysis of the sustainable transport systems and the concept of green transport corridors have been applied to the East-West Transport Corridor in the BSR through the trans-national cooperation project EWTC II, as a case study with a review of EU documents and academic literature as well as research into the documentation of the project.

## Table of contents

Acronyms .....	5
Glossary and Nomenclature .....	5
<b>Introduction</b> .....	8
1.2. Goals and research questions .....	9
1.3 Methodology and structure of the thesis .....	10
1.4. Limitations .....	11
<b>2. Sustainable transport and sustainable transport system</b> .....	12
2.1. Environmental approach to a sustainable transport system .....	13
2.2. Use of natural resources .....	13
2.3. Transport costs .....	14
2.4. Transportation modes .....	14
2.5. Available technologies .....	15
2.6. Conclusion.....	15
<b>3. European Transport System</b> .....	17
3.1. European road freight transport.....	19
3.2. European rail freight transport .....	19
3.3. European waterways freight transport.....	20
3.4. EU policy towards sustainable transport development .....	21
3.5. Conclusions .....	22
3.6. Intermodality .....	23
3.6.1. EU transport policy towards better intermodality .....	24
3.6.2. Conclusion.....	26
<b>4. Concept of transport corridors</b> .....	27
4.1. Pan-European transport corridors.....	27
<b>5. Green Transport Corridors</b> .....	29
5.1. The European concept.....	29
5.2. Development of the concept green corridors in the EU .....	29
5.3. Co-modality as objective of the concept .....	30
5.4. Innovative technologies and ITS .....	31
5.5. Effective energy use .....	31
5.6. EU project “Super Green” – “Brussels initiative” .....	31
5.7. Conclusion.....	32
<b>6. East-West Transport Corridor</b> .....	34
6.1. Freight transport sector in the Baltic Sea Region.....	34
6.2. Regional initiative of the concept of green corridors .....	36
6.2.1. Swedish initiative .....	36
6.2.2. Regional cooperation.....	38
6.3. Regional development in the southern BSR .....	38
6.4. Project of the East-West Transport corridor.....	40
6.4.1. Stakeholders of the project.....	41
6.4.2. EWTC Association.....	43
6.4.3. Green Corridor Manual .....	44
6.4.4. Development of ITS technologies and services .....	45
6.4.5. Development of co-modality.....	46
6.4.6. Development of environmental approach in the corridor .....	49
6.5. Conclusion.....	50

<b>7. Discussion and conclusions</b> .....	53
7.1. Which elements in the theory of sustainable transport can be recognized in the European concept of Green Corridors? .....	53
7.2. How is the concept implemented in the East-West Transport Corridor (a) and what is the difference between the political concept and its implementation level (b)? .....	54
7.3. To what extent does a 'greener' East-West corridor relate to sustainable transport solutions in the BSR and to the development towards a sustainable transport system in the EU? .....	56
References .....	58
List of Figures and Tables .....	65

## Acronyms

BSR – Baltic Sea Region  
CO<sub>2</sub> – Carbon dioxide  
COM – Communication of European Commission  
EC- European Commission  
ERDF – European Regional Development Fund  
EP –European Parliament  
EU – European Union  
EWTC – East-West transport corridor  
HELCOM – Helsinki Commission of Baltic Marine Environment Protection  
HC - Hydrocarbons  
GDP – Gross Domestic Product  
GHG – Greenhouse gases  
GC concept – The concept of green transport corridors  
ITS – Intelligent transport systems  
KPI – Key performance indicators  
NAIADES – Navigation and Inland Waterway Action and Development in Europe  
MoS – Motorways of the Sea  
NO<sub>x</sub> - Nitrogen oxides  
OECD – Organisation for Economic Co-operation and Development  
PM – Particulate matter  
SEA - Strategic Environmental Assessment  
SDS - Sustainable Development Strategy  
SO<sub>x</sub> - Sulphur dioxide  
STA - Swedish Transport Administration  
TEN-T - The Trans-European Transport Networks

## Glossary and Nomenclature

*Accessibility* - can be defined as facilitation in terms of time and cost to reach economically important assets by different transport modes. This term is also used as a goal of the European spatial development policy in order to ensure economic and social cohesion and more balanced competition between European regions by improving the regional accessibility level.<sup>1</sup>

*Baltic Sea Region* – the region consists of 8 EU member states – Finland, Sweden, Denmark, Germany, Latvia, Lithuania, Estonia, Poland and a non-member state – Russia.

*Bottlenecks* – different hinders for transportation. They can be divided into 3 parts. 1) Infrastructure bottlenecks consist of physical restrictions, for example, traffic expands, weather disruptions, construction and accidents – events which are expected, but cannot be predicted. 2) Regulations delaying transportation of goods. For example, cabotage restrictions (preventing foreign carriers to move freight within a country), competition policies (by

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<sup>1</sup> Danielis R., Rotaris L. and Kropf S. European transport integration: reconciling accessibility and environmental concerns. Working paper 212; University of Trieste, 2008; [www.2.units.it/nirdses/sito\\_inglese/working%20papers/.../wp121.pdf](http://www.2.units.it/nirdses/sito_inglese/working%20papers/.../wp121.pdf)

supporting a monopoly or complete deregulation and competition in similar transport segments) and fiscal policies (by deterring investments through taxation which can create hinders.). 3) Supply chain bottlenecks relating to specific tasks and procedures in supply chain management that cause hinders.<sup>2</sup>

*Cohesion* - an expression of 'solidarity' regarding the economic, social and territorial dimensions between the member states and the EU regions with the aim for a balanced development throughout the EU and decreased structural disparities between regions. There are different financial instruments to reach these aims in form of Structural Funds and the Cohesion Fund.<sup>3</sup>

*Door-to-door supply chain* – transport arrangement of direct flow of goods from the exporter to the importer or from the point-of-origin to the point-of-sale with a minimum of interruption or delay.<sup>4</sup>

*EU competence* - regarding the distribution of powers between the member states and the EU there is a distinction between 3 types of competences: shared competence between them, the exclusive Community competence and the supporting competence when the Community has only the role of coordination and encouragement to the actions of the member states.<sup>5</sup>

*Interconnectivity* – the ability of a creation such multimodal connections which would facilitate the use of networks of different transport modes between different countries.<sup>6</sup>

*Interoperability* - the ability of the EU rail system to allow safe and uninterrupted movement of trains accomplishing the required levels of performance for these lines. This ability is dependent on the regulatory, technical and operational conditions which should be met to provide it.<sup>7</sup>

*INTERREG IIIB* – is one of the EU initiatives stimulating interregional cooperation and supporting transnational projects for balanced and sustainable development of the regions within the EU.<sup>8</sup>

*Last mile delivery* – transport term which names the final delivery in a supply chain from a provider to a customer.

*Liability system* – the term liability applies to an environmental liability regarding the "polluter pays" principle which is incorporated in the Treaty of the European Community. It applies to environmental damage and the risk of damage resulting from commercial activities. Currently there are 2 systems of liability – the first is a system with no fault to be proved and the second is a system where an evidence of a fault must be presented.<sup>9</sup>

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<sup>2</sup> Rodrigue J. et al. The Geography of Transport Systems. 2009, New York: Routledge; <http://people.hofstra.edu/geotrans/index.html>

<sup>3</sup> EU Summaries of EU legislation; Glossary; [http://europa.eu/legislation\\_summaries/glossary/competences\\_en.htm](http://europa.eu/legislation_summaries/glossary/competences_en.htm)

<sup>4</sup> Business Dictionary. <http://www.businessdictionary.com/definition/door-to-door-service.html>

<sup>5</sup> EU Glossary

<sup>6</sup> Definition by Erdmenger, (1996) in Chlomoudes K., Pallis A., European Union port policy: the movement towards a long-term strategy. Edward Elgar Publishing Ltd, Cheltenham, U.K 2002, p.86

<sup>7</sup> Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system; Official Journal L 110 , 20/04/2001 P. 0001 - 0027

<sup>8</sup> The Baltic Sea Region INTERREG III B Neighbourhood Programme 2000-2006; <http://www.bsrinterreg.net/>

<sup>9</sup> EU Glossary

*Lisbon strategy* – This EU strategy for growth and jobs was launched in 2000 for the EU and the member countries to cooperate on reforms regarding generating growth and jobs as well as greening of the economy and innovation.<sup>10</sup>

*Schengen Agreement* - signed on 14 June 1985 the agreement between Belgium, France, Germany, Luxembourg and the Netherlands agreed to gradually remove controls at the borders between them and to introduce freedom of movement for individuals. Presently the Schengen area includes all the EU member states excluding Ireland and the United Kingdom as only partial participants as well as Bulgaria, Cyprus and Romania.<sup>11</sup>

*TEN-T policy* – The aim of the EU Trans-European Networks policy has been to create an effective infrastructure in order to link European regions and national networks for proper operation of the common market ensuring free movement of goods, persons and services within the EU. TEN covers road and intermodal transport, waterways and seaports, intelligent transport management systems, the electricity and natural gas sectors. The TEN budget includes contributions from the European Regional Development Fund, the Cohesion Fund, the European Investment Bank and the European Investment Fund.<sup>12</sup>

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<sup>10</sup> EC. Lisbon strategy for growth. [http://ec.europa.eu/archives/growthandjobs\\_2009/objectives/index\\_en.htm](http://ec.europa.eu/archives/growthandjobs_2009/objectives/index_en.htm)

<sup>11</sup> EU Glossary

<sup>12</sup> EU Glossary

## Introduction

Transport has always played an essential role in economic development. Freight transportation provides access to goods by road, sea and air and well-functioning transport systems are essentially important for further development. However, the transport sector also contributes to environmental problems – like air, soil and water pollution which are a part of the impact on climate change; social problems –congestion, accidents; as well as health problems – noise pollution etc.

Europe is facing the challenge of economic growth and rapid development in the transportation sector but at the same time growing environmental concern about climate change, mainly air pollution, requires solutions to combat it.

In spite of the recent economic crisis, which has reduced the volume of transport in Europe, the freight transport has grown faster than production between 1997 and 2007. Regarding such environmental problem as air pollution the transport sector contributes to it by GHG around 19 % of total emissions.<sup>13</sup> Also the challenge to meet the goals stated by the Europe 2020 Strategy to reduce GHG emissions to 20% lower than 1990, to increase the share of renewable energy sources in the final energy consumption to 20% as well as to increase the energy efficiency by 20%<sup>14</sup> requires a competitive, sustainable and efficient transport sector.

In spite of political aspirations to develop the transport sector towards sustainability as well as the technical progress and already achieved energy efficiency improvements, according to the EU White Paper on “Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system” the EU transport system is not considered as sustainable.<sup>15</sup>

One of the elements to minimise the external impact of freight transport in the EU and to contribute to sustainable transport solutions is the European concept of Green Transport Corridors.

It is defined as long-distance freight transport corridors which by advanced technology and co-modality intend to achieve energy efficiency and reduce environmental impact. The Freight Transport Logistics Action Plan has stated the concept as one of the 6 prioritized areas by characterizing it as an integrated transport concept which could “be used to experiment with environmentally-friendly, innovative transport units, and with advanced ITS applications”.<sup>16</sup> The concept is also integrated in the European Commission’s TEN-T policy.<sup>17</sup>

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<sup>13</sup> EEA Report No 2/2010; Towards a resource-efficient transport system — TERM 2009;

<http://www.eea.europa.eu/pressroom/newsreleases/is-europe2019s-transport-getting-greener-partly>

<sup>14</sup> COM. Europe 2020. A European strategy for smart, sustainable and inclusive growth; 03.03.2010, (COM(2010) 2020),

[http://europa.eu/press\\_room/pdf/complet\\_en\\_barroso\\_007\\_-\\_europe\\_2020\\_-\\_en\\_version.pdf](http://europa.eu/press_room/pdf/complet_en_barroso_007_-_europe_2020_-_en_version.pdf)

<sup>15</sup> COM. White Paper on Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system.

28.03.2011, (COM(2011) 144 final), <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0144:EN:NOT>

<sup>16</sup> COM. Freight Transport Logistics Action Plan, 1.10.2007, (COM/2007/0607 final),

[http://ec.europa.eu/transport/logistics/freight\\_logistics\\_action\\_plan/doc/action\\_plan/2007\\_com\\_logistics\\_action\\_plan\\_en.pdf](http://ec.europa.eu/transport/logistics/freight_logistics_action_plan/doc/action_plan/2007_com_logistics_action_plan_en.pdf)

<sup>17</sup> COM. TEN-T: A policy review – Towards a better integrated trans-European transport network at the service of the common transport policy; Green Paper on TEN-T: A policy review. 04.02.2009, (COM(2009) 44 final),

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0044:FIN:EN:PDF>

As one of the main EU transport policy objectives is the decarbonisation of the transport sector, as it is the only sector where the GHG level is increasing,<sup>18</sup> as well as the transport sector's desire to comply with the goals of the Europe 2020 Strategy, the time for further development of the green corridors' concept can be considered as favourable.

Regarding further perspective within the EU, cooperation between the countries of the Baltic Sea Region (BSR) is one of the ambitious solutions to implement this concept and make the transportation sector more competitive, greener and sustainable in the region.

The EU Strategy for the BSR, prepared by the European Parliament and the European Commission, contributes to such aims by focusing on four areas: environment, economy, accessibility and security.<sup>19</sup>

The BSR is characterized as highly heterogeneous as regards economic, environmental and cultural issues but cooperation opportunities and common interest in the regional development and economic growth are the factors which unite the countries round the Baltic Sea. One of key challenges stressed out in the Baltic Sea Strategy is to enable sustainable development and to increase accessibility, which also refers to sustainable transport solutions in the region.<sup>20</sup>

This key challenge addresses regional transport imbalances, and in order to minimise the impact of transport barriers the objective is to improve the external and internal accessibility of the BSR as<sup>21</sup> it is essential not only for ensuring the mobility but also the territorial cohesion. BSR Action plan defines such tasks as *'improvement of internal and external transport links, increasing the efficiency and minimizing the environmental impact of transport systems'* as well as facilitation of efficient freight transport and logistics solution through the promotion of intermodal connections and developing the green corridor concept through regional projects.<sup>22</sup>

The east- west transportation route in the BSR shows the potential for significant growth in the transportation sector as well as a tendency towards increased volumes of transport. These expectations together with the EU transport and energy goals shows the necessity for an adapted, competitive and environmentally friendlier transport system with an efficient infrastructure and transnational connections to meet this challenge.

The cooperation between the BSR countries, transnational projects and initiatives contributes to further development of the concept by implementing it in the region, as well as by serving as bottom-up initiatives where solutions for green transport corridors can be taken to the policy level for the EU institutions to modify and improve the transport policy if necessary.

## 1.2. Goals and research questions

Key objectives of the thesis are: development of the concept of Green Corridors regarding the theory of sustainable transport and EU transport policy; the implementation level of the concept within the East-West Transport Corridor; and relation to the 'greener' East-West

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<sup>18</sup> Juriado R., DG European Commission Energy and Transport, conference material; the EC initiative of green corridors at the seminar of green corridors development in the BSR in Stockholm, 24th of November, 2009

<sup>19</sup> Baltic Sea Region Programme 2007-2013, [http://www.eu.baltic.net/Baltic\\_Sea\\_Region\\_Strategy.7428.html](http://www.eu.baltic.net/Baltic_Sea_Region_Strategy.7428.html)

<sup>20</sup> COM; the European Union Strategy for the Baltic Sea Region; 10.06.2009; (COM(2009) 248 final), [http://ec.europa.eu/regional\\_policy/sources/docoffic/official/communic/baltic/com\\_baltic\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/baltic/com_baltic_en.pdf)

<sup>21</sup> Baltic Sea Region Programme 2007-2013

<sup>22</sup> Baltic Sea Region Action Plan. 2009, [http://ec.europa.eu/regional\\_policy/cooperation/baltic/pdf/communication/action2009.pdf](http://ec.europa.eu/regional_policy/cooperation/baltic/pdf/communication/action2009.pdf)

corridor towards sustainable transport solutions in the BSR and the EU. The purpose of the thesis was to study about a possible difference between the stated objectives of the concept at the EU level and its implementation phase in regional initiatives and projects as well as the challenges to be met.

Through studying these issues the thesis tries to answer the following questions:

- 1) Which elements in the theory of sustainable transport can be recognized in the European concept of Green Corridors?
- 2) How is the concept of Green Corridors implemented in the East-West Transport Corridor and what is the difference between the political concept and its implementation level in the project's programme?
- 3) To what extent does a 'greener' East-West corridor relate to sustainable transport solutions in the BSR and to the development of a sustainable transport system in the EU?

### **1.3 Methodology and structure of the thesis**

The analysis of the sustainable transport systems and the concept of green transport corridors have been applied to the East-West Transport Corridor in the BSR through the trans-national project – EWTC II, as a case study with a review of academic literature and EU documents and a research of projects' documents. The case study as a method was chosen because it gives broader picture of further implementation of the concept at the regional level.

In the theoretical part the context has been set by analysing sustainable transport systems, the concept of sustainable transport as well as the European concept of green transport corridors in order to find possible differences, common goals and the formulation of the term "green" in the new concept.

The concept of green corridors has been analysed in comparison with the theory of sustainable transport to find which elements from the theory can be recognized in the concept of green corridors. For this reason the relevant academic literature and the EU documents for the concept of sustainable transport and the development of the concept of green corridors have been reviewed. The thesis also looks upon existing policy instruments in transport sector at the EU level to find out about the measures to reach the objectives towards sustainable transport system in the EU.

The empirical part consists of the case study of the East-West Transport Corridor through the trans-national project EWTC II within the BSR. Qualitative content analysis of the project has been made to find out how the concept of green corridors has been implemented in the projects by analysing the available projects documents - programme, progress report; materials of the conferences, etc as well as by the interview with Mr. Bengt Gustafsson, the Senior Advisor for regional planning of Blekinge region, Sweden, in order to gain deeper knowledge about details of the projects and the current situation in the transport corridor.

In the final discussion the concept of sustainable transport and green corridors as well as the present EU transport policy have been compared with the implementation phase in the project to find the differences between the theory and aims and its implementation level as well as the challenges at this stage. The thesis also clarifies the relation of a 'greener' East-West transport

corridor to sustainable transport solutions in the BSR and the development towards a sustainable transport system in the EU.

#### **1.4. Limitations**

The thesis examines freight transport policy and issues on roads, rail and inland seas in the EU and the BSR.

The thesis reviews and analyses the policies and infrastructure planning towards sustainable transportation and the development of the green corridors concept at the political level (the EU, national and regional levels) and the implementation level – projects and initiatives. Therefore it does not include the technical realisation of the project and transport logistics planning.

The concept of green corridors and particularly the EWTC II project as well as Swedish and SuperGreen initiatives are in the early stages and therefore there is a possibility that several details and approaches may be modified during the further development of the projects and initiatives.

## 2. Sustainable transport and sustainable transport system

The term *sustainability* first became world-known after the Brundtland Report where the concept of sustainability was defined as "...meeting the needs of the present without compromising the ability of future generations to meet their own needs."<sup>23</sup>

There have been many attempts to define sustainable transport without resulting in generally accepted definition, for example, emphasising particularly environmental dimension towards sustainability,<sup>24</sup> but the main idea, rephrased by the definition of sustainability by Brundtland Commission, is that sustainable transport satisfies current and future needs without threatening the needs of next generations<sup>25</sup> and such transport has a proper balance between 3 current and future qualities – economic efficiency, social progress and environmental protection.<sup>26</sup>

More specifically, according to R. Black a "sustainable transport system is one that provides transport and mobility with renewable fuels while minimizing emissions detrimental to the local and global environment and preventing needless fatalities, injuries and congestion."<sup>27</sup>

The European Union Council of Ministers of Transport in 2001 has adopted broader but more consisting definition of a sustainable transportation system and it is characterized as one that:

“- Allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.

- Is affordable, operates fairly and efficiently, offers a choice of transport modes, and supports a competitive economy, as well as balanced regional development.

-Limits emissions and waste within the planet's ability to absorb them, uses renewable resources at or below their rates of generation, and uses non-renewable resources at or below the rates of development of renewable substitutes, while minimizing the impact on the use of land and the generation of noise.”<sup>28</sup>

This approach because of its generality can be seen as ambitious because there are different competing objectives stated without guidelines how to balance them.<sup>29</sup> At the same time it “has been reviewed by political mechanisms and has received general political acceptance”<sup>30</sup> in the EU.

In comparison with the conventional definition of sustainable transport this approach is more complex and recognizes more elements on which sustainability is dependent on. Rohacs and Simongati recommend more detailed approach to sustainability which can be extended also to

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<sup>23</sup> Brundtland G. H., ed. (1987). Our common future: The World Commission on Environment and Development. Oxford, UK: Oxford University Press

<sup>24</sup> Greene W. (1997), Sustainable transport. Journal of transport Geography 5 (3). p.177

<sup>25</sup> Black W. R. (2000), Socio-economic barriers to sustainable transport. Journal of Transport Geography 8, 2000, 141-147; p.141

<sup>26</sup> Steg L., Gifford R. (2005), Sustainable transportation and quality of life, Journal of Transport Geography 13, 2005, 59-69, p. 60

<sup>27</sup> Black W. R. (2010), Sustainable transport: Problems and solutions”, The Guilford Press, New York, p.3

<sup>28</sup> TDM Encyclopaedia; Victoria Transport Policy Institute; <http://www.vtpi.org/tdm/tdm67.htm>

<sup>29</sup> Goldman T., Gorham R. (2006), Sustainable urban transport. 4innovative directions. 2006, Technology in Society 28, 261–273; Elsevier Ltd; p.264

<sup>30</sup> Rohacs J., Simongati G. (2007), The role of inland waterway navigation in a sustainable transport system, Transport 2007, Vol XXII, Nr 3, p.148.

sustainable transport. The 3 main elements are complemented by such interdependent elements as use of natural resources, built systems and available technology<sup>31</sup> which all influence sustainable development.

## 2.1. Environmental approach to a sustainable transport system

Environment and human health are those factors which are the main concerns relating to the externalities caused by transport sector.

According to OECD an environmentally sustainable transport system is defined as such “*that does not endanger public health or ecosystem and meets mobility needs consistent with (a) use of renewable resources at below their rates of regeneration and (b) use of non – renewable resources at below the rates of development of renewable substitutes.*”<sup>32</sup>

It is characterized by emphasizing environmental approach in sustainability – meeting health objectives and environmental quality; the integrity of ecosystem as well as less impact on global climate change.<sup>33</sup>

In comparison with previously mentioned definitions this admits that the environment and health issues are those elements which are crucial for the system to become sustainable.

## 2.2. Use of natural resources

There are different kinds of natural resources on which not only the world’s economy but also quality of life is dependent on, including raw materials and natural environment like air, water, soil. We use renewable and non-renewable resources to help moving towards better economy and life but the way how they are used is rapidly eroding the world’s capacity to regenerate them and environment services on which human growth is based on.<sup>34</sup>

Black, by discussing sustainable transport elements, mentions the challenge of petroleum-based fuel availability for the next generations and air pollution as the negative consequence of emissions which impacts not only global warming but also the health and well-being for humans living in urban areas.<sup>35</sup> He considers that, in spite of other fossil fuels being used as substitutes to petroleum- based fuel, for example, coal and natural gas, is not the solution to avoid environmental and social problems in transportation as such alternatives are expensive and contribute to air pollution and global warming as much as petroleum- base fuels. Therefore he suggests considering the shift towards alternative fuels and vehicles which would pollute less, but admits higher costs for such alternatives.

There is a growing trend that the use of fossil fuels in the transport sector which dominated in the past century has been gradually changed by the increased use of cleaner alternatives – for example, bio fuels.

However, there are also growing concerns expressed about negative impacts of biofuels on the environment including loss of biodiversity if public policies wouldn’t ensure the sustainability of the biomass used and the GHG reduction achieved by the fuels.<sup>36</sup>

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<sup>31</sup> Rohacs, Simongati, p.149.

<sup>32</sup> OECD guidelines to Environmentally sustainable transport., 2002, OECD Publication Service, France, p.42.

<sup>33</sup> OECD guidelines, p.42

<sup>34</sup> COM, Thematic Strategy on the sustainable use of natural resources, 21.12.2005, (COM(2005) 670 final), <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52005DC0670:EN:NOT>

<sup>35</sup> Black, Socio-economic barriers to sustainable transport, p.141

<sup>36</sup> EEA report. 1/2007.Transport and environment: on the way to a new common transport policy, [www.eea.europa.eu/en/publications/eea\\_report.../eea\\_report\\_1\\_2007.pdf](http://www.eea.europa.eu/en/publications/eea_report.../eea_report_1_2007.pdf)

### 2.3. Transport costs

Development in the transport sector is matched by global and regional competition and interdependence; therefore the two main components for effective transportation to be competitive are - to increase capacity and to reduce the costs of movements.<sup>37</sup> Among such entities as travel distance, freight quantity and value, transportation costs, Rodrigue et al consider the cost as one of the most important considerations when certain mode is being chosen.<sup>38</sup> They define 2 kinds of transportation costs – fixed costs, which includes infrastructure and variable or operating costs which refers to geography (distance and accessibility), administrative barriers, energy, transportation mode etc.<sup>39</sup>

### 2.4. Transportation modes

Transportation modes are essential components of transport systems as they are different kinds of transport facilities by which mobility is supported<sup>40</sup> by road, rail, air or sea. Transport modes compete or complement each other in order to offer the most effective way of transportation in term of costs, speed, safety etc.

In comparison with all these 4 categories the road transportation has become the most dominant transport system because of such advantages over other modes as flexibility of route choice, high relative speed and relative low capital costs of vehicles.<sup>41</sup> Nevertheless, it is also the transport mode which has the most impact on environment by air and soil pollution, noise and road congestion.

Rail and water transportation modes are considered to be more environmentally friendly regarding GHG and other transport emissions,<sup>42</sup> but less competitive due to capital costs (for rail – infrastructure, for water transport – capital costs of vessels) as well as the technical differences regarding rail transportation – gauge differences, which makes the integration of rail systems difficult, and signalling and electrification standards which differ between different countries.<sup>43</sup> Water transportation, in spite of having low operating costs and advantages like less transport accidents and higher security, has two main disadvantages – slow speed and time delays in ports.<sup>44</sup> For example, Rohacs and Simongati emphasise inland waterways as a very environment-friendly, safe, and effective transportation mode and consider that as a part in intermodal chain it could greatly contribute to a more sustainable transport system.<sup>45</sup>

Therefore the time and speed of different transport modes is a very important element for transport efficiency. Although the waterborne transportation can be environmentally friendlier alternative as road and cause less congestion which influences also traffic safety, its weakness is in low speed what can influence longer delivery time and decrease transportation efficiency.

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<sup>37</sup> Rodrigue J.P, Comtois C., Slack B. (2009), *The geography of transport systems.*, Routledge, New York, p. 43

<sup>38</sup> Rodrigue et al., p.112

<sup>39</sup> Rodrigue et al. p.43

<sup>40</sup> *ibid*, p.101

<sup>41</sup> *Ibid*, p.102

<sup>42</sup> EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010; p.29,

<http://www.europarl.europa.eu/activities/committees/studies/download.do?language=en&file=30411>

<sup>43</sup> Rodrigue et al, p.104

<sup>44</sup> Rodrigue et al, p.105

<sup>45</sup> Rohacs, Simongati, p.153

Rail transportation is also considered as environmentally friendlier as road transportation, but it has less flexibility than road and therefore it has more necessity to be combined with other transport modes in the transportation chain from sender till recipient.

However, the modal shift towards more environmentally friendly transport use can be considered as one of the core steps towards sustainable transportation in a long term perspective to mitigate the transport caused impacts on eco-system, human health. Modal shift from road to rail or water can also give positive impact on traffic safety and congestion.

## **2.5. Available technologies**

Rohacs and Simongati consider sustainable transport development to be based on technology development as innovation process starting from research, through engineering and production, to operation services. According to them only such development can balance the society's continuously rising needs, economy and usage no more or even less natural resources which would give less impact on environment.<sup>46</sup>

Green stresses out two kinds of technologies, that the environmental impacts of transport are highly dependent on - the technologies used to produce transport and the technologies used to mitigate its impacts, and therefore he considers that technology plays an essential intervening role between transport activity and its environmental impacts.<sup>47</sup>

## **2.6. Conclusion**

According to different references and considerations it can be concluded that there is no generally accepted definition of a sustainable transport system as well as there are different approaches to it. However, its common core element is the low impact on the environment.

Nevertheless, the emphasis only on environmental nature of this definition does not give a comprehensive picture of transport sustainability as a whole system because in such case it limits those important economic aspects which can give opportunities for development of the transport sector including also environmental protection and decreasing the level of pollutants what the environment has the ability to assimilate. The consideration only on the environmental aspect and protective use of natural resources can make the transportation sector far too expensive to be competitive in the international context.

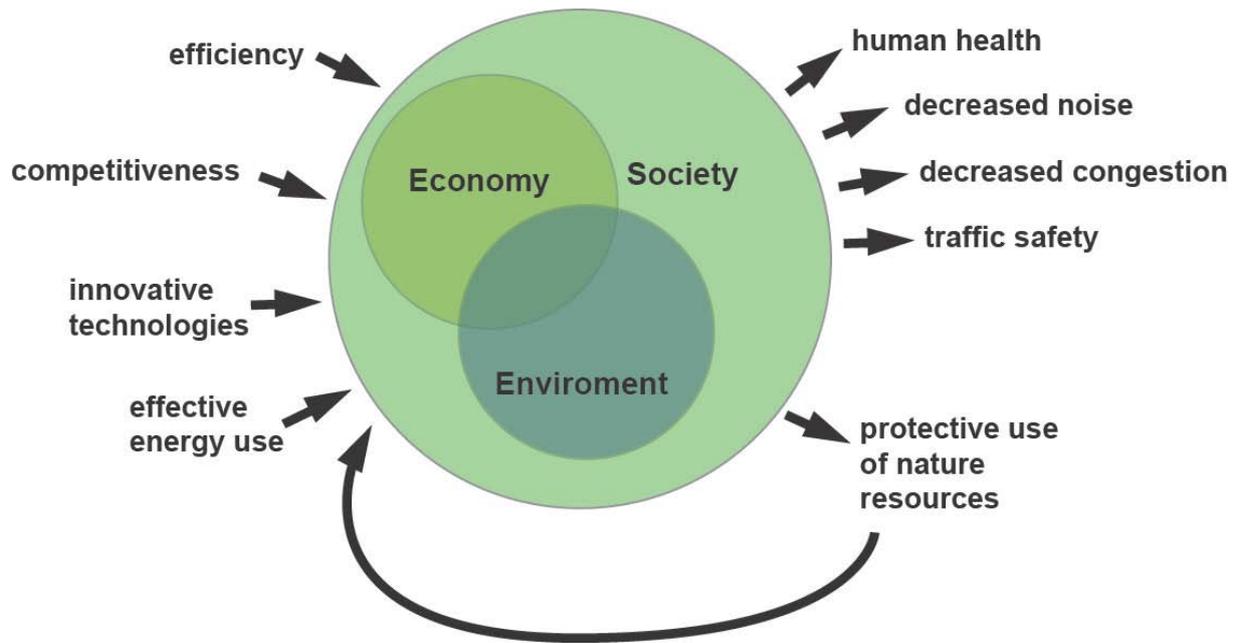
The characteristics for a sustainable transport system to be competitive include flexibility, low costs, speed, low emissions, limited use of non-renewable resources and development in use of innovative technologies.

As transport efficiency and striving for economic growth as well as more competitive solutions can be seen in a conflict with environmental protection, the challenge is to unite these 2 factors and use different trade-offs towards sustainable solutions where environment and efficiency would be interdependent and complement each other.

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<sup>46</sup>Rohacs, Simongati, p.149.

<sup>47</sup> Green L., Wegener M. (1997), Sustainable transport. Journal of transport geography. Vol.5, nr 3., p.181



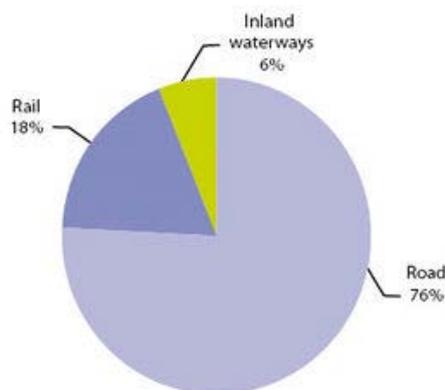
Therefore it can be considered that a sustainable transport system is such, where the economic efficiency (influenced by low costs, effective use of transport modes, competitiveness, use of innovative technologies etc.) and environmental protection (influenced by efficient and protective use of natural resources – mostly renewable but also limited use of non-renewable) complement each other or an acceptable balance between them is found; together they influence positively the social dimension – human health, decreased noise level, decreased congestion as well as traffic safety.

### 3. European Transport System

European freight transport grows continuously, particularly in those modes which are considered as less environmentally friendly – road and air. In 2007 freight transport activities amounted to 4228 billion tonnes/km. The most increase in 10 years time period has been in road transport from approx 1380 to 1860 billion tonnes/km and it has been also the predominant transport mode followed by sea and rail modes,<sup>48</sup> which shows that road has kept its leading position as the most chosen transport way due to its flexibility, relatively low costs and developed infrastructure.

In 2008, the modal share of road transport accounted for 76 % of the total EU freight transport and it has continued to grow if compared in 8 years period by 2%.<sup>49</sup> The reasons for this growth include the road flexibility corresponding with the increasing importance of ‘door-to-door’ and ‘just-in-time’ transportation services, contributing to the strong growth of road transport.<sup>50</sup> In comparison, rail transport has fallen from 20 % of the total EU freight transport in 2000 to 18 % in 2008 and there are only few member states where railway transport has accounted for larger share than roads.<sup>51</sup> Concerns regarding this transport mode include the reliability and flexibility, the available capacity, the information management as well as the average speed.<sup>52</sup> The statistical data for the modal split and transport volumes still shows the tendency to be much more favourable for road transport.<sup>53</sup>

#### 1. Transport modes in the EU (2011)



NB: Eurostat estimates.  
source: Eurostat statistics 2011

Between 2001- 2007, in spite of the investments in infrastructure in railway and ports to promote environmentally friendlier transport modes, it can be seen that the investments in

<sup>48</sup>EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010;

<http://www.europarl.europa.eu/activities/committees/studies/download.do?language=en&file=30411> .p. 26

<sup>49</sup> EC, Eurostat information, sustainable development: transport,

[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Sustainable\\_development\\_-\\_Transport](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Sustainable_development_-_Transport)

<sup>50</sup> COM, Mid-term review of the EC 2001 Transport White paper; 22.06.2006, (COM(2006) 314 final),

[http://ec.europa.eu/transport/transport\\_policy\\_review/doc/com\\_2006\\_0314\\_transport\\_policy\\_review\\_en.pdf](http://ec.europa.eu/transport/transport_policy_review/doc/com_2006_0314_transport_policy_review_en.pdf)

<sup>51</sup> Eurostat pocketbook, Energy, transport and environmental indicators; 2010 [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-DK-10-001/EN/KS-DK-10-001-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-DK-10-001/EN/KS-DK-10-001-EN.PDF)

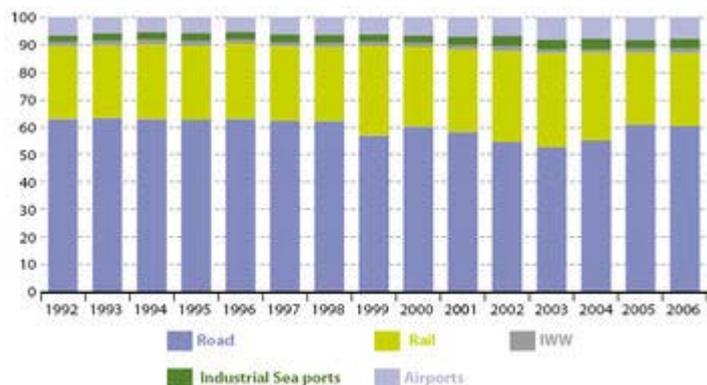
<sup>52</sup>COM. Towards a rail network giving priority to freight. 18.10.2007; (COM(2007) 608 final), [http://eur-](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0608:FIN:EN:PDF)

[lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0608:FIN:EN:PDF](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0608:FIN:EN:PDF)

<sup>53</sup> EC, Eurostat information, sustainable development: transport

road infrastructure has kept the dominance all these years and the share of the investments in rail and ports have not been increased.<sup>54</sup>

## 2. Modal share of investment in transport infrastructure, EU (%) (1992 – 2006)



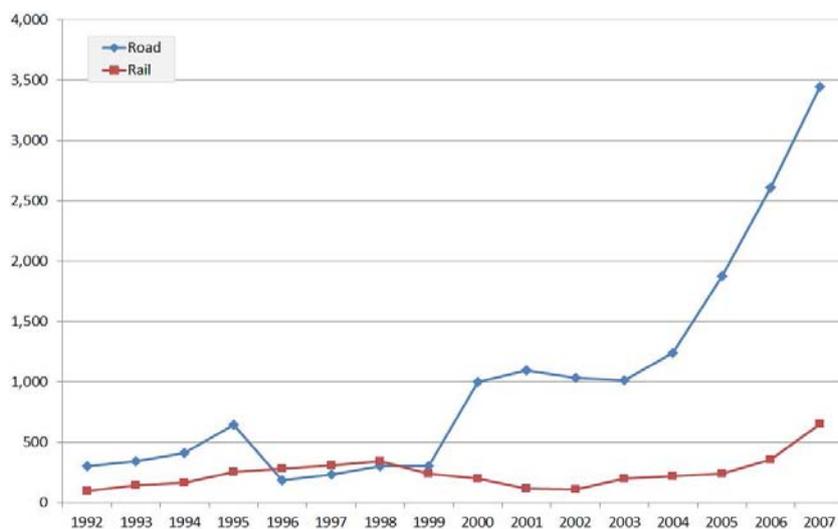
NR: Data are missing for several important countries: see the methodological notes for further information.

Source: International Transport Forum, Eurostat, 2011

This dominance can be explained by the growing demand for road network improvement. It has been influenced also by the EU enlargement when large investments were needed to develop the road infrastructure in the new memberstates in the Eastern Europe. The demand for better road infrastructure there is still high.

For example, Poland (3) has seen the development of road infrastructure as a priority since joining the EU and in 2007 investments in this transport mode has increased 5 times more than in rail infrastructure.<sup>55</sup>

## 3. Investments in road and rail infrastructure in Poland (million Euro) (2007)



Source: The Centre for European Policy Studies

<sup>54</sup> Ibid.

<sup>55</sup> Ludewig J. (2011), EU transport policy – innovation, integration and 21st century Infrastructure; study presentation, [http://www.ceps.eu/files/Ludewig\\_CER.pdf](http://www.ceps.eu/files/Ludewig_CER.pdf)

Regarding the safety aspect, there has been a decrease in road accident fatalities with 21 %. However, if comparing with the objective to cut road fatalities to a half until 2010 the target is still quite distant and there are not enough improvements to reach it.<sup>56</sup>

#### 4. Greenhouse gas emissions from transport (1990- 2008)

### Greenhouse gas emissions from transport

1 000 tonnes of CO<sub>2</sub> equivalent

#### European Union (27 countries)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
778 314	782 956	806 858	814 578	820 877	836 170	861 296	871 237	899 030	915 857
2000	2001	2002	2003	2004	2005	2006	2007	2008	
915 405	928 299	940 702	949 524	968 686	967 602	974 417	979 402	961 772	

Source: Eurostat statistics 2011

According to the Eurostat statistical data (4) in a time period of almost 20 years there has been an increasing dynamics of GHG from transport sector in the EU with the road transport keeping its dominance. Only in 2008 there can be seen a slightly fall in GHG.<sup>57</sup>

### 3.1. European road freight transport

There have been several reasons which have influenced the boost of road transport in the EU, including the liberalisation of road freight transport sector according to free market principles. The introduction of the single currency as well as harmonisation of technical standards has caused rapid development in internal trade within the EU. By the Schengen agreement and the following abolition of internal borders between most of the EU member states and later the enlargement towards Eastern and Central Europe this development has become even stronger and it has given more advantages for further boost of road transport. Regarding climate change and GHG road transport is still the leader among other transport modes in the EU, contributing with 93% CO<sub>2</sub> in comparison with railways 2%, inland navigation 1%, aviation 3% and other modes 1%.<sup>58</sup>

### 3.2. European rail freight transport

Due to such social and environmental challenges caused by road transport sector as pollution, congestion and accidents the EU has tried to find alternatives for freight transport in order to tackle these problems. Already since 2001 the EU memberstates have worked on restructuring the rail market, improving interoperability between national networks and made efforts to open freight rail sector for competition.

In comparison with road transport, in spite of no internal borders inside the EU, differences in rail infrastructure exist. For example, one of the problems is the difference in track gauges of national rail systems in the member states; another problem is signalling systems and energy

<sup>56</sup> Ibid.

<sup>57</sup> EC, Eurostat information, sustainable development: transport

<sup>58</sup> Eurostat data 2008; EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010

supply<sup>59</sup> - difference in voltages on electrified lines. Both these problems make the possibility to provide cross border freight service by rail more difficult and complicated.

Also different administrative procedures and formalities on the borders have caused a hinder towards more efficient rail freight system regarding interoperability between the EU railways and neighbouring countries.<sup>60</sup>

Hopefully, the EU negotiations on Agreement on the Accession of the EC to the Convention concerning International Carriage by Rail (COTIF)<sup>61</sup> will help to establish standardised rules and a legal foundation for international freight transport for the organisation's 43 member states, which would facilitate border formalities.

### 3.3. European waterways freight transport

It is considered that inland waterway transport and short sea shipping are modes which are able to contribute most to the sustainability of EU transport system as it is energy efficient and therefore environmentally friendly as well as the safest way to transport goods.<sup>62</sup>

As approx 90% of the EU trade with other countries passes through European ports with around 3.2 billion tonnes of freight loaded and unloaded every year, they play an important role in the EU competitiveness internally and internationally.<sup>63</sup> 40% of the internal EU trade is represented by the short sea shipping in terms of ton-km.<sup>64</sup>

Monti report considers that there is no single market for maritime transport yet in the EU, as customs' formalities for ships travelling between two European ports remain subject to custom formalities which are identical to those for international maritime transport.<sup>65</sup> Therefore the challenge what European ports are facing is different administrative procedures which increase duration of transportation time through them as shipments of goods by sea between the EU ports are aligned with shipments to other non-EU countries.<sup>66</sup> Thus, modernisation and harmonisation of these procedures would enable this transport mode to compete with road and rail or complement each other in order to provide intermodal solutions.

EU transport policy encourages the market position of other transport modes than roads due to the numerous problems - lack of capacity, extra costs and bottlenecks, mainly on the borders with non- EU memberstates, energy consumption and environmental impacts.<sup>67</sup> To mitigate these problems promotion of innovative and new political solutions are requested not only at the EU level but also at regional and national levels.

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<sup>59</sup> M.Monti Report. A new strategy for the single market at the services of Europe's economy and society. 09.05.2010

[http://ec.europa.eu/bepa/pdf/monti\\_report\\_final\\_10\\_05\\_2010\\_en.pdf](http://ec.europa.eu/bepa/pdf/monti_report_final_10_05_2010_en.pdf)

<sup>60</sup> NEA. 2010. Situation and perspectives of the Rail Market. TREN/R1/350-2008 Lot 2, Final report

[http://ec.europa.eu/transport/rail/studies/doc/2010\\_03\\_situation\\_and\\_perspectives\\_of\\_the\\_rail\\_market.pdf](http://ec.europa.eu/transport/rail/studies/doc/2010_03_situation_and_perspectives_of_the_rail_market.pdf)

<sup>61</sup> NEA, Situation and perspectives of the Rail Market

<sup>62</sup> Danklefsen N. Inland waterway transport, intermodality and logistics. 2008, [http://www.europarl.europa.eu/ftu/pdf/en/FTU\\_4.6.10.pdf](http://www.europarl.europa.eu/ftu/pdf/en/FTU_4.6.10.pdf) and Rohacs, Simongati, p.28

<sup>63</sup> EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010, p.28

<sup>64</sup> Maritime transport of goods and passengers 1997-2007; Eurostat 6/2009; [http://epp.eurostat.ec.europa.eu/cache/ITY\\_OFFPUB/KS-SF-09-006/EN/KS-SF-09-006-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-09-006/EN/KS-SF-09-006-EN.PDF)

<sup>65</sup> Monti Report 2010

<sup>66</sup> EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010, p.29

<sup>67</sup> EC, Marco Polo programme, <http://ec.europa.eu/transport/marcopolo/> and Giaoutzi, Nijkamp, p.156

### 3.4. EU policy towards sustainable transport development

When looking at sustainable transport from the policy context it is important to comprehend if the transport sustainability is a political goal to be reached or a present state where the transport system is at the moment. Usually, in practice, it means that transport policy is being moved towards sustainability but the system is not yet sustainable.<sup>68</sup>

Banister et al consider that, although, the EU has its policy objectives which help to move gradually towards sustainable transport the economic and social issues have become more important than environmental dominance. They state two problems which hamper this move – one is the reluctance of the EU decision makers to impose common pricing strategies as well as mandatory targets on industry and the other problem is the EU willingness to lead and coordinate the political actions towards sustainable transport but at the same time not to oppose the national interests. In spite of the subsidiarity principle “*to devolve the responsibility for action to the lowest appropriate level*”, there are certain political and legislative actions required, for example, regarding the environmental issues - harmonised emissions standards and taxation on fuel, which have to be taken at the EU level.<sup>69</sup>

As stated in the EC White paper “European transport policy for 2010: time to decide” the objective for sustainable transport systems in the EU is to meet society’s economic, social and environmental needs. Such transport systems would be effective to have significant impact on economic growth and competitiveness, social development and the environment in Europe with minimised undesirable impacts according to the revised Lisbon Strategy for jobs and growth as well as to the revised Sustainable Development Strategy (SDS).<sup>70</sup>

In spite of the target to decouple transport volumes from economic growth regarding the aim to reduce environmental impacts and reduce transport GHG emissions, in 2009, reviewing the development of the SDS, it has been admitted that the EU freight transport has grown faster than GDP and energy consumption and GHG emissions still continue to rise.<sup>71</sup>

Still, the EU during these years have adopted several policy documents to reduce GHG emissions for example by promoting renewable energy consumption by binding sustainability criteria for biofuels included in the Renewable Energy Directive and the Directive on the promotion of clean and energy-efficient road transport vehicles, as well as the greening of transport and the internalisation of external charges.<sup>72</sup>

Regarding the maritime transport development the EU has worked on safety policy in form of the improvement of the effectiveness of existing measures to prevent accidents in seas<sup>73</sup> and a strategy for further development of the maritime transport by emphasising competitiveness of this transport mode and the whole sector while increasing its environmental performance, safety and security.<sup>74</sup>

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<sup>68</sup> Himanen V., Perrels A., Gosselin M.L. (2008), Building blocks for sustainable transport: obstacles, trends, solutions. Emerald Groups Publishing Limited, Howard House, Bingley, UK; p.4

<sup>69</sup> D. Banister, J. Pucher, M. Lee-Gosselin (2007), Making sustainable Transport Politically and Publicly; in Rietveld, P. and Stough, R., eds., Institutions and Sustainable Transport: Regulatory Reform in Advanced Economies. Cheltenham, England: Edward Elgar Publishing, p.19 and 29.

<sup>70</sup> COM. On the review of the Sustainable Development Strategy (SDS). A platform for action. 13.12.2005; (COM(2005) 658 final ), [http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005\\_0658en01.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0658en01.pdf)

<sup>71</sup> COM. Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development, 24.07.2009; (COM(2009) 400 final),

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009DC0400:EN:NOT> Review of the SDS 2006

<sup>72</sup> COM. 2009 Review of the SDS, 2009, 400 final

<sup>73</sup> 3rd maritime safety package general framework. Press release, 11.03.2009;

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/105&format=HTML&aged=0&language=en&guiLanguage=en>

<sup>74</sup> COM. Strategic goals and recommendations for the EU’s maritime transport policy until 2018; 21.01.2009; (COM(2009) 8 final), <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009DC0008:EN:HTML:NOT>

SDS has encouraged the member states together with the EU to find solutions in change from road transport to other, more environmentally friendly transport modes like rail and water transport through better connections between these transport modes not only for environment but also for possible reduction of congestion and further impact on public health (noise and air pollution, injuries and fatalities).<sup>75</sup>

Although the global environmental concern and the EU response to it by adopting different policies to decrease this external impact caused by transport, particularly by implementing different charges for transport infrastructure, vehicles etc, an argument against it is the risk of increase of transport costs which can cause further risk for undermining the competitiveness of the whole freight transport sector in the EU.

Regarding the development of freight transport in the EU the emphasis has been put particularly on the improvement of the efficiency of different transport modes and the promotion of intermodality principle. This principle would offer a better distribution of traffic towards more environmentally friendly as well as safer and more energy efficient transport modes.<sup>76</sup>

To improve the efficiency and sustainability of freight transport, the EU has established a framework – political freight transport agenda which envisages those political actions required to reach the objectives.

This agenda contains such transport policy documents as the Freight Logistics Action Plan, the Communication on a Freight-oriented Rail Network, the Communication on a European Ports Policy and the Commission staff working papers "Towards a European maritime space without barriers" and the programme "Motorways of the Sea".<sup>77</sup>

Currently also the work on legislative measures for technical standardisation, quality and simplification of different transport administrative procedures is in progress.

### 3.5. Conclusions

During the years after the adoption of SDS there have been many political actions and policy documents adopted in order to move towards sustainable transport system in the EU. Therefore it can be considered that the EU political action and willingness to develop sustainable transport is high.

However, by analysing the statistical data of transport development in ten years period as well as the three SDS documents, the real progress is still rather slow, if compared with the development of transport sector, particularly, road transport which has kept its dominance through all these years.

One of the problems for environmentally sustainable transport development is the transport costs, which can be influenced by the adoption of different restrictions and charges. These extra costs cause a risk to increase the transportation price which will have to be paid by service recipients. Therefore it can influence negatively the transportation competitiveness globally. On the other hand it can be considered as a political mechanism to steer the balance between the environment and the efficiency.

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<sup>75</sup> SDS, 2006

<sup>76</sup> COM. The EU's freight transport agenda: Boosting the efficiency, integration and sustainability of freight transport in Europe; 18.10.2007, (COM (2007) 606 final), <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0606:FIN:EN:PDF>

<sup>77</sup> COM (2007) 606

### 3.6. Intermodality

A transport corridor can be characterized by canalisation of transportation, concentration of transport volumes, intermodality and possible multimodality.<sup>78</sup>

Intermodality is seen as an important element of a corridor and it provides at least two different modes for a single origin-destination tour and it presupposes the existence of a certain transport node which allows the transfer between these two (at least) different transport modes.<sup>79</sup> Instead of a competition between different modes in a transport corridor, which can make a transport system segmented, intermodality integrates separate transport systems and enhances more effective economic performance.<sup>80</sup>

Very important factor for intermodality has been the development of technology and techniques for transferring freight between the modes. For example containers (and international standardization of them) have become one of the most important components for maritime and rail intermodal transportation as they allow easy handling between modal systems.<sup>81</sup>

The benefits of intermodality include transportation flexibility, transport costs and environmental performance.<sup>82</sup> . The development of use of intermodal containers provides the flexibility to change between the modes

Intermodal transportation offers freedom to choose the most efficient means of transport through combining rail, sea or road by the most efficient and energy efficient routes. Regarding the environmental performance, all power driven transports consume energy and cause certain pollution;<sup>83</sup> therefore the balance between the use of transport modes or those, most efficient ones can have a significant effect on air pollution, at least in comparison with the use of only the road for the whole transportation route.

Konings et al stress out 2 major elements for intermodal freight transport which hamper further development – lack of interconnectivity and interoperability in transport operations which are connected with lack of international as well as inter-organisational coordination that causes decrease in reliability, speed and costs.<sup>84</sup>

As a solution towards better intermodality regarding the short sea shipping they name the main strategic actions to be taken - the connectivity of ports with intermodal chains, the interoperability with other modes, standardisation of loading units, the use of modern ITS in short sea shipping operations and the adequacy of the port infrastructure for intermodal operations.<sup>85</sup>

Therefore it can be concluded that the work on solving these 2 elements – interconnectivity and interoperability, is crucial for further development of intermodality.

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<sup>78</sup> Giaoutzi M., Nijkamp P. (2008), Network strategies in Europe: developing the future for transport and ICT.; Ashgate Publishing Limited, Hampshire, England, p.156

<sup>79</sup> Giaoutzi, Nijkamp, p.156.

<sup>80</sup> Rodrigue et al, p.115

<sup>81</sup> Ibid.

<sup>82</sup> Ibid.

<sup>83</sup> Lowe D. (2005), Intermodal freight transport. Oxford: Elsevier B.H, p.118

<sup>84</sup> Konings R. Nijkamp P., Priemus H. (2008), The future of intermodal freight transport: operations, design and policy. Edward Elgar, Cheltenham, UK, p.2

<sup>85</sup> Konings et al, p.290

### 3.6.1. EU transport policy towards better intermodality

EU transport policy encourages the market position of other transport modes than roads due to the numerous problems - lack of capacity, extra costs and bottlenecks, mainly on the borders with non- EU memberstates, energy consumption and environmental impacts.<sup>86</sup> To mitigate these problems the promotion of innovative and new political solutions are requested not only at regional and national levels but particularly at the EU level.

Besides the 2 previously mentioned obstacles hampering well functioning intermodality and multimodality in the EU there has been the absence of a single transport document and a single liability system,<sup>87</sup> because at present different transport modes require different documentation which increases the administrative time for freights changes between modes.

A number of measures and instruments supporting the EU transport policy are being implemented in order to improve efficiency and environmental performance in the freight transport sector as well as to promote intermodality.

**Railway.** The freight railway liberalisation in the EU is one of the essential measures by which it is intended to change the direct state monopoly over national railway towards more opened and integrated railway policy. For a successful liberalisation process and competitive new market-based structures for rail service provision very important condition is interoperability.<sup>88</sup>

Regarding previously mentioned challenges of interoperability for European rail, measures to ensure the interoperability of the transport networks, particularly the technical standardisation of railway systems, requested a political action. It resulted in April 2001 by the Directive 2001/16<sup>89</sup> on the interoperability of conventional rail operations dealing with the technical specifications for interoperability including common European standards where the infrastructure, fixed equipment and logistics systems where the critical elements. The work on common standards focused particularly on control-command and signalling issues, traffic operation and management, freight wagons and noise pollution.<sup>90</sup>

Due to the EU enlargement in 2004 as well as the integration of environmental and sustainable development concerns into the EU transport policy including requirement to adjust the balance between the transport modes, new railway interoperability Directive 2008/57 was adopted in June 2008 repealing the previous ones. The new directive deals with the common conditions for the design, construction, upgrading, renewal, operation and maintenance of the parts of the railway system as well as the professional qualifications and health and safety conditions of the staff who contribute to its operation and maintenance.<sup>91</sup>

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<sup>86</sup> EC transport, <http://ec.europa.eu/transport/marcopolo/>, Giaoutzi, Nijkamp, p.156

<sup>87</sup> Monti report. 2010

<sup>88</sup> Konings et al, p.342

<sup>89</sup> Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the conventional rail system; 20.04.2001, Official Journal of the European Communities

<sup>90</sup> Summaries of EU legislation. Interoperability of the conventional rail system; Directive 2001/16/EC;

[http://europa.eu/legislation\\_summaries/internal\\_market/single\\_market\\_for\\_goods/technical\\_harmonisation/124229\\_en.htm](http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/technical_harmonisation/124229_en.htm)

<sup>91</sup> Directive 2008/57/EC of the EU parliament and of the Council. 17.06.2008; on the interoperability of the rail system within the Community; <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:191:0001:0045:EN:PDF> and Directive 2001/16/EC

This directive contributes also to the reduction of the environmental impact of rail transport when establishing and operating the system already at the “design stage” and respecting the existing regulations on noise pollution.<sup>92</sup>

**Short sea shipping.** The European Commission strongly supports the short sea shipping within the EU considering it as highly efficient in terms of environmental performance and energy efficiency, comparatively low external costs, low infrastructure costs as well as with the potential to solve a part of road congestion problems. Therefore the promotion of this mode could contribute to meet the goals towards European sustainable transport policy.<sup>93</sup>

At the same time the European Commission admits that there are several weaknesses for optimal development of this mode, including lack of integration of individual transport acts in the *door-to-door* supply chain, complex administrative procedures and not enough port efficiency as well as good hinterland accessibility. In order to solve these obstacles since 2003 the European Commission has worked on different legislative, operational and technical initiatives to develop the short sea shipping and integrate it into the EU intermodal transport policy planning.<sup>94</sup>

The initiatives of particular interest regarding intermodality are:

- *Motorways of the Sea* programme, which promotes short sea shipping as the modal shift from road by quality of services and infrastructure in ports and hinterlands connections, and efficient administrative procedures;<sup>95</sup>

This programme has been established with an objective - freight flow concentration on sea-based logistical routes which would reduce road congestion due to modal shift and improve cohesion through better access to peripheral regions.<sup>96</sup> Currently there are 4 maritime corridors designed and one of them is *Motorway of the Baltic Sea* which links the member states of the Baltic Sea with other central and western member states and includes the route through the Baltic and Northern seas.<sup>97</sup>

- The concept of European maritime transport space without barriers<sup>98</sup> which suggests the facilitation of customs procedures with the minimum for ships involved in the trade and sailing between European ports within the EU and the establishment of paperless administrative customs procedures where electronic messages will replace the earlier paper procedure relating to the transport of goods under the single administrative document;<sup>99</sup>

As the result, from the year 2013 the deployment of e-maritime services intends to start providing advanced and interoperable communication systems for business and administration applications.<sup>100</sup>

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<sup>92</sup> Directive 2008/57/EC

<sup>93</sup> COM. Maritime transport. Short Sea Shipping. [http://ec.europa.eu/transport/maritime/short\\_sea\\_shipping/short\\_sea\\_shipping\\_en.htm](http://ec.europa.eu/transport/maritime/short_sea_shipping/short_sea_shipping_en.htm)

<sup>94</sup> COM - Programme for the Promotion of Short Sea Shipping; (COM/2003/0155 final), [http://eur-lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!DocNumber&lg=en&type\\_doc=COMfinal&an\\_doc=2003&nu\\_doc=155](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2003&nu_doc=155)

<sup>95</sup> COM/2003/0155

<sup>96</sup> Decision No 884/2004/EC of the European Parliament and of the Council of 29 April 2004 amending Decision No 1692/96/EC on Community guidelines for the development of the trans-European transport network

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:167:0001:0038:EN:PDF>

<sup>97</sup> EC. Maritime transport. Motorways of the Sea programme. [http://ec.europa.eu/transport/maritime/motorways\\_sea/motorways\\_sea\\_en.htm](http://ec.europa.eu/transport/maritime/motorways_sea/motorways_sea_en.htm)

<sup>98</sup> COM. Communication and action plan with a view to establishing a European maritime transport space without barriers, 21.01.2009, (COM/2009/11 final) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52009DC0010:EN:HTML:NOT>

<sup>99</sup> COM/2003/0155

<sup>100</sup> COM/2003/0155

### **3.6.2. Conclusion**

It can be concluded that intermodality contributes not only for the efficiency and lower transportation costs but, by adapting different available transportation modes, it is possible to decrease the environmental impact and congestion. The main factor here is the different EU transport policy initiatives and the support programmes which envisage the legal and political framework for promoting intermodality as well as to facilitate financially infrastructure development for better efficiency and connectivity. Although the European Commission had adopted several essential regulations towards the freight rail liberalisation, the promotion of the short sea shipping as well as there is work in progress on the e-maritime system with a single transport document, it will take years until it will start reflecting at the implementation level and results in the transportation sector in terms of better efficiency, less environment impact etc.

## 4. Concept of transport corridors

There can be different views to see and characterize a transport corridor as it depends on the context in which the corridor is being analysed. It can be seen as a “*broad geographical band that follows a general directional flow connecting major sources of trips that may contain a number of streets, highways, transit routes, rail lines or air pats alignments.*”<sup>101</sup> This definition shows the transport corridor as purely an infrastructure axis which serves transport activities. Here a corridor can be also defined in terms of “traffic engineering” as it is used when developing or improving connected infrastructure modalities on a particular route.<sup>102</sup>

Another view how to see a transport corridor is the spatial approach which defines a transport corridor as “*a geographic area between two points, linking multiple centres, and moving people and freight*”; this definition includes both the transport infrastructure as well as the existing and potential development that surrounds it.<sup>103</sup> A more complex view is to see the corridor as “*a connection-axis, characterized by interaction between nodes along the corridor.*”<sup>104</sup> Here the emphasis is not only on the corridor itself but the connection between it and the nodes along the corridor developing the spatial interaction between them.

If assumed that the main driving force of a corridor is the urban centres along it, then the growth of these centres would influence growth in urban regions and these processes will further increase the interaction along the corridors.<sup>105</sup> From this point of view the corridor can be seen also as “*an economic development axis*” showing the connection between opportunities for economic development and the corridor related to it as here it can be assumed that the spatial results of functional economic activities are determined by the infrastructure network.<sup>106</sup>

When referred to the transport corridor in this thesis, it is analysed by considering these different dimensions of the definition.

### 4.1. Pan-European transport corridors

Due to the growing international traffic and necessary connections between the EU and neighbouring countries there was an expanding need for planning of more effective and accessible transport network. The idea of transport corridors as further development of TEN-T infrastructure and traffic crossings of Europe became more actual at the beginning of 1990-s due to the changing political and economic situation in the Eastern Europe and the collapse of the USSR.

Within the Trans-European Network concept implemented in the Maastricht Treaty the EU adopted 30 priority road and rail corridors’ projects in the EU which will be completed until 2020.<sup>107</sup> Pan-European corridors’ concept was established at the European conference of the transport ministers in 1994, Crete, where 10 priority Pan-European links with the Eastern and

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<sup>101</sup> Rodrigue et al, p.258

<sup>102</sup> Priemus H, Zonneveld V. (2003), What are corridors and what are the issues? Introduction to special issue: the governance of corridors. Journal of Transport Geography 11, p173

<sup>103</sup> Douma F, Kriz K. A. (2003), Transportation corridor planning: a model and case studies, <http://www.hhh.umn.edu/img/assets/8460/CBPTRBpaperFinalr2.pdf>

<sup>104</sup> Nilsson J.E., Florkowski S. (2007), Regional Dynamics in the East-West Transnational Transport Corridor. EWTC report.

<sup>105</sup> Nilsson, Florkowski 2007

<sup>106</sup> Priemus, Zonneveld, p.173

<sup>107</sup> Emerson M., Checchi A., Fujiwara N., Gavrilis G. (2009), Synergies Vs. Spheres of Influence in the Pan-European Space, p.34

Central Europe as well as transport areas were defined in order to expand trans-European network, to develop infrastructure and multimodal routes between Western and Eastern Europe as well as to improve European standards on the links towards new attractive markets.<sup>108</sup>

Regarding the economic and political development in the EU after the eastern and central countries' accession to the EU in 2004 it can be seen that these transport corridors have more benefits as just being infrastructure routes to complete the network and link neighbouring countries<sup>109</sup> outside the EU. Although the main focus of the TEN-T policy has been on strengthening the links across the EU instead of improving the accessibility of the new memberstates as lagging regions, the investments through the two EU funds (ERDF and Cohesion Fund) have contributed to enhance the level of connectivity between the 'old' and 'new' memberstates, within regions and also between regional networks.<sup>110</sup> It has stimulated the economic performance of the eastern and central regions resulting in better cohesion and economic integration in the EU.

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<sup>108</sup> Giaoutzi, Nijkamp, p.153

<sup>109</sup> Giaoutzi, Nijkamp, p.154

<sup>110</sup> EC report. Investing in Europe's future. Fifth report on economic, social and territorial cohesion. November 2010; [http://ec.europa.eu/regional\\_policy/sources/docoffic/official/reports/cohesion5/pdf/5cr\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docoffic/official/reports/cohesion5/pdf/5cr_en.pdf)

## 5. Green Transport Corridors

### 5.1. The European concept

Green transport corridors is an integrated freight transport concept which envisages different transport modes - road, rail, short sea shipping as well as inland waterways to complement each other in order to enable environmentally friendly alternatives for long-distance transport.<sup>111</sup> These types of transport corridors are characterised by low impacts on the human and natural environment.<sup>112</sup> One of the essential requirements for attaining this is advanced ITS technologies;<sup>113</sup> such corridors would have equipment of transshipment facilities at strategic locations which will have supply points for bio fuels or other forms of green propulsion.<sup>114</sup>

Theoretically this concept is a successful combination of infrastructure and transport operations which are in line with environmental and economic demands. As green corridors are relatively a new concept, different criteria are being mentioned, but the main focus is on long-term efficiency, environmental sustainability and energy efficiency.<sup>115</sup>

One of the core objectives for the freight transport logistics industry by reaching efficiency and growth in the longer perspective, outlined in the EU documents, is to minimise external impacts caused by transport.<sup>116</sup> Therefore the green corridors concept also addresses environmental impacts like air, soil and water pollution, and noise which can be seen as both – an environmental as well as social problem – impact on human health and well-being. Other social aspects addressed include transport security and reduction of congestion.

The social dimension can also be seen in the principle of accessibility requiring fair and non-discriminatory access to these corridors, trans-shipment and a market for terminal operation for operators and customers of these facilities as a requirement for co-modality.<sup>117</sup>

### 5.2. Development of the concept green corridors in the EU

In order to develop new effective technologies – navigation, logistic chains in sustainable transport systems there have been more and more discussions about such public policies which would enable optimal use of intermodality which would meet environmental needs, increase security and would be competitive.

Therefore in 2006 European Commission in a review of the EC (2001) White paper of European transport policy stated a need to develop a framework strategy for transport logistics in order to meet the objective of intelligent logistics, to promote standardisation and interoperability across modes as well as to attract investments for trans-shipment hubs.<sup>118</sup>

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<sup>111</sup> COM. Freight Transport Logistics Action Plan, 18.10.2007; (COM(2007) 607 final), <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52007DC0607:EN:NOT>

<sup>112</sup> COM(2007) 606

<sup>113</sup> COM, Action Plan for the Deployment of Intelligent Transport Systems in Europe; 16.12.2008; (COM(2008) 886 final), <http://eurlex.europa.eu/Notice.do?mode=dbl&lng1=lv.en&lang=&lng2=bg.cs.da.de.el.en.es.et.fi.fr.hu.it.lt.lv.mt.nl.pl.pt.ro.sk.sl.sv.&val=485276:cs&page=&hwords=null>

<sup>114</sup> EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010, p.50

<sup>115</sup> Jüriado, 2009 and COM(2007) 607

<sup>116</sup> COM(2007) 607

<sup>117</sup> COM(2007) 607

<sup>118</sup> COM(2006) 314

In 2007 the concept 'green corridors' was mentioned for the first time in EU public documents. European Commission's Freight Transport Logistics Action Plan, which is one of the transport policy initiatives to improve the efficiency and sustainability of freight transport in the EU, stated the concept as one of the 6 prioritized areas<sup>119</sup> by characterizing it as an integrated transport concept which could "be used to experiment with environmentally-friendly, innovative transport units, and with advanced ITS applications".<sup>120</sup> Two environmentally friendlier transport modes - rail and waterborne, are stated as essential components of these green corridors.<sup>121</sup>

The Freight Logistics Action Plan proposed several initiatives in order to develop the concept further: - to reinforce green corridors in the TEN-T and *Marco Polo* programme priorities by 2010;

- to develop a freight-oriented rail network by 2012;

- to promote the establishment and recognition of *Motorways of the Sea* by 2008; and

- to implement the NAIADES programme.<sup>122123</sup>

In 2009 Green paper on review of TEN admits that co-modal transport chains support the EU economic growth in a sustainable way by making freight transport more efficient economically as well as environmentally. By improving and developing the infrastructure basis in terms of intermodal terminals, ITS, and by increasing the capacity of the nodes it would be possible to use the potential of green corridors which would allow a strengthening of the environmental and innovative dimensions.<sup>124</sup>

### 5.3. Co-modality as objective of the concept

The Freight Logistics Actions Plan recommends co-modality as part of the solution towards the aim of the green corridors concept.

The term co-modality differs from the previously mentioned term intermodality. While the latest concept consists of at least two transport modes, co-modality, according to the European Commission, means 'use of different modes on their own and in combination' to result in "an optimal and sustainable utilisation of resources".<sup>125</sup>

The main difference between these two approaches is in the change of focus from the transfer of goods from road to other modes towards the total efficiency of the transport sector.<sup>126</sup>

As an environmentally friendlier alternative, different transport modes within the corridor has the potential to contribute in mitigating external impacts of transport– noise, air pollution; innovative technologies including ITS can further contribute to facilitating congestion relief, enhance security and make the transport flow more effective and faster. One very important factor in developing such corridor and pushing forwards an intermodal transport model is to increase the attractiveness of such a model as well as to reduce total logistics costs because

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<sup>119</sup> COM(2007) 607

<sup>120</sup> COM(2007) 607

<sup>121</sup> COM(2007) 606

<sup>122</sup> NAIADES programme relates to inland waterway transport.

<sup>123</sup> COM(2007) 607

<sup>124</sup> COM(2009) 44

<sup>125</sup> COM. Keep Europe moving - Sustainable mobility for our continent - Mid-term review of the European Commission's 2001 Transport White paper, 22.06.2006; (COM/2006/0314 final), [http://eur-lex.europa.eu/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!DocNumber&lg=en&type\\_doc=COMfinal&an\\_doc=2006&nu\\_doc=314](http://eur-lex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexplus!prod!DocNumber&lg=en&type_doc=COMfinal&an_doc=2006&nu_doc=314)

<sup>126</sup> Gustafsson I. (2008), Interaction infrastructure. a holistic approach to support co-modality for freight, PhD thesis, BTH, p.46 [http://www.bth.se/fou/forskinfornsf/all/e2b0aad6ae4c30f8c12573d8003b5b62/\\$file/Gustafsson\\_diss.pdf](http://www.bth.se/fou/forskinfornsf/all/e2b0aad6ae4c30f8c12573d8003b5b62/$file/Gustafsson_diss.pdf)

then such model would be competitive and that would facilitate further use of environmentally friendly transport modes.<sup>127</sup>

#### **5.4. Innovative technologies and ITS**

The European term "Intelligent Transport Systems" means systems of information and communication technologies which will provide innovative services to different transport modes and traffic management. Such systems, by integrating telecommunications, information and electronics technologies with transport engineering, would enable more coordinated and safer use of transport networks due to better and more effective information supply – by planning, designing, operating, managing these transport systems.<sup>128</sup>

In 2010 an EU directive was adopted which established a framework for coordinated and coherent deployment and use of ITS, particularly across the memberstates' borders, as well as setting out general conditions for what would apply to road transport and to interfaces with other modes of transport.<sup>129</sup> It is considered that these technologies would make a significant contribution to the improvement of environmental performance, efficiency, energy efficiency, safety and security of road transport.<sup>130</sup>

#### **5.5. Effective energy use**

One of the objectives of the green corridors concept is efficient energy use for transportation along such corridors.

In spite of the goal – decoupling the transport energy growth from GDP towards sustainable transport in the EU, the statistical findings show that the energy consumption in transport sector has grown only slightly more slowly than GDP, and it indicates that there is a continuing interdependence between them. Economic growth in the EU has exceeded growth in the energy consumption of transport from 2000 till today, but it has been evaluated as only a very minor decoupling.<sup>131</sup>

Beside the use of renewable energy, the two previously discussed elements – co-modality (through the modal shift favouring more energy efficient transport modes) and innovative technologies as well as ITS are considered to be the proper means for more efficient energy use.

#### **5.6. EU initiative - project “SuperGreen”**

In 2010 a new 3 year EU project entitled “Supporting EU freight transport logistics action Plan on green corridors issues” (“SuperGreen”) started and is supported by the European Commission in the context of the 7th Framework Programme. The purpose of this project has been to promote the development of environmentally friendly freight transport and to evaluate numerous green corridors from some representative regions and main transport routes throughout Europe as well as green technologies.<sup>132</sup>

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<sup>127</sup>EC Directorate – General for internal policies; policy department B: Structural and cohesion policies; Transport and tourism, Logistics as an instrument for tackling climate change. Study. January 2010, p.46

<sup>128</sup> Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport; <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:207:0001:0013:EN:PDF>

<sup>129</sup> Directive 2010/40/EU

<sup>130</sup> Ibid.

<sup>131</sup> EC Eurostat. data Sustainable development – Transport,

[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/Sustainable\\_development\\_-\\_Transport](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Sustainable_development_-_Transport)

<sup>132</sup> Super Green Project information, 2011, <http://www.supergreenproject.eu/project.html>

After the selection of transport corridors which will be examined as green ones, the work on definition of benchmarking indicators and methodology is in progress at present and there are five groups of key performance indicators (KPI) defined.<sup>133</sup>

*SuperGreen* sets the development of freight logistics in an environmental friendly manner as a priority, considering environmental factors as increasingly important in all the transport modes.<sup>134</sup> At the same time the project also acknowledges the importance of other elements, influencing sustainability beside the environmental dimension. As shown in the project's KPI list (Appendix, Tab. 5), there are indicators covering most of the measurable factors influencing sustainability. However, preference is given firstly to efficiency and service quality as well as environmental sustainability by CO<sub>2</sub> and NO<sub>x</sub>.

Regarding the transport policy implications of the green corridors the project examines the interaction between the relevant regulatory policy framework and its implementation level within the project. By selection of the most relevant policy initiatives and analysis of the documentation to identify their weaknesses and potentials the objective would be suggestions for the European Commission regarding the formulation and harmonisation of policies on green transport corridors.<sup>135</sup>

The key policy initiatives that have been chosen, for example, regarding such fields as freight transport logistics, freight-oriented rail network, European ports and European maritime transport, promotion of inland waterway transport etc., shows the intentions to promote co-modality as a major element of the concept for efficiency and environmental solutions.

## 5.7. Conclusion

As the European concept of green freight transport corridors is a relatively new, it has a fairly general formulation in the EU transport policy and logistics documents.

At present, while the work is in progress on developing this concept further, the official documents emphasise only two main objectives – to achieve energy efficiency and reduce environmental impact. In comparison with a sustainable transport system the concept does not cover all the aspects of sustainability and does not correspond to the same goals due to the emphasis only on these two objectives. Therefore, a sign of equality cannot be put between sustainable transport system and the concept of green transport corridors. However, it has the potential to contribute to a sustainable transport system in Europe. A green transport corridor can be seen as a part of a sustainable transport system, where the transport efficiency is in balance with the environmental performance. Indirectly, such a corridor's performance is envisaged to give positive social effects – to decrease external transport impacts like congestion and noise and increase transport safety.

It can be considered that the 'green' dimension in the concept represents those measures – transport operations along the corridors to mitigate the negative transport impact on natural and human environment with the help of innovative technologies, co-modality and efficient energy use, including alternative fuel.

The term 'corridor' explains the infrastructure and its development and improvement according to the aims of the concept to increase efficiency, quality of service as well as to reach better accessibility between logistic hubs and also regions in the EU and outside.

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<sup>133</sup> Super Green Project information

<sup>134</sup> SuperGreen project. 3rd Regional Workshop; Malmö, Sweden, March 10, 2011; Workshop material

<sup>135</sup> SuperGreen project, Newsletter nr 1, 2010, [http://www.supergreenproject.eu/docs/public/SuperGreen\\_Newsletter\\_1.pdf](http://www.supergreenproject.eu/docs/public/SuperGreen_Newsletter_1.pdf)

The general framework, launched at the European level, leaves further formulation and interpretation of the concept to the regional and national levels – different projects and bottom-up initiatives in relation to the EU transport policy.

*SuperGreen* develops the concept further by granting more sustainable elements to it, for example, when defining key performance indicators for measurement of the level of ‘greenness’ in the transport corridors. In addition to efficiency and environmental sustainability the corridors will be measured by infrastructure sufficiency – congestion and bottlenecks as well as social issues – traffic safety and noise. However, the emphasis is on the first two elements and natural environment has the preference over human environment and well-being.

As *SuperGreen* has promotion from the European Commission and one of the objectives is to deliver suggestions back to the European Commission regarding the formulation and harmonisation of policies on the green corridors concept, this project can be seen as an EC supported initiative and it has the potential to make impact on further implementation of the concept at lower levels – regional and local.

## 6. East-West Transport Corridor

The East WEST Transport Corridor (EWTC), by including several TEN-T ports, railway and road links connects the eastern and western parts of the southern BSR - Lithuania, Russia (Kaliningrad) with South Sweden, Denmark and Germany.<sup>136</sup>

The corridor is a network of transport links, consisting of intermodal systems from Esbjerg in Denmark to Vilnius in Lithuania connecting two capital regions - Copenhagen and Vilnius. This corridor connects transport nodes Kaunas, Klaipeda, Karlshamn, Malmö and Esbjerg. In broader perspective it links important transport nodes and destinations in the BSR such as Kaliningrad, Gdynia-Gdansk, Gothenburg and Oslo, as well as German ports.<sup>137</sup>

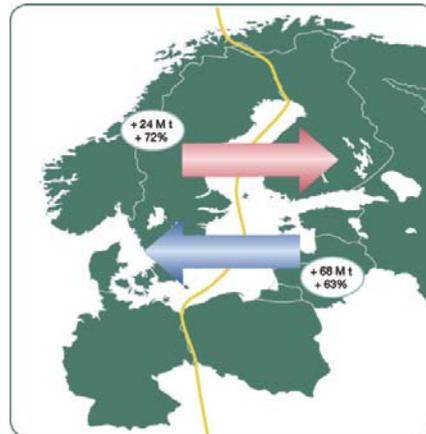
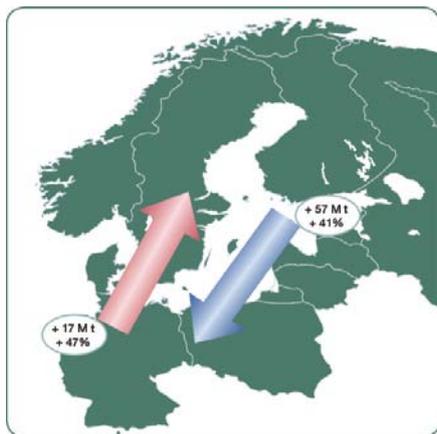
This transport corridor is also a part of the Trans-European Network, Northern Transport Axis - an EU initiative to link northern neighbouring countries with the EU by improved transport corridors. This transport axis consists of 7,000 km of roads and 7,300 km of railways including interconnections between Moscow and Finland, Estonia, Latvia, Lithuania, Kaliningrad, Poland and Germany.<sup>138</sup>

The East-West Transport Corridor is considered to have the potential to become an important east-west trade route between Russia, the Far East and the EU as in a broader perspective it links the transport systems of southern BSR with systems in the Ukraine, Belarus and Russia.

### 6.1. Freight transport sector in the Baltic Sea Region

Transport flows in the region from East to West have a tendency to increase. According to the Baltic Maritime Outlook 2006<sup>139</sup> statistics (fig. 6 and 7), the trade pattern in the region shows larger east - west trade volumes than north - south volumes mainly due to Russia's trade with western countries.<sup>140</sup>

#### 6. Trends of North-South trade corridors 2003-2020



7. Trends of East-West trade corridors 2003-2020

Source: Baltic Maritime Outlook. Goods flows and maritime infrastructure in the Baltic Sea Region. 2006

<sup>136</sup> EWTC II Project Application 2009 for the Baltic Sea Region Programme 2007-2013

<sup>137</sup> EWTC Strategy and Action Plan. Final report. December 2007; Region Blekinge

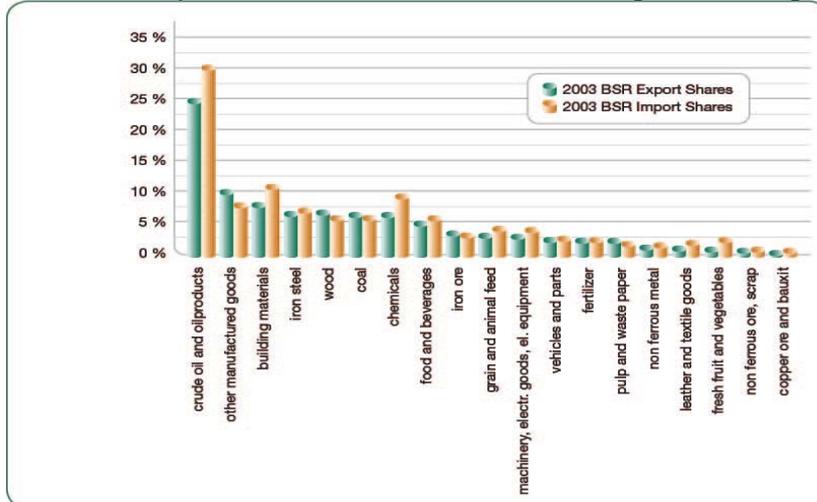
<sup>138</sup> Clemetson P. (2008), Pre-feasibility study on the Trans-Siberian Route and the relation to the EWTC. The Trans-Siberian Route in relation to the East West Transport Corridor, EWTC project, p.3

<sup>139</sup> Baltic Maritime Outlook. Goods flows and maritime infrastructure in the Baltic Sea Region. March, 2006; Risbergs Information och Media AB, Uddevalla, Sweden

<sup>140</sup> Baltic Maritime Outlook 2006

The trade volumes on the east - west corridor<sup>141</sup> are expected to increase by 24 million tonnes in the eastern direction and by 68 million tonnes in the western direction due to the trade with mainly oil and coal. Crude oil and oil products are the most dominant commodity group in the region for both - export and import, followed by such groups as manufactured goods, building materials, chemicals, wood etc.(Fig. 8) Although the biggest trade partners in the region are Russia, Germany and Poland, there is also a tendency of growth of trade between Finland, the Baltic States, Russia and Scandinavian countries. Compared with the expected growth of the regional north - south trade flows, the respective east - west trade flows show significantly stronger dynamics.<sup>142</sup>

## 8. Commodity structure (shares) of BSR total imports and exports 2003



Source: Baltic Maritime Outlook. Goods flows and maritime infrastructure in the Baltic Sea Region. 2006

Concluding the statistical data of trade volumes in the BSR, it can be seen that the east- west transportation route has the potential to grow significantly and by an increase of trade patterns there will be also a tendency for increased transport volumes in the region.

To meet this challenge the region need to have an adapted transport system with the capacity to meet the increase of transport volumes in terms of efficient infrastructure, transnational connections etc.

The transport system in the BSR has been characterized as fragmented and, in comparison with the western part – Scandinavian countries, the eastern part of the region has been more inwardly orientated towards national transport networks. Although the accession of the Baltic states and Poland to the EU has improved the situation, there are still deficiencies regarding the cross-border and transnational connections.<sup>143</sup>

For example, the growth in the volumes of east-west freight flows in and through the Baltic States and Poland from Russia and Belarus is a challenge for the road network – somewhat slow improvement in carriage capacity and change in infrastructure quality which leads to an increase of congestion on the roads.<sup>144</sup>

<sup>141</sup> between Finland, Russia, Estonia, Latvia, Lithuania, Eastern Poland and Germany, Denmark, Norway, western Sweden.

<sup>142</sup> Baltic Maritime Outlook 2006

<sup>143</sup> VASAB Committee. VASAB Long-Term Perspective for the Territorial Development of the Baltic Sea Region Towards better territorial integration of the Baltic Sea Region and its integration with other areas of Europe; Strategy, 2010; [http://www.vasab.org/conference/upload/dokumenti/vasab\\_ltp\\_final.pdf](http://www.vasab.org/conference/upload/dokumenti/vasab_ltp_final.pdf)

<sup>144</sup> VASAB Strategy 2010

As regards the rail transport, the lack of interoperability between the national rail infrastructures with different technical standards is a factor which limits freight mobility across the region.<sup>145</sup>

Nevertheless, the Baltic Sea can be seen as an asset for further transport development regarding intermodality, because it gives the chance to integrate the maritime transport network between the countries round the sea and to further develop co-modality principle.

## 6.2. Regional initiative of the concept of green corridors

### 6.2.1. Swedish initiative

Before the presidency of the EU Council (2009) Sweden, by the Swedish Logistics Forum,<sup>146</sup> started a national green corridors initiative in autumn 2008 to promote development of the concept in Sweden and to facilitate the establishment of green transport corridors in the BSR.<sup>147</sup> The objective has been to demonstrate efficient transport solutions, to promote development of Green Corridors in the EU transport policy and to establish partnership for such corridors.<sup>148</sup>

Swedish Logistics Forum has defined a green transport corridor thus:

- co-modality as an integrated logistics concept with optimal use of several transport modes;
- sustainable logistics solutions by documentary proved reduced environmental impact and with high safety and quality and high efficiency;
- a harmonised system of rules with openness for all users;
- a concentration of national and international freight traffic on long transport routes;
- strategically placed trans-shipment points;
- adapted and supportive infrastructure with innovative information systems and technology.<sup>149</sup>

As in 2007 the Freight Transport Logistics Action Plan had given only a general description of the 'green corridors' and there was no definition for it<sup>150</sup>, by the attempt to define green corridors in more concrete terms the Swedish Logistics Forum has further developed the concept. For example, in comparison with the Action Plan, which mentions the promotion of environmental sustainability in green corridors, the Swedish definition has developed this objective more specifically - that such a corridor expects logistics solutions to include documentary proved reduced environmental impact, high safety, quality as well as high efficiency.

The Forum consists of different stakeholders representing governmental transport, academic sectors and industry and it intends to develop the concept as a project linking business,

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<sup>145</sup> VASAB Strategy 2010

<sup>146</sup> Advisory board for the Swedish government and Ministry of Enterprise, Energy and Communications

<sup>147</sup> Agreement on joint green transport corridor activities 23 November, 2009; <http://www.transbaltic.eu/wp-content/uploads/2010/05/Signed-GC-Agreement3.pdf>; and Conference material. The Swedish GC initiative. Schelin E. EWTC midterm conference, April, 2011, <http://www.eastwesttc.org/media/140007/presentation%205%20-%20the%20swedish%20green%20corridor%20initiative%20-%20eva%20schelin,%20vinnova.pdf>

<sup>148</sup> Sjögren J., Towards a sustainable transport system – the Swedish example. Ministry of Enterprise, Energy and Communications Sweden. Green Corridors. TransBaltic WP3 Seminar. Stockholm 2010-02-01

<sup>149</sup> Green Corridors. Regeringskansliet. Näringsdepartament.; and Green corridors - the smartest way across Europe., <http://www.scania.com/media/feature-stories/sustainability/green-corridor.aspx>

<sup>150</sup> Sjögren J, Szydarowski W. Green Corridor Development; Presentation at the Annual Progress Conference of the EU Baltic Sea Strategy Priority Area 11, Vilnius, 7 December 2010

research and society needs.<sup>151</sup> Therefore it seems that the definition has been formed by uniting interests of all these 3 sectors.

Although the Swedish initiative sees the concept as a tool which would contribute to decreasing negative effects of freight transport on environment, health and climate it considers also the positive side of transportation affecting the society through competitiveness, economic growth and welfare.<sup>152</sup> While emphasising the environmental sustainability the transport efficiency is considered to be an important factor<sup>153</sup> to reach the growth in the sector.

This initiative has become the responsibility of three Swedish transport authorities - the Swedish Transport Administration (STA), the Swedish Maritime Administration and the Swedish Governmental Agency for Innovation Systems. The working group of these three is presently working on a proposal of relevant environmental criteria to measure the green corridors performance – to select and evaluate such projects in order to achieve economic development through efficient transport logistics as regards such elements as costs, environment, quality, traffic safety and vulnerability risks.<sup>154</sup>

According to the STA, the “green” in the concept is characterized by continuous reductions of external effects deriving from logistics solutions emphasising the attention to GHG and dealing with health impacts. On the theory basis STA divides green corridors into 3 categories of projects – national and cross-border corridors as links and nodes where projects promote collaboration between transport modes and optimal use of them including hubs; transport techniques and transport logistics solutions.<sup>155</sup>

In comparison with the *SuperGreen* project, when selecting the key performance indicators, emphasis is put on the environmental aspect by focusing on measuring emissions with negative impact on health and environment. The report sets out 4 different categories – local emissions (PM, HC), regional emissions (NOx, SOx), global emissions (GHG - CO<sub>2</sub>) and energy (fossils).<sup>156</sup>

In the selection process the regional aspect – the Baltic Sea seems to be taken into account regarding environmental concern for the sea pollution from shipping in form SOx and NOx emissions, later contributing to the eutrophication of the Baltic Sea. According to HELCOM data, shipping is among the largest contributors to NOx deposition to the Baltic Sea with the total NOx emissions from ships of more than 393 kilo tonnes NOx in 2008.<sup>157</sup>

Other environmental effects like noise, land use and impact on biodiversity are not included in the report and among the criteria due to the consideration that it would be problematic to measure and establish common values for their impact and therefore they are generally included through estimations on their external costs in the measurement approach.<sup>158</sup>

To conclude about the Swedish initiative, it can be considered that at the present stage the focus of this initiative is mainly on the environmental approach in the concept of green transport corridors without addressing specifically economic and social aspects.

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<sup>151</sup> Trafikverket report. June, 2010

<sup>152</sup> Ibid.

<sup>153</sup> Interview with B.Gustafsson. March, 2011

<sup>154</sup> Trafikverket report. June, 2010

<sup>155</sup> Ibid.

<sup>156</sup> Ibid.

<sup>157</sup> Data from HELCOM homepage: [http://www.helcom.fi/shipping/emissions/en\\_GB/emissions/](http://www.helcom.fi/shipping/emissions/en_GB/emissions/)

<sup>158</sup> Ibid.

### 6.2.2. Regional cooperation

In order to promote further the concept of green corridors in the BSR and the Nordic region, the ministry of Enterprise, Energy and Communications of Sweden has signed an agreement with 3 transnational projects in the BSR – *Scandria*, *East-West Transport Corridor II* and *TransBalt* about further cooperation regarding the green corridor concept and coordination of thematic activities regarding testing and verification of the concept.<sup>159</sup>

Each of the projects represents different tasks, goals and responsibilities in different geographical areas within the BSR, but this cooperation can facilitate faster implementation of the concept in the region by combining but not overlapping the activities as well as by sharing information for a common approach towards the concept.

The *Scandria* project is part of the initiative to develop a green and innovative Scandinavian-Adriatic transport corridor from Scandinavia and the Baltic Sea to the Adriatic Sea. Regarding the concept of green corridors this project participates by working out a strategy for a green transport corridor<sup>160</sup> including planned optimisation measures in infrastructure and logistics on time, energy and emission saving criteria and testing the feasibility of such a corridor findings and criteria together with the EWTC project.<sup>161</sup>

The *TransBaltic* project is involved in the cooperation by providing an “*umbrella framework*”, creating synergies between the other two transnational transport projects and by generalising their findings towards general transport development solutions in the BSR.<sup>162</sup>

The objective of the *TransBaltic* regarding the GC concept is to deliver a regional transport action plan addressing interoperability, connectivity and co-modality challenges in the BSR from the perspective of sustainable regional development. It will include a study on a green corridors’ model for the region and the result of the study is intended to be generalised for possible macro-regional solutions in the transport sector.<sup>163</sup> In order to facilitate the establishment of green transport corridors in the region the Swedish government’s role in this cooperation can be seen as a coordinator by creating an advisory body – a ‘Stakeholders’ Forum, consisting of political and business actors from the BSR countries to discuss transport development and the need of further harmonisation of transport policies.<sup>164</sup>

Through cooperation these projects coordinate their activities and harmonize their work with a common goal – to implement the concept by incorporating it in the BSR. It also contribute to further development of the concept as a bottom-up initiative where the solutions for green transport corridors, that have been found, can be taken from the project level to regional and EU policy level to modify and improve the transport policy if necessary.

### 6.3. Regional development in the southern BSR

The East – West transport corridor connects 9 urban regions - four in Denmark – Copenhagen, Odense, Fredricia and Esbjerg, three in Sweden – Malmö-Lund, Kristianstad and Karlskrona as well as two in Lithuania – Klaipeda and Vilnius.<sup>165</sup>

From regional development perspective, in order to increase the competitiveness of the corridor these urban regions have possibility to cooperate and exchange business ideas

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<sup>159</sup> Agreement on joint green transport corridor activities, 2009

<sup>160</sup> Interview with B.Gustafsson. March 2011

<sup>161</sup> Agreement 2009; and EWTC II Project Application 2009

<sup>162</sup> Transbaltic project application for Baltic Sea Region Programme 2007 – 2013; <http://transbaltic.eu/about/deliverables/>

<sup>163</sup> Agreement. 2009

<sup>164</sup> Agreement, 2009

<sup>165</sup> Florkowski, Nilsson, 2007

regarding the transportation sector, development of ports and hubs for more effective transport services and infrastructure.

It also gives opportunities for entrepreneurs in these regions to explore new markets as their expansion and growth has the potential further to increase transport volumes in the corridor.

Therefore there can be seen interdependence between further development of the Swedish, Danish and Lithuanian urban regions and the East-West transport corridor.<sup>166</sup> Expansion in these urban regions has the potential for the increase of transportation in the corridor; whereby investments in the corridor infrastructure can contribute to further expansion and economic growth in these regions. Closer cooperation between the western and eastern parts of the BSR can also contribute to better cohesion.

The East-West transport corridor can also be seen as an instrument of spatial integration in the southern BSR as it integrates these regions by the intentions for harmonisation of national, regional and local infrastructure development plans concerning the freight transport demands.<sup>167</sup>

As one of the main links of the TEN-T network in BSR the East-West corridor has the potential to become one of the candidates for inclusion on the TEN-T priority list.<sup>168</sup> This list, based on the proposals from the memberstates, includes priority projects of European interest with a strong contribution to the sustainable development of transport and economic efficiency of the European transport system.<sup>169</sup> As these priority projects receive EU financial and coordination support,<sup>170</sup> the willingness of the project to reach this status is obvious.

Presently, the programme 'Motorways of the Sea' holds the status of TEN-T priority projects. It includes the Baltic Sea Area Klaipeda - Karlshamn link as part of this project with an EU financial contribution of 5 240 000 Euros.<sup>171</sup>

Concluding these aspects, a more effective East-West corridor has the potential to make a contribution towards a regional transport system as well as makes an impact on regional development in terms of better territorial cohesion and economic growth as well as fewer transport barriers between the countries. All these factors can contribute seeing this corridor as an important link of TEN-T network in the BSR and economic growth which can also promote an increase in transport volumes has the potential to influence the development of the whole region.

There have been several cross-border and trans-national cooperation projects in the southern BSR in order to promote economic growth and sustainability in the region in the transport sector and prevent existing bottlenecks in the transport infrastructure which hamper further development and growth.

Presently, there are several obstacles identified in the region for the further development of efficient and sustainable intermodal transport system<sup>172</sup>:

- low quality facilities at the hubs;
- no coherent trans-national system of ports and hinterland connections;

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<sup>166</sup> Ibid.

<sup>167</sup> Sakalys A. Development of the East-West Transport Corridor in European and global context. Project workshop. 2008; [http://www.promit-project.net/UploadedFiles/Events/Pres\\_Seminar\\_7thWorkshop/Sakalys\\_East-West\\_TSR.pdf](http://www.promit-project.net/UploadedFiles/Events/Pres_Seminar_7thWorkshop/Sakalys_East-West_TSR.pdf)

<sup>168</sup> Sakalys A. Putting Green Corridors into a Global Logistics Chain - the East West Transport Corridor Association – Overview. EWTC workshop, 2011, March

<sup>169</sup> EC. TEN-T, transport infrastructure. [http://ec.europa.eu/transport/infrastructure/european\\_coordinators/european\\_coordinators\\_en.htm](http://ec.europa.eu/transport/infrastructure/european_coordinators/european_coordinators_en.htm)

<sup>170</sup> Ibid.

<sup>171</sup> Priority project 21. EC TransEuropean transport Network Executive Agency; [http://tentec.europa.eu/en/ten-t\\_projects/30\\_priority\\_projects/priority\\_project\\_21/priority\\_project\\_21.htm](http://tentec.europa.eu/en/ten-t_projects/30_priority_projects/priority_project_21/priority_project_21.htm)

<sup>172</sup> EWTC II Project Application 2009

- low level of intermodality and ITS services;
- external impacts of traffic, including growing congestion, air emissions, fatal accidents.

An important contribution to solving these problems would be for the national governments in the BSR to cooperate which would attract more investments to integrate TEN-T classified ports in the European transport system.<sup>173</sup> Therefore transnational projects within the freight transport sector would have the ambition to connect different actors involved in the sector and governmental organisations for further cooperation and problem solving.

#### 6.4. Project of the East-West Transport corridor

The first “East-West Transport Corridor” project, co-financed by the INTERREG IIB Baltic Sea 2000-2006 programme, was started in 2006 as a trans-national cooperative venture between different actors including national, regional and local authorities, private stakeholders, and academic institutions from 4 countries – Sweden, Denmark, Lithuania and Russia. The project’s long term strategy envisaged improving transport infrastructure, finding new business, logistics solutions, steering mechanisms as well as increasing cooperation between researchers in order to develop transport solutions and increase competitiveness in this sector in the southern BSR.<sup>174</sup> EWTC final report in form of an action plan for the future, regarding the integrated transport system, has considered that the links between various hubs and their integration in the corridor are the key to the strategy.<sup>175</sup>

The project’s final report brought up environmental concern and required the need for sustainable solutions to contribute to solve social and environmental problems caused by freight transport. The solution seemed to be found in the form of combining transport efficiency with environmental performance for a new long term goal for the corridor – a vision of the EWTC as a green transport corridor based on the new European concept, also promoted by the Baltic Sea Strategy.

The project East-West Transport Corridor II was started in September 2009 and will be finished in September 2012 with the total budget about 6 million EUR.<sup>176</sup> As this project is the continuation of the previous EWCT project which was successfully completed in 2007 the objective has been to use the first project’s experiences to implement parts of the EWCT Action Plan in the EWCT II.<sup>177</sup>

The aim of the current project’s strategy has been to develop a transport corridor which would be able to absorb increasing transport volumes by more environmentally friendly transport solutions.<sup>178</sup> The corridor is intended to become a good case- example for Green Corridor development in the EU regarding the EU transport policies, as a part of the EU Commissions Action Plan for the BSR as well as an integrated part of the Northern Transport Axis; meeting market demands for more efficient and environmental friendly transports.<sup>179</sup>

Among the project’s main goals there is an innovative pilot testing ground included with modern technology and information systems (IT-based “Information Broker System”) to offer more transport alternatives by which the environmental impact in the corridor could be

<sup>173</sup> Final report. Baltic Gateway project; [www.balticgateway.se](http://www.balticgateway.se)

<sup>174</sup> EWCT Final report. 2007; EWCT II project application

<sup>175</sup> EWCT Final report. 2007

<sup>176</sup> EWTC II Project Application 2009

<sup>177</sup> EWTC II Project Application 2009

<sup>178</sup> EWTC final report 2007

<sup>179</sup> A Partnership for Sustainable Transport Solutions: the Green corridor. EWTC II brochure, 2010

reduced, while there would be an increase in efficiency, traffic safety and security.<sup>180</sup> Another goal is the establishment of a "green" management system in form of a general Green Corridor Manual. This manual intends to contribute to further development of the GC concept by providing a governance model for the deployment of a green corridor,<sup>181</sup> showing the steps for technical implementation of the concept.

New business concepts for railway transports will be developed to strengthen the railway concept. In order to develop hubs as growth centres and improve access to them transport service will be improved in ports and terminals as well as the infrastructure within the corridor.<sup>182</sup>

In conclusion, it can be considered that within the Northern Transport Axis approach the project is planned to correspond not only to the goal of the European concept of green corridors - more effective and environmentally friendly logistics system but also to the goal of the Baltic Sea Strategy - to improve internal and external accessibility of the BSR as well as to stimulate economic growth in this transport corridor area and cohesion in the region.

The green aspect has influenced the development of the EWCT from a transport corridor project with a strong goal of mainly growth in transport efficiency and competitiveness by the development of hubs and nodes, improving the infrastructure, etc. towards a project, where the emphasis is put on combining the transport efficiency in the form of the promotion of co-modality and ITS technologies with the environmental performance as well as traffic safety and security issues.

#### **6.4.1. Stakeholders of the project**

International cooperation is a strong element of the project process, as the aim of the project is to develop an efficient, safe and environmentally friendly freight handling on the east-west direction in the southern Baltic region. Through this project regional stakeholders will have the chance to enhance sustainable transport planning and use advanced IT solutions.<sup>183</sup>

Around 70 stakeholders, not only from the BSR countries like Sweden, Lithuania, Germany, Russia and Denmark, but also from China and Italy (as associated partners), have joined the project.

The project can be characterised as a *triple helix* organisation where partners from business field, mostly private stakeholders, cooperate with regional and local authorities and with universities and research institutes. Private stakeholders have been involved in the project to facilitate business development in the hubs and ports along the corridor, research organisations contribute to the project by their knowledge in transport and logistics at advanced simulation studies.

To secure a multimodal approach along the whole corridor it has been essential to involve those stakeholders who are necessary for a proper coverage of the whole corridor. For example, in the eastern part of the corridor the involvement of Belarusian partners strengthen the possibility for the development of railway connections in the region outside the EU. In the western part such coverage is the MoS connection from Esbjerg to Zeebrugge as well as the

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<sup>180</sup> Ibid.

<sup>181</sup> EWTC II Project Application 2009

<sup>182</sup> EWTC II brochure 2010

<sup>183</sup> Ibid.

cross-border MoS project between Klaipeda and Karlshamn which secure a multimodal approach in the corridor.<sup>184</sup>

These project partners consist mainly of the major ports of the region (Esbjerg (as an associated partner), Karlshamn, Klaipeda etc.), private companies in transport, logistics and ITS sectors which have different levels of involvement in the project in the form of direct operation activities, seminars or participation in the advisory board. Their interest in the project mainly covers the development of business opportunities in form of improved operations and ports' facilities as well as the possibility to develop new ITS services along the corridor. An interesting point is the fact that most of the private partners involved in the business and hubs development participate in the project with their own resources.<sup>185</sup>

According to the stated interests of different stakeholders in the project programme and the expected benefits from its outcome, it is quite obvious that these stakeholders do not represent the whole corridor and the interest for better multimodality. Instead their interests emphasise the development of their own transport mode, hubs, nodes and provision of service. Their individual development interests seem to be united by this project which gives them better opportunities to promote their own business agendas. An important factor here is also the possibility of EU funding for the development of their agendas.

In order to promote multimodality, another aspect is the need to plan it in the corridor from a joint perspective, combining rail, short sea shipping and road transportation management. A good example of this is the cooperation between the ports and railway companies within the framework of the project to improve rail transportation in the form of infrastructure, railway services, the development of hubs along the corridor as well as implementation work for seamless rail cargo flows, including harmonisation measures.<sup>186</sup>

One of the challenges is the project's ambition through testing in practice EU transport policy to demonstrate the feasibility of policy driven concepts as well as to provide feedback to the Commission and national authorities on adjustments needed to be made at the policy level, including harmonisation of national transport policies regarding the transport corridor issues also including Russia and Belarus.<sup>187</sup>

An important factor for reaching this goal is the interest showed in the project results by the authorities at the national level of the countries involved and their willingness to accept recommendations from the EWTC project for the further development of transport policy issues to be implemented in the national policies is crucial.

To reach this goal the involvement of Swedish, Danish, Lithuanian and Mecklenburg/V transport ministries as associated organisations supporting the project<sup>188</sup> has been a provident step to establish the link between the project and governmental levels.

Another important factor is the need for large-scale investments to provide for the activities planned by the project and apart from different EU funding programmes it would be up to the national and regional authorities involved to support them by investments as well as possible modifications in transport development plans at national and regional levels.

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<sup>184</sup> EWTC II Project Application 2009

<sup>185</sup> Ibid.

<sup>186</sup> Ibid

<sup>187</sup> Ibid.

<sup>188</sup> Ibid.

One example of shared responsibility between the local municipalities, state authorities – Danish Road Directorate, Swedish Road Administration and Lithuanian road Administration as well as potential private stakeholders is the development of ‘intelligent’ truck parking areas and ITS information service about them and occupancy level along the corridor in order to enhance traffic flows, the EU regulations for driving and resting time of freight transport drivers as well as to promote better safety for freight and drivers on their way. The responsibility of the national road authorities is to develop basic digital information about the location of possible truck parking areas, provide road connections to these areas and together with local municipalities to provide land for creating these parking areas; private interested stakeholders would participate with investments in providing services at the parking places.<sup>189</sup>

Although there is political support at the national level from transport ministries as well as the Swedish and Lithuanian governments,<sup>190</sup> project management is mainly in hands of regional and local authorities, ports and private stakeholders. As such hindrances as delays at the borders, lack of a single freight document bottlenecks etc., are a matter of political and administrative responsibility at the national level, it can be difficult to expect progress in solving these issues without the support of national governments.

If the EWCT II project reaches the goal of being included in the EU strategy and action plan of the BSR then obviously the political support for eliminating bottlenecks for integrated transport in the region could be greater due to the political importance of the corridor.

It would also strengthen the possibility of the project to lobby the national authorities to promote the business and development interests of the project stakeholders.

#### **6.4.2. EWTC Association**

The EWTC II intention to meet this challenge has resulted in establishing a new instrument for organizing supply chains - a new management structure, to be efficient for the coordination network of involved partners along the extended corridor. An organisation - The East - West Transport Corridor Association was established in June, 2010, based on common business interests in order to make the corridor effective and competitive linking the EU countries in southern BSR with neighbouring countries Russia, Belarus and Ukraine as well as other countries further to the east - Kazakhstan, Mongolia, China, etc. This organisational body as a ‘cooperation platform’ has been planned to implement the green corridor concept in practice by promoting innovations in form of new technologies and business models, working on transportation management systems and market analysis for new logistic solutions and business plans.<sup>191</sup> This cooperation includes private stakeholders, national, regional and local authorities as well as science and research institutions.<sup>192</sup>

The establishment of the association has several potentials due to its organisational structure and transnational character, based on involvement of different stakeholders from different countries, representing public and private sectors.

As the extended corridor intends to connect links and services between the EU and different Asian regions,<sup>193</sup> the corridor’s importance can contribute to influence the initiation of different policies and regulations at both the EU level and national level in order to simplify

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<sup>189</sup> Final report. Truck Parking Strategy for the East West Transport Corridor. 2011, march.

<http://www.eastwesttc.org/media/139681/ewtc%20ii%20wp6d%20part%201%20final%20report%20ver.%201.0.pdf>

<sup>190</sup> EWTC II Project Application 2009

<sup>191</sup> Sakalys, 2011

<sup>192</sup> EWTC Association consists of 7 business associations, 16 companies, 5 public administrative institutions, 2 universities, approx. 2000 companies and institutions from 12 countries, including Belarus, Denmark, Kazakhstan, China, Lithuania, Mongolia, France, Belgium, Russia, Ukraine, Sweden and Germany. Source – Sakalys. 2011. March

<sup>193</sup> Sakalys, 2011

procedures and documentation at the borders as well as to advocate the necessity of removing those existing bottlenecks which hamper the development of the corridor's infrastructure and operations, for example, delays at the borders.

As an organisation it can also gain stronger influence in the dialogue with the European Commission, national and regional authorities as well as in cooperation with different international transportation organizations.<sup>194</sup> Therefore the EWTC Association has the characteristics not only of a cooperative but also of a lobbying body for joint interest.

Regarding the objective to develop a greener transport corridor, the intention of the association to initiate and promote implementation of common key performance indicators and standards along the corridor for greener transport in practice seems to be ambitious because of the stakeholders representing countries in the EU and outside it. The green transport corridors is the European concept; the EU competence does not stretch over to the neighbour countries and it is doubtful that the political and legal decisions connected with this concept, for example, dealing with the EU environmental restrictions could be the competence and interest of all the involved countries outside the EU.

In conclusion, it can be considered that the connection and cooperation between the project's stakeholders and public authorities at national and regional levels as well as their involvement is crucial for the implementation phase of the concept into real life.

Cooperation among stakeholders from different countries along the extended East –West transport corridor has its emphasis mostly on more efficient transport development. The regions within the EU through closer cooperation in the corridor have greater potential to strive for investments in transport infrastructure as well as to influence changes regarding the transport policy regulations and at national and the EU levels.

### **6.4.3. Green Corridor Manual**

One of the main tasks of the project is the work on a Green Corridor Manual based on development and testing of the concept along the corridor. It will consist of recommendations and guidelines to national and regional authorities in cooperation with private stakeholders implementing the concept according to the EU logistics freight agenda and the Baltic Sea Strategy. The manual intends to propose key performance indicators and steering mechanisms for environmentally friendly transport services and facilities in the corridor.<sup>195</sup> As the EWTC project is presently the only producer of such a manual,<sup>196</sup> it has a broader perspective to be used within the EU.

At present work on the manual is in progress and the main outcome is that the definition of green corridors has been worked out. The definition has the elements of the both – the basic EU definition from the EC Freight Transport Logistics Action Plan and the definition worked out by the Swedish Logistics Forum. However, based on the survey answered by the project partners as well as different experts from other Green Corridors projects, in the manual the concept is further developed in line with the Swedish definition of green transport corridors. The objective of the concept is the promotion of the development towards 'greener' transport system which could contribute further towards an integrated and sustainable transport system in the EU.<sup>197</sup>

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<sup>194</sup> Sakalys, 2011

<sup>195</sup> EWTC II Project Application 2009

<sup>196</sup> Interview with B.Gustafsson, March 2011

<sup>197</sup> EWCT Report, March 2011

The manual will have measurable indicators – key performance indicators, linked to the efficiency, cargo volumes, environment, economy etc., by which the potential green corridor will be measured in order to become ‘green’ if the indicators are better than the average transport corridors in the EU and with a continuous improvement in them over time.<sup>198</sup>

As already mentioned with the key performance indicators by the *SuperGreen* project and by the Swedish Initiative, the important factor in the establishment of the indicators is their measurability in order to have the best possible comparability between green corridors. The key factor in becoming a green transport corridor is intended to be progressive results towards more sustainable transport solutions along it. In longer time perspective it would give an opportunity to compare and evaluate green corridors by a standardized method, which would have been prepared by this project.

By the work on the management system of the green corridors there can be seen further development of the Green Corridors concept from political and legal framework at the EU level into implementation level as developers represent different environments - business, academic and public administration. It also shows the potential of the regional initiative to be taken over by the EU level and contribute to further political development of the concept in the whole EU.

#### **6.4.4. Development of ITS technologies and services**

As the time planning is considered to be one of the main elements of efficient transport performance, the development of an Information Broker System, based on innovative IT, has been envisaged to correspond with the demand from logistics providers for reliable and up-to-date information<sup>199</sup> which would increase efficiency along the corridor by the development and operation of real-time applications based on the information sources.<sup>200</sup>

The project intends to develop a digital system of information exchange, by connecting databases and physical resources – vehicles, machines, containers, which would provide information about traffic intensity and conditions, logistics services, intermodal availability, weather conditions, customs clearance, bookings, e-payment, etc., to be used by different groups of users- public and private stakeholders including logistics providers and public administration.<sup>201</sup>

Although this system has the potential to contribute to sustainable transport solutions by increasing efficiency and reducing congestion risk, it is planned on the voluntary principle providing access to external information sources on a business-to-business exchange basis for information exchange between partners of their choice, as there will be a structure supplied for only those users who wish to share the information.<sup>202</sup> Therefore it can be questionable whether this system will offer complete and precise data and describe the real picture of the transport and traffic situation along the corridor. Another aspect is the cost of using this system and how it influences the total transportation cost.

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<sup>198</sup> Ibid.

<sup>199</sup> EWTC II newsletter II. February 2010; <http://ewtc2.eu/media/108882/ewtc%20ii%20newsletter%202.pdf>

<sup>200</sup> Project news. 15 June, 2010; <http://www.eastwesttc.org/ewtc/project-news/work-on-information-broker-has-started.aspx>

<sup>201</sup> Ibid.

<sup>202</sup> Ibid.

## 6.4.5. Development of co-modality

### Railway

As one of the core elements for the implementation of the green corridor concept is co-modality, the action plan sets out the development of railway concept and provision of a high-quality rail infrastructure to correspond with freight increase due to the growing international trade<sup>203</sup> through the corridor and to mitigate the environmental impact and congestion caused by road transportation. Presently, the hindrance is the deficit in railway infrastructure and it requires investments prioritisation.<sup>204</sup> As this is mainly the competence of national rail and infrastructure authorities a jointly elaborated railway plan, as stated in the EWTC project's action plan, would contribute to further approval at the national level and it would give the opportunity to attract funding by national and EU funds towards improved infrastructure along the corridor.

The EWTC action plan<sup>205</sup> states such existing problems as custom and tariff-related issues between the EU and neighbouring countries (Russia, Belarus), inadequate capacity at the borders where cargo-transshipment is required. It intends to address those political challenges which appear because of imbalance in traffic flow and trade restrictions.<sup>206</sup>

An ambitious expectation has been stated in the action plan to connect the corridor with possible extensions towards Asia and the Far East through 3 rail routes which should be extended<sup>207</sup>:

- Trans Siberian route through Russia or the Kazakhstan route to China;
- TRASECA corridor between Klaipeda and Odessa – the VIKING train solution;
- Mercury train solution for transportation between Klaipeda/Kaliningrad and Moscow.

The reason for these routes is the shortened transportation time from the Far East in comparison with sea shipping. Another benefit would include freight reload nodes along the corridor which is considered to influence regional economies positively and create opportunities for new markets.<sup>208</sup> For example, in Lithuania public logistics centres in Vilnius and Kaunas, the two biggest cities, will be founded in the form of overland intermodal terminals in order to develop intermodal freight transport. Attractive conditions will also be created for transport and logistics companies engaged in freight related activities in the territory of the terminals. By European investment in rail infrastructure the Lithuanian part expects to encourage commercial cooperation among transport modes by considering rail freight as more cost-efficient and environmental friendly mode of transport.<sup>209</sup>

The action plan states that there are not only political problems regarding the railway system development in several countries but also organisational, technical and legal challenges which would be met by implementing this plan. For example, the long waiting times on the EU external border with Belarus<sup>210</sup> decrease the speed of freight transportation by rail.

Lithuania is considered to have the best potential in meeting the capacity of rail freight growth in the corridor as the port of Klaipeda is well integrated in the long distance railway network on the continent.<sup>211</sup> Southern Sweden and Denmark still have a limited share of freight

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<sup>203</sup> EWTC Final report. 2007

<sup>204</sup> Ibid.

<sup>205</sup> EWTC project's final report (2007) includes Strategy and Action Plan.

<sup>206</sup> Ibid.

<sup>207</sup> Ibid..

<sup>208</sup> Ibid.

<sup>209</sup> JSC Lithuanian Railways home page information; [www.litrail.lt](http://www.litrail.lt)

<sup>210</sup> Interview with B.Gustaffson

<sup>211</sup> EWTC Final report. 2007

transport capacity for railways and the work connecting the ports with railway network is still in progress.

For example, in Denmark the factors which hinder the development of rail freight transport include relatively short railway distances and industry declining in comparison with services industry as well as the insufficient efficiency level of co-modal terminals which improvement could allow better use of the modal shift. To improve the rail infrastructure there are investments of amount of 50 billion DKK planned for the railway sector for 10 years period starting from 2010 with the aim of promoting this transport mode and also strengthening the co-modal terminals.<sup>212</sup>

Also, regarding the challenge with gauge width, which is considered to be one of the problems which hamper transportation between the western and eastern EU member states as well as neighbouring countries, Lithuania has adjusted its track gauge for different connections with other countries. It has 3 kinds of widths of the track gauge - 1520 mm and 1435, aligned from Russia, with an automatic device for changing the gauge width installed, and 1435 mm gauge line which has been constructed with the connection to Poland.<sup>213</sup> There is still concern about an operational incompatibility between neighbouring railway systems between Lithuania and Belarus,<sup>214</sup> an improvement which is necessary for developing the extended transport corridor outside the EU territory.

### **Short sea shipping**

The final report of the first EWCT project discusses the need to develop the maritime transport corridor in the Baltic Sea towards sustainability and in order to reach it the emphasis has been put mostly on the necessity to develop and increase the effectiveness in the hubs and hinterlands connections.<sup>215</sup>

The Action Plan names the Motorways of the Seas project proposal for Klaipeda- Karlshamn regarding the EWCT and also encourages other ports, for example, Esbjerg port, to submit a proposal in order to be approved for MoS funding. By that there would be 3 regional ports receiving funding from this programme and that will provide more competitive sea hubs connected with regional ports and the economic regions in their hinterlands.<sup>216</sup>

As the project involving the ports of Karlshamn and Klaipeda was approved in 2008 to receive EU co-financing it proves the benefit of the implementation of the MoS concept in the EWCT being one of the 4 MoS defined corridors by Priority Project 21 of the TEN-T guidelines,<sup>217</sup> because it has helped to improve infrastructure in these two ports and further support intermodality to contribute to a more efficient as well as environmentally friendlier corridor.

For example, the port of Karlshamn has been awarded investments for new rail yard, new intermodal terminal as well as support for the development of a new rail line between Olofström and Karlshamn,<sup>218</sup> while the port of Klaipeda uses the financing for installing a hydraulic Ro-Ro ferry ramp.<sup>219</sup>

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<sup>212</sup> Selsmark N., Danish Transport Authority. How can we increase rail transport in the corridor? Obstacles and opportunities. EWTC Midterm Conference; March 2011

<sup>213</sup> Network statement for 2011-2012. Informative publication of the public railway infrastructure. 2010; [www.litrail.lt](http://www.litrail.lt)

<sup>214</sup> EWTC Final Report, 2007

<sup>215</sup> Ibid.

<sup>216</sup> Ibid.

<sup>217</sup> Swedish-Lithuanian Motorways of the Sea Project approved for EU co-financing. Pressmeddelande. 18.11.2008; <http://www.sweden.gov.se/sb/d/119/a/115947>

<sup>218</sup> Port of Karlshamn. Motorways of the Sea Programme, <http://www.karlshamnshamn.se/?info=3436ff7>

<sup>219</sup> Port of Klaipeda. Project news. EU Commission approved the financing of the project Motorways of the Seas Klaipeda–Karlshamn; [http://www.portofklaipeda.lt/en.php/news/news/eu\\_commission\\_approved\\_the\\_financing\\_of\\_the\\_project\\_motorways\\_of\\_the\\_seas\\_klaipedakarlshamn/9916;year:2009;month:9](http://www.portofklaipeda.lt/en.php/news/news/eu_commission_approved_the_financing_of_the_project_motorways_of_the_seas_klaipedakarlshamn/9916;year:2009;month:9)

These improvements are intended to have a positive impact not only on the effectiveness and capacity increased of the ports but also the potential for the attractiveness of the whole BSR for transport service providers to use waterborne transport for their freights and that could help to remove the freight dominance from the road.

### **Road transportation**

Although road transportation mode has been considered as one of less environmentally-adapted modes, it is a part of almost every transport chain due to its flexibility, low costs, and the *door-to-door* and *last mile delivery* principles.

As there are intentions to modernize this transport mode towards ‘greener’ solutions by new technologies, by using alternative fuels etc. it is not possible to deny its present and future role of importance in transportation chains. Therefore the project emphasizes the optimal utilisation of each transport mode, including road, in order to be suitable and efficient regarding the principle of co-modality.

Regarding road transportation along the extended corridor one can ask a question - will it stay fragmented outside the EU territory; another question is about the longer term perspective - how the corridor will be influenced by the development of use of biofuels or other green propulsion along it as the project has stated that the East-West corridor intends to become a green – bio-fuel corridor, at least within the EU territory.

There would be a necessity to provide appropriate infrastructure which would support the biofuels supply and their use for such type of trucks. It would also require creating reliability for logistics providers to start using more environmentally friendly trucks in the corridor without the necessity for transport change to non bio trucks. The project documents do not give an answer to this question because work on potential use of biofuels is not the competence of the current project.

One of the possible measures to deal with environmental concern in increasing road transport along the corridor the EWCT action plan proposes road charging systems as a funding possibility for necessary investments as well as steering possibility of transportation flows to certain alternatives to roads.<sup>220</sup> As it is the political competence at the national and the EU levels there would be a need of better involvement of national governments and the EU institutions to make decision upon this proposal.

At the same time there can be a discussion about the necessity of such a charging system in terms of attractiveness to compete with alternative routes without such a system which could make a difference in transport costs. This approach could be discussed in a broader perspective at the EU level.

There has been an effort made to establish a harmonised EU framework for charging heavy goods vehicles<sup>221</sup> regarding road transportation in TEN-T network adopted by the ‘Eurovignette directive’ in July 2006, which has authorised member states to levy user charges, based on time or tolls, based on distance.<sup>222</sup> Due to the directive review process the European Commission’s proposal for some marginal changes in the directive would allow individual member states to charge heavy goods vehicles by integrating the external costs of road transport (including costs for environmental pollution, noise, congestion, health costs

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<sup>220</sup> EWTC Final Report, 2007

<sup>221</sup> with weight of minimum 12 tonnes till year 2012 when it will allow the EU member states to levy charges on vehicles of more than 3.5 tonnes.

<sup>222</sup> EU Press release. Review of the Directive on charging Heavy Goods Vehicles – "Eurovignette Directive"- Questions and Answers; 13.10.2010.

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/10/489&format=HTML&aged=0&language=en>

etc.) into toll prices.<sup>223</sup> Until now there have been charges only for the use of road infrastructure. The Eurovignette countries<sup>224</sup> in the BSR are Denmark and Sweden with a common electronic charging system but Lithuania has its national road tolls. Currently such countries in the southern BSR as Latvia and Estonia do not have road tolls system at all but in Poland work is in progress to establish integrated electronic network wide toll collection system to be compatible with Germany.<sup>225</sup> Regarding these differences in the region it gives freedom to logistics providers to vary their transport routes if necessary by avoiding these charges.

#### **6.4.6. Development of environmental approach in the corridor**

Environmental assessment is characterized as a procedure ensuring that the environmental implications of decisions are taken into account during the preparation and before approval or authorisation of such decisions. Therefore, such procedure is considered to provide more consistent framework in which to operate by the inclusion of this relevant information into decision making and it further contributes to more sustainable solutions.<sup>226</sup> By reporting about likely significant effects on the environment it should also identify reasonable alternatives to the proposed plan.<sup>227</sup>

In order to reach the goal of the project towards environmentally friendly transport solutions along the corridor such assessment has been essential to ensure possible impacts on the environment.

During the EWTC project the SEA has been made to estimate these impacts and it has indicated several negative issues which can have an impact on the environment – the increased road traffic, the risk of accidents on roads and in the sea; human health can be affected and degradation of landscapes can be influenced by further development of hubs and lines.<sup>228</sup> According to the SEA document it is stated that the SEA directive is not formally applicable to the project's strategy and therefore some of the steps in this assessment have not been fully carried out, for example, the strategy and SEA were the subject of public hearings in Sweden and Lithuania, but the environmental aspects were not discussed at the hearings.<sup>229</sup>

The proposed mitigating measures in order to gain significant positive impact rely mainly on the change of transport modes - from road to rail, as well as the modernisation of sea transport by increased use of environmentally friendly fuels, electrification of ports and enhanced loading.<sup>230</sup>

At the same time the Action Plan states that these measures are not only the responsibility and competence of the involved stakeholders in the project and therefore it is considered that the outcome partly depends on the project stakeholders potential “to steer future cooperation and decision-making towards environmentally better solutions” as the first step including national commitment to develop regulations for the implementation phase of the action plan. One

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<sup>223</sup> Road Charging (Eurovignette). 30.January, 2009. Euroactiv; News <http://www.euractiv.com/en/transport/road-charging-eurovignette/article-117451>

<sup>224</sup> Eurovignette treaty (between Belgium, Luxemburg, Netherlands, Denmark and Sweden) has converted the existing system for charging and controlling road user charges into the Electronic Eurovignette;  
Source: <http://ages.eu/index.jsp?sltem=216&lng=31&cnt=99>

<sup>225</sup> Data from [http://ec.europa.eu/transport/road/road\\_charging/doc/hgv\\_charging.jpg](http://ec.europa.eu/transport/road/road_charging/doc/hgv_charging.jpg)

<sup>226</sup> Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, Official Journal L 197 , 21/07/2001 P. 0030 - 0037

<sup>227</sup> EC. Strategic Environmental Assessment – SEA; Legal context, <http://ec.europa.eu/environment/eia/sea-legalcontext.htm>

<sup>228</sup> EWCT final report 2007

<sup>229</sup> Ibid.

<sup>230</sup> Ibid.

example which characterizes the need for regulation internationally is the difficulty for a modal shift in international shipping admitting the challenge to influence this area through the work of only one trade corridor.<sup>231</sup>

For the implementation of a green transport corridor the Action Plan required the development of common measures for the partners of the project regarding effective environmental consideration.<sup>232</sup> As the project consists of public and private stakeholders not only from the EU member states but also neighbouring countries it is open to discussion how efficient these common measures can be as the EU regulations regarding environment and transport are not applicable for example, in Belarus and Russia.

The Action plan proposes to develop common short term and long term environmental goals for the corridor and to specify the goals when suitable for each region.<sup>233</sup>

The specification and separation of goals for each region is a successful solution in this situation when the corridor crosses countries with different socio-economic situation and not harmonised transport systems which make it difficult otherwise to implement the same standards and measures for the common goal. Nevertheless the question of the vision of the long term perspective– a green transport corridor along the extended East-West corridor is arguable if the environmental goals differ in the involved countries.

Another proposal for a common environmental concern is a draft of ‘environmental agreement’ between the project’s stakeholders. It would be logical for the parties participating in the project to support common environmental values, therefore it would not be a problem with the implementation of this agreement among them, but the corridor will be used by many other transport users whose level of environmental interest can differ.

The answer to this could partly be a promotion of implemented ITS solutions for transport companies as well as encouragement for the industry to rely on co-modality and on advanced technology.<sup>234</sup> In this case strong promotion work and marketing would be needed to change environmentally non-friendly elements of the existing transportation model towards more friendly ones. Here the transportation costs would play an essential role as these innovations should go hand in hand with attractive and comparable logistics expenses.

## 6.5. Conclusion

Although there is the intension to see the East-West transport corridor in an extended version, connecting the EU member states and neighbouring countries as well as the southern BSR including the region of Kaliningrad (Russia), the current project mainly emphasises the development of the corridor within the 3 EU countries - Denmark, Sweden and Lithuania, leaving cooperation with Belarus and the region of Kaliningrad and other regions for a longer time perspective.

The east- west transportation route in the BSR shows the potential to grow significantly and by increase of trade patterns there is a tendency for increased transport volumes. Therefore it will be necessary to have an adapted transport system with a capacity to meet this increase in terms of efficient infrastructure and transnational connections.

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<sup>231</sup> Ibid.

<sup>232</sup> Ibid.

<sup>233</sup> Ibid.

<sup>234</sup> EWCT Final report, 2007

In spite of regional imbalances between the eastern (Lithuania) and western (Denmark and Sweden) parts of the region and also their reflection in the transportation sector, the Baltic Sea gives the chance to integrate the maritime transport network between them and to develop further intermodal transport solutions. The corridor contributes to closer cooperation between the hubs along it and it gives more opportunities for the eastern and western parts of the region to develop the transportation sector together and put the emphasis on regional transport systems instead of focusing only on national ones.

The concept of Green Corridors has been developed by national and regional initiatives. The Swedish initiative has given more detailed characteristics to the concept in the form of a definition and is working on the environmental approach of the concept.

The cooperation between the 3 regional projects regarding the coordination of thematic activities for testing and verification of the concept contributes to further implementation of the concept and acts as a bottom-up initiative in relation to the national and the EU policy levels to modify and improve the transport policy planning if necessary.

The objective of the EWTC projects has been to increase the efficiency and the competitiveness of the corridor but the environmental concern has influenced this development towards combining the transport efficiency - promotion of co-modality and ITS technologies with the environmental performance including traffic safety issues.

The work on Green Corridor Manual can be seen as further development of the Green Corridors concept from the EU level into implementation level as it is the first guideline in the EU and therefore it would show the practical testing of the concept from the regional perspective. It shows also the potential of the regional initiative to be taken over by the EU level and contribute to further political development of the concept in the whole EU.

Regarding the efficient use of energy through development of cleaner fuels and the promotion of greener propulsion, at the moment this question has been seen in a longer time perspective and the project itself does not develop actions for supply infrastructure for clean fuels. However, the cooperation with the other 2 transnational projects in the BSR regarding the implementation of the concept allows solving this important issue by dividing the concept tasks between themselves. In this particular case, the development of strategy regarding bio fuels is the responsibility of Scandria project, which can also be implemented into the EWTC.

Within the framework of the green corridors concept the project still has a strong emphasis on corridor efficiency and the necessary infrastructure development to meet higher transport volumes, the work includes the development of the hubs - ports and hinterlands. Regarding the intermodality, the ITS technologies are being developed in the form of establishing and testing Information Broker system and intelligent parking for trucks. The implementation of the digital information Broker system has the potential to contribute to higher safety and quality. These activities are expected to reduce congestion, air and noise pollution as well as increase traffic safety on roads.

More elements of the project contributing to the reductions of environmental and climate impact would be the optimal use of those transport modes which are considered to be environmentally friendly – mostly short sea shipping due to the Baltic sea and railway, mostly in the eastern part of the BSR. That is expected to contribute to the decrease of air pollution and reduction of congestion due to the modal shift from road transportation.

All these elements together along the corridor have the potential to increase the efficiency and cause less impact on the environment as well as on congestion along the corridor.

However, the mitigating measures, proposed by the project for better environmental performance rely mainly on the shift of transport modes - from road to rail and sea. Such activities as modernisation of sea transport by increased use of environmentally friendly fuels, electrification of ports and enhanced loading as well as railway infrastructure development is left for longer time perspective. Still the challenge for the shift from road to rail includes the increase of attractiveness of rail transport in the western part of the BSR and lack of competitiveness with road transportation. Without political measures at the national and the EU level it can be difficult to make a distinction.

Harmonised regulations in the form of the establishment of a single transport document, harmonised technical standards between the member states to increase interoperability, road charges etc. are the competence of the EU. Therefore without EU political decisions and regulations it will be difficult to facilitate freight administration (customs) at the ports and on the borders with the EU neighbour countries. National and regional competence include also adapted infrastructure planning which would promote co-modality.

It can be admitted that there is a gap between the overall goal of the project for a green and efficient transport corridor and the actual capability to influence all the measures to fulfil it as the required political and legal actions to remove the existing bottlenecks and modify the necessary regulations are not the project's competence. It also concerns infrastructure planning. Here the influence of the project to gain the political support to resolve hinders for integrated transport in the region is marginal.

Financial capability also plays an important role in the implementation process of the stated goals.

Therefore interdependence can be seen between the project which unites the business and development interests of the stakeholders, the willingness to attract marginal and financially strong stakeholders to the project and the stakeholders' willingness to combine their business interests to gain stronger influence to promote these interests.

The establishment of the new management structure in the form of an organisation - The East-West Transport Corridor Association which will coordinate the network of the involved stakeholders along the extended corridor, has the potential to gain stronger influence in the dialogue with the EU institutions, national and regional authorities as well as different international transportation organizations. Therefore the organisation can be characterized not only as a cooperative but also a lobbying body for joint business interests.

## **7. Discussion and conclusions**

This chapter includes the discussion and responds to the posed research questions of the thesis. The discussion contains the findings identified in the East-West transport corridor, the initiatives of the EU transport policy regarding development towards sustainable transport and synthesizes them with the theory of sustainable transport systems to answer the following research questions:

- 1) Which elements in the theory of sustainable transport can be recognized in the European concept of Green Corridors?
- 2) How is the concept implemented in the East-West Transport Corridor and what is the difference between the political concept and its implementation level in the project's documents?
- 3) To what extent does a 'greener' East-West corridor relate to sustainable transport solutions in the BSR and to the development of a sustainable transport system in the EU?

### **7.1. Which elements in the theory of sustainable transport can be recognized in the European concept of Green Corridors?**

The European concept of green freight transport corridors is a new concept and therefore presently, it offers only a general political framework by leaving further formulation and development of it to the regional and national levels including bottom-up initiatives in form of different national and transnational projects in relation to the EU transport policy.

The goal of the concept is to achieve freight transport efficiency in the EU and together with other political initiatives in the freight logistics and transportation sector it intends to improve the efficiency of freight transport and make it sustainable. Sustainability aspect in these political documents includes mitigation of climate change and others human and natural environmental impacts like air pollution and noise; it enhances transport security and safety as well as facilitation of congestion relief and better cohesion in the EU.

In the definition of green corridors the emphasis is put on transport efficiency in terms of promotion of different modes of transport – co-modality, use of innovative technologies, energy efficiency as well as environmental sustainability.

In comparison with a sustainable transport system where economic and environmental dimension is in balance and influence the social dimension, the concept of green corridors indirectly covers all the three aspects of sustainability but does not correspond to exactly the same goals, due to the emphasis on efficiency and environmental sustainability. Therefore, a sign of equality cannot be put between them. However, the direct impacts of the concept – the decrease in pollution and efficiency can influence the indirect impacts – noise and congestion; increase in traffic safety and security, regional development and cohesion.

It is not possible to measure and prove the balance between all the three major dimensions in the concept because of its present early stage. When proper measurement criteria have been worked out and different transport corridors measured then there will be an opportunity to

discuss the balance and more certain boundary between economic, social and environmental aspects.

**7.2. (a) How is the concept implemented in the East-West Transport Corridor and (b) what is the difference between the political concept and its implementation level?**

(a) In order to meet the challenge of increasing trade volumes in the BSR and the potential of the east- west transportation route to grow in transport volumes the region needs to have an adapted and efficient transport system with the capacity to meet this increase in terms of efficient infrastructure, transnational connections and developed hubs along the East-West transport corridor.

The global and regional environmental concern has required the need for sustainable solutions to contribute to solve environmental and social problems caused by the freight transport.

Therefore the aim of the EWTC II project corresponds to the both challenges - to develop the East-West transport corridor to be able to absorb increasing transport volumes by more environmentally friendly transport solutions in form of combining the transport efficiency with the environmental performance.

The effort to implement the European concept of green transport corridors into the East-West corridor is seen as the solution to reach the goal. In a longer perspective the vision of the EWTC as a green transport corridor is based on the concept.

The concept is intended to be implemented in the corridor by combining the tools for the increase of efficiency: co-modality and ITS technologies by which it is expected to reach also better environmental performance in the corridor.

The role of co-modality in the project is in better interoperability between the transport modes along the corridor, the connectivity between the ports and rail and the use of modern ITS in transport operations. Very important factor here is the adequacy of the ports and rail infrastructures for intermodal operations to increase their competitiveness with roads.

The flexibility of co-modality is the factor which ensures the efficiency and opportunities to lower transportation costs as well as it has the potential to contribute to the progress in decreasing the environmental impact and congestion by adapting different available transportation modes in the corridor.

In order to develop co-modality along the EWTC there should be a shift from optimising individual transport modes to solve their own problems towards a broader view of the transport system as a whole. Better results for co-modality can be reached by combining the interests of ports, railway companies and road administrations into a common approach.

(b) As presently the concept of green corridors has been set as one of the policy tools for sustainable transport systems in the EU without concrete criteria, it leaves quite a broad interpretation on implementation and actions for stakeholders and member states who are working with this concept. The general framework and nature of this concept leave much variations and opportunities for those who develop it further.

There are two different approaches to the concept among the EU research consortium “*SuperGreen*” and Swedish initiative – presently, the two political initiatives in the EU regarding the concept of green transport corridors.

*SuperGreen* project admits environmental factor as significantly important but links the green corridors concept with the sustainability approach dividing the emphasis between economic, environmental and social dimensions. At the present stage the Swedish Initiative sees the

concept through more environmental approach and beside the transport efficiency emphasises environmental sustainability.

The definition by the Swedish initiative of green corridors is developed further and incorporated into the manual of green transport corridors whose objective is the promotion of development towards a 'greener' transport system and could contribute towards an integrated and sustainable transport system in the EU.

The Swedish initiative has the potential to be incorporated not only in the regional and national projects but also in the BSR strategy and have further influence in the EU.

The crucial element for the implementation of the concept of green corridors is the interdependence between the 'top down' initiatives – legislative and political measures mostly at the EU level, and the 'bottom-up' initiatives – different national and regional projects as well as the response from the industry, transport service providers etc, to these measures.

The 'bottom-up' initiatives represent the interests from different environments – business (transport industry, transport service providers, ports etc.), academic (universities and research companies) and public administration (local, regional and national authorities).

The EWTC project as well as regional cooperation between the projects regarding the coordination of activities for testing and verification of the concept act as 'bottom-up' initiatives in relation to national and EU policy levels to promote necessary modifications and improvements in the transport policy planning to remove hindrances for better transport efficiency and competitiveness.

Harmonised regulations as well as technical and environmental standards between the member states to increase interoperability, interconnectivity, transport efficiency and better environmental and social performance are the competence of the EU as well as in many cases the shared competence with the member states. Therefore without their political and legislative decisions it would be difficult to facilitate necessary measures, for example, the freight administration (customs) at the ports and on the borders with the EU neighbour countries. National and regional competence also include adapted infrastructure planning which would promote co-modality.

The weaknesses of the concept implementation phase include the slow process of policy development towards tackling such politically sensitive issues, harmonized border administration and further cooperation regarding this issue between the EU and its neighbouring countries; there is still an absence of standardised administrative procedure on the borders.

International cooperation is a strong element in the implementation process in the transport corridor. By depending on the variety of involved stakeholders the project can reach a large competence sphere for developing the concept and implementing it in the East-West transport corridor. The active participation of national and regional authorities in the development of the project provides the necessary link between the interests of private and public stakeholders and the state interests for sustainable transport solutions.

The response from the transport industry, logistics providers and other stakeholders involved in the transport sector to the project's activities is another crucial element for the implementation of the concept of green corridors in the East-West corridor.

The corridor is used by different users, not necessarily involved in the project. Users' priority is efficient logistics and adequate infrastructure provided for their activities. The project's capacity is to fulfil the stated goal within the limits of its competence.

Proper division of competences between EU institutions, national governments and state authorities as well as the projects and other initiatives is therefore necessary. The transport sector has a very strong international character because of the current and necessary connections, interoperability and interconnectivity between countries. This transportation character requires a more integrated transport system in the EU instead of an emphasis on the development of national transport networks.

### **7.3. To what extent does a ‘greener’ East-West corridor relate to sustainable transport solutions in the BSR and to the development towards a sustainable transport system in the EU?**

The elements of the concept of green corridors relating to a sustainable transport system in the EU include:

- International and regional intermodal transport opportunities to encourage energy efficient transport;
- Use of ITS and innovative ‘green’ technologies;
- Further EU and national transport development policies and transport planning, improvements of administrative procedures and interoperability between the member states as well as with the neighbouring countries of the EU.

The EWTC II project is still in the early stages of developing the corridor towards better efficiency and environmental performance. Therefore it is difficult to call the East-West transport corridor ‘green’ yet but the project is intended to lay the foundation for it to become ‘green’.

Also there is a possibility that several details and approaches can be modified during the development and implementation process of the project. It all influences the possibility of discussing the future of the East-West transport corridor from today’s point of view.

However, the East-West corridor as a part of the EU transport network is expected to become ‘greener’ through the development of better co-modality and use of innovative technologies (Broker information system).

The modal shift towards the use of more environmentally friendly transport can be considered as one of the core steps towards sustainable freight transport in a long term perspective to mitigate the transport caused impacts on environment and human health. Modal shift from road to rail or short sea shipping can also make positive impact on such social aspects as traffic safety and congestion.

The promotion of co-modality can be seen as the shared responsibility of different interested parties – EU institutions together with national governments are able to introduce the transport development policy, harmonised standards and legislation by promoting the modal shift towards rail and sea shipping; use of renewable energy as well as through adopting environmental restrictions in the form of energy tax, road tolls etc.

At the same time several measures to simplify administrative procedures, interoperability and interconnectivity between the modes as well as between the EU and its neighbouring countries should be implemented. That would help transport service providers to adapt to the modal shift and to strengthen the corridor approach outside the EU. The investments and different support programmes play a very important role for the future of co-modality. This is a shared responsibility by the EU and national governments.

The response from the transport industry, transport service providers and other public and private stakeholders involved should be in the form of development of innovative and more 'green' technologies to maintain and increase competitiveness and growth of different transport modes.

The development of innovative technologies with research, engineering and industry involved plays an essential role for the development of sustainable freight transport as well as being a mitigating element between transport activity and its environmental impacts.

However, by emphasising only the environmental aspect there is a risk that the transportation sector will be too expensive to be competitive. The challenge requires a balance between economic growth and the use of natural resources as well as environmental protection in the form of different trade-offs towards sustainable solutions where environment and efficiency are interdependent and complement each other.

A more efficient and 'greener' corridor has the potential to contribute to closer cooperation between the Scandinavian and the Baltic countries to develop a sustainable transportation sector together where the emphasis is put on regional freight transport system instead of focusing on national ones. By integrating eastern and western parts of the region the imbalances between transport sectors in the 'old' and 'new' EU memberstates would decrease.

The development of hubs as growth centres along the corridor can promote an increase in transport volumes in the region, can contribute to regional development in terms of better territorial cohesion and economic growth as well as fewer transport barriers between countries. It has the potential to influence the development of the whole region.

Regarding the above mentioned hindrances for further development of efficient and sustainable intermodal transport in the southern BSR, the expected results of the project can contribute to the following:

The development and improvement in the infrastructure of the ports can be expected to raise the quality of facilities at the hubs and hinterland connections; together with the development of the railway concept in the region it is intended to promote intermodal connections. The use of short sea shipping and rail transportation instead of road transportation dominance has the potential positively to influence natural and human environmental impact.

**Conclusion.** In general, green corridors due to their characteristics (co-modality, use of innovative and 'green' technologies etc.) have the potential to become an important element of a sustainable transport system in the EU. By the precondition that co-modality and green technologies are used efficiently, including also efficient energy use and continuous progress is being detected, it emerges environmentally friendlier freight transportation, which causes less pollution, as well as society's wellbeing in terms of less impact on human health, noise relief, less congestion and better traffic safety. Lower transport costs and more efficient use of transport modes influences also transport competitiveness which may result in better economic growth.

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## 5. List of key performance indicators for green transport corridors

KPI	Input unit	Output unit	Assessment
<b>Efficiency</b>			
Absolute costs	ton, €	€/ton	3 Can manage without
Relative costs	ton, €, km	€/ton-km	1 Must have
<b>Service quality</b>			
Transport time	hours	hours	1 Must have
Reliability	Total number of shipments, On-time deliveries	%	1 Must have
ICT appl.	Availability, integration & functionality of cargo tracking & other services	graded scale	2 Prefer to have
Frequency	Services per week	number	1 Must have
Cargo security	Total number of shipments, Security incidents	%	2 Prefer to have
Cargo safety	Total number of shipments, Cargo safety incidents	%	2 Prefer to have
<b>Environmental sustainability</b>			
CO <sub>2</sub> emissions	ton, km	g/ton-km	1 Must have
NO <sub>x</sub> emissions	kg, km	g/1,000 ton-km	1 Must have
SO <sub>x</sub> emissions	kg, km	g/1,000 ton-km	2 Prefer to have
PM emissions	kg, km	g/1,000 ton-km	2 Prefer to have
<b>Infrastructural sufficiency</b>			
Congestion	ton, km, Average delay	hours/ton-km	2 Prefer to have
Bottlenecks	number & category	graded scale	2 Prefer to have
<b>Social</b>			
Corridor land use	Share of distance per area type	percent	2 Prefer to have
Traffic safety	Traffic safety incidents	percent	2 Prefer to have
Noise	Share of distance above level	percent	2 Prefer to have

Source: SUPERGREEN 3rd regional workshop, Malmö, Sweden, March 10, 2011

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