

CORRIDOR STUDIES

Analysis of the Copenhagen – Wrocław and Copenhagen – Minsk corridors

**TetraPlan A/S in co-operation with Wiktor Szydarowski, Baltic Gateway
project secretariat**

2006-01-10



Table of Contents

1	Introduction	3
2	Geographic and thematic scope of the corridor analysis	3
3	The corridor Copenhagen – Berlin – Prague (executive summary)	6
4	Summary notes on other corridors	8
4.1	Corridor of STRING	8
4.2	Alternative routes conveying transport flows between Scandinavia and Germany	9
5	Description of the corridors Copenhagen-Wroclaw and Copenhagen- Minsk.....	12
5.1	Copenhagen – Ystad – Swinoujscie – Wroclaw	12
5.1.1	General description.....	12
5.1.2	Passenger transport	15
5.1.3	All road freight transport	16
5.1.4	Intermodal freight transport.....	18
5.1.5	Inland waterway	19
5.1.6	Accessibility considerations in the corridor Copenhagen - Wroclaw....	20
5.2	Copenhagen – Blekinge – Klaipeda – Minsk.....	24
5.2.1	General description.....	24
5.2.2	Passenger transport	26
5.2.3	All road freight transport	27
5.2.4	Intermodal freight transport.....	28
5.2.5	Inland waterway	30
5.2.6	Accessibility considerations in the corridor Copenhagen - Minsk	30
6	Summary of barriers and bottlenecks.....	33
6.1	Corridor Copenhagen-Wroclaw	34
6.2	Corridor Copenhagen-Minsk	35
7	SWOT analysis	36
7.1	Corridor Copenhagen – Ystad – Swinoujscie – Wroclaw.....	36
7.2	Corridor Copenhagen-Minsk	37
8	Development potentials	39
8.1	Corridor potentials for Copenhagen-Wroclaw	39
8.2	Corridor potentials for Copenhagen-Minsk.....	42
9	References	46



1 Introduction

The main purpose of the corridor studies is to provide analytical background and conceptual justification for future projects of trans-national relevance to be identified in the Baltic Gateway Quick Start Programme. Already today the corridors are important for the flow of goods and passengers in the transit area across the South Baltic Sea. It can be seen, however, that their importance will grow in the future as the trade between the new EU countries and Scandinavia (north-south) and trade in the east-west direction will be developing.

One of the main aspects of analysis is the development of sustainable transport solutions in the corridors by improving logistic service for cargo other than the traditional road haulage method. The corridors set together, along with other elements of the transport network, are expected to compose a comprehensive system of high quality transport and transport-related services. This system is meant to contribute to better accessibility within the South Baltic area and to improvement of links both between European Union and Russia and between the core economic areas placed on intercontinental trading routes.

The above rationale implies that within individual corridors growth problems, bottlenecks in the seamless cargo flows and mitigation measures are identified and addressed. Some of them are listed in the financial plans of responsible authorities, some other need to be checked against their trans-national relevance and placed in the Baltic Gateway Quick Start Programme.

2 Geographic and thematic scope of the corridor analysis

The Baltic Gateway project highlights several components in making an efficient system servicing intercontinental, trans-national and cross-border flows in the South Baltic area. Among them are:

- Integration of maritime links and inland hinterland links, with ports and their logistic centres and terminals as operating multimodal nodes;
- Development of viable transport market concepts, which balance shares of rail, road and sea transport, and
- Preparation and prioritising on those investments scheduled by the European and national authorities, which contribute to alleviation of missing links and elimination of bottlenecks, and at the same time combine improved performance of trans-national transport corridors and national transport axes with intraregional accessibility.

The project thus focuses on those corridors in the studied area of the South Baltic, which include the maritime links conveying the ro-ro traffic. Some of these routes require a deeper insight into the socio-economic setting, as they have not been analysed elsewhere, while some other have already been investigated and therefore need only a recollection of the research conclusions.

The present report takes into account three corridors designated for the analyses within the framework of the Baltic Gateway project, namely:



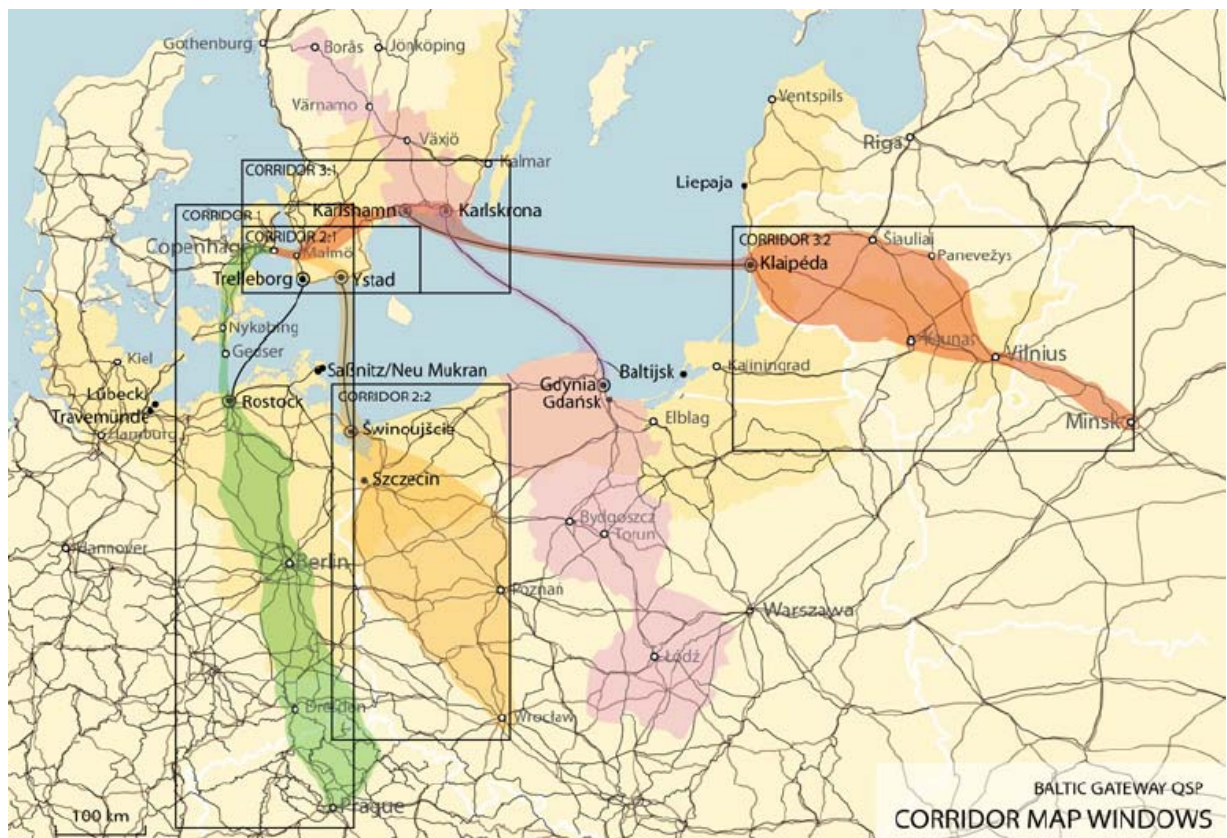
- Copenhagen – Ystad – Swinoujscie – Wrocław,
- Copenhagen – Blekinge – Klaipeda – Minsk,
- Copenhagen – Berlin – Prague.

The corridor Copenhagen – Berlin – Prague has already been analysed in a specific study carried out by Planco and COWI. Results from this study will be quoted in chapter 3.

Furthermore, the report presents findings of the parallel Baltic Gateway port twinning studies (e.g. Trelleborg-Rostock, Karlskrona-Gdynia) and completes the whole picture of flows in the South Baltic Sea area with conclusions retrieved from other trans-national projects done under the Interreg IIC and III B programmes for the Baltic Sea (e.g. STRING, SEBTrans, SEBTrans-Link).

In the thematic analysis the main focus will be placed on freight transport considerations whereas passenger transport will be referred to marginally.

The corridors subject to analyses within the Baltic Gateway project (inclusive of the sections and routes within the port twinning arrangements) are shown on the following map.



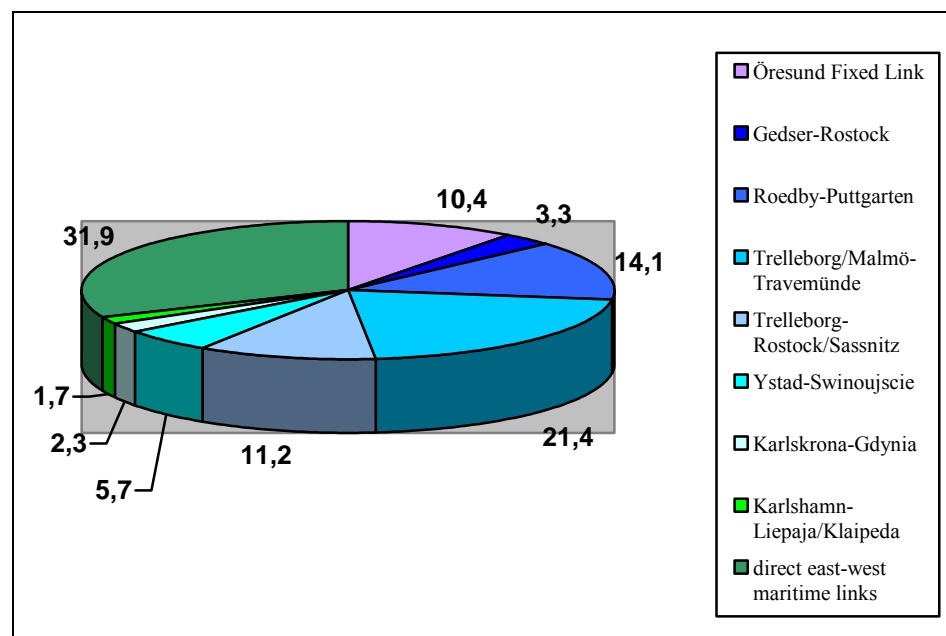
The three Baltic Gateway corridors have one of their nodes in Copenhagen. Two of them, go across Scania heading south whereas the other one continues through Blekinge towards Russia. The opposite nodes of the corridors, conventionally set for the purpose of the project, are Prague, Wrocław and Minsk.



Structurally, all corridors consist of land sections and water-crossing links connecting old and new Member States and EU neighbouring countries in the east, as indicated on the map. The biggest difference between the three corridors is related to improvement needs. For the corridor Copenhagen-Prague, flow capacity issues are important, while in the other corridors solving missing links and improving multimodal connections is of the primary need.

The identified corridors are characterised by small amounts of traffic compared to the main flows running between Scandinavia and the continent via Trelleborg – Rostock/Travemünde, or directly via Copenhagen – Great Belt Link-Hamburg route. However, in many areas the condition of the infrastructure is very poor and therefore bottlenecks might occur even in areas with low traffic volumes.

The diagram below presents traffic figures for trailers on ferry crossings along individual corridors and routes in the South Baltic Sea area. According to 2003 data (after MariTerm AB), the north-south links account for over 65% of the flows, with the Trelleborg/Malmö-Travemünde route taking the prominent position. The second largest contributor, Rødby-Puttgarden link on the corridor from Copenhagen to Hamburg (STRING), is expected to gain on the market share when the fixed link across Fehmarn Belt has been established. As proved by the Öresund case, construction of a fixed link affects distribution of the traffic in the proximity and may even stop operation along some lines in certain segments of commodities. The present share of the Öresund fixed link in the South Baltic Sea crossings exceeds 10% and is comparable with the traffic on the Trelleborg-Rostock/Sassnitz route.



Completion of the Fehmarn Belt fixed link could affect flows especially on the Malmö/Trelleborg – Travemünde route. To counteract, the ports of Trelleborg and Travemünde provide infrastructure for efficient handling of intermodal cargo on its way between Scandinavia and the Continent, opposite to in general a uni-modal transport setup on the Fehmarn Belt fixed link.



The process of the EU enlargement and associated socio-economic integration processes in the Baltic Sea Region caused remarkable increase in the share of traffic from Scandinavia towards Poland. Its westernmost corridor to Wroclaw (with its maritime section between Ystad and Swinoujscie) competes for the cargo with the nearby Copenhagen-Berlin-Prague corridor. The introduction of the German Maut may in foreseeable future re-direct some of the traffic to the Polish route.

The Copenhagen – Blekinge – Klaipeda – Minsk corridor not only rivals the north-south links bypassing the southern coast of the Baltic Sea but also struggles against direct port-to-port connections, whose 32% of the traffic share is taken in principle by the ferry service from Germany (Kiel, Sassnitz) to Klaipeda. Therefore, building of the corridor concept for the ferry connections from Swedish Karlshamn to the Baltic States (Klaipeda, Liepaja) needs to be embedded in the socio-economic setting of the areas it transverses.

3 The corridor Copenhagen – Berlin – Prague (executive summary)

The corridor Copenhagen – Berlin – Prague was analysed by Planco and COWI within the framework of the Baltic Gateway project. Its executive summary is taken from the Baltic Gateway report ‘Geography of flows in the South Baltic Sea area and their implications for regional growth’.

The corridor Copenhagen-Gedser-Rostock- Berlin consists of road and rail track sections between Copenhagen and Gedser in Denmark and between Rostock and Berlin in Germany and is supplemented with a ferry line in the middle connecting Gedser and Rostock. This opens possibilities for travelling between Copenhagen and Berlin by car, bus and train. Bus services run between Copenhagen and Berlin, while trains only go part of the way with two or more necessary transfers. The infrastructure standards and distribution of technical facilities indicate certain bottlenecks in the corridor performance. The major challenge is the missing link in the railway service across the sea between Gedser and Rostock, although cargo-handling facilities are present in the port of Rostock. Other operation obstacles include:

- Low technical standard of the section of the corridor across the island of Falster in the southern part of Denmark – narrow road passage including a passage through the urban area of Nykøbing serving commuters and long-distance freight and passenger traffic, a single and not electrified railway track, missing automatic train control system in the southernmost part of this section, and a speed limit on both road and railway track not exceeding 80 km/hour;
- Absence of automatic train control system also in the German part of the corridor between the port and the central railway station in Rostock;
- No facilities for handling of rail cargo and limited passenger facilities in the port of Gedser despite provision of the railway connection from Copenhagen;
- Difficulties in transfer of passengers between the port and the central railway station in Rostock (local train and bus service) and upon change from train to ferry on the Danish and German side – due to a poor co-



ordination of timetables and long distances between passenger stops and terminals;

- Lack of fast train connection between Rostock and other major urban centres in Germany (e.g. Berlin)

Due to the limited traffic volumes today, these bottlenecks are not critical. However, if traffic volumes would increase they should be removed.

The estimations for the passenger traffic in the medium-term horizon show a potential for train service in the whole corridor as Copenhagen and Berlin are among the most significant traffic generators between Scandinavia and the Continent. With the freight traffic, however, the highest volumes refer to regions where competing routes will have an advantage.

Considering the priority given by railway operators to either the Great Belt route or to direct links to Sweden, there is no real potential for rail freight on the Rostock-Gedser route. The potential catchment area of the Rostock-Gedser route on the continental side, verified through generalised travel costs, spreads east from the line Schwerin- Magdeburg and is little more extensive for the freight traffic.

The Gedser-Rostock link is the preferred option for road cargo flows from Mecklenburg-Vorpommern and other new Bundesländer towards Copenhagen. For example, 85% of the traffic from Berlin is conveyed through this link. For westbound flows the Rødby-Puttgarden connection provides a faster and the shortest alternative for the regions responsible for the highest traffic volumes. Therefore, this link generates four times more traffic. This poses a limitation on importance of the Gedser-Rostock route.

The above pattern of the catchment areas should not be largely affected after launching of the Fehmarn Belt Fixed Link between Rødby and Puttgarden. The improved link is supposed to generate additional traffic demand as well as to change route choice. Although the areas close to the Fehmarn Belt route (Hamburg and Schleswig - Holstein) will record the highest increase in traffic volumes, some improvements are possible also for flows between Berlin and Mecklenburg- Vorpommern on one side and Copenhagen on the other side.

As estimated, potentials for a passenger railway connection between Rostock and Gedser are rather independent on a fixed link at the Fehmarn Belt, contrary to road cargo flows, whose volume may slightly decrease.

Future position of the Rostock-Gedser route and the whole corridor in general depends on the layout of infrastructural and organisational investments. The German plans envisage upgrading of the railway line from Berlin to Rostock for higher speed and load capacity, which may be accomplished in the seven years perspective. No major projects are being considered in the southern part of the Danish island of Falster, though the present standard is low compared to the remaining parts of the corridor. The planned investments in the TEN road and rail network will strengthen the position of the Rødby-Puttgarden connection against the Gedser-Rostock link.

In addition to the Fehmarn Belt Fixed Link a number of hinterland investments in Denmark and Germany are expected to decrease the travel time between Scandinavia and the Continent. In Schleswig-Holstein the road to Puttgarden will be upgraded, while in Denmark the investments will be concentrated in the Copenhagen area, on the road between Eskilstrup and



Sakskøbing and along the railway line from Copenhagen through Nykøbing to Rødby. The Rostock-Gedser route will not benefit from TEN-T investments on the Danish side as the section between Nykøbing and Gedser, streamlining the flows to Rostock and Berlin, is not planned for upgrading. However, the most critical bottleneck on the Danish side, the part of the road link through Nykøbing will be relocated on a new bypass. The Gedser-Rostock route makes good use of its potential as regards road traffic in both passenger and freight segments.

Although there is no relevant potential for railway freight traffic between Rostock and Gedser some small-scale investments may improve the position of the corridor in handling passenger flows. In that respect, improvements in the interfaces at ports of Rostock and Gedser are highly necessary.

Conclusions/necessary development measures:

- ‘Last mile investments’ for rail traffic in the ports of Rostock and Gedser, including provisions for smoother passenger service;
- Improvement of road and railway infrastructure for long-distance freight and passenger traffic in the island of Falster, including bypassing facilities for the transit traffic in the area of Nykøbing.

4 Summary notes on other corridors

Below a short summary of the conclusions on development perspectives for other corridors and links are presented.

4.1 Corridor of STRING

The STRING corridor (Scania – Copenhagen – Rødby – Puttgarden – Lübeck – Hamburg) is the most important passenger corridor passing the Baltic Sea, and also an important route for international goods traffic by road. The ferry connection between Rødby in Denmark and Puttgarden in Germany is the most frequent service operating in the Baltic Sea, with 2 departures per hour per direction almost 24 hours a day.

There have been rail services for goods operating in the corridor, but after the establishment of the fixed link across Great Belt in Denmark, the goods traffic by rail was redirected to follow the route via Great Belt and through south Jutland and Schleswig. In the STRING corridor a passenger rail service is operated jointly by Danish and German State Railways. There are 4 departures per day per direction. The number of travellers by rail has been declining strongly during the nineties, mainly because of intensified competition from air and bus transport.

Bus transport and transport by passenger cars have increased, and the Rødby – Puttgarden link serves about 56% of the passenger transport across the south Baltic Sea (2004) excluding air transport. In 1990 the figure was 57%. In the period 1990 – 2004 tax free sales have been abandoned and passenger travel to and from Poland and the Baltic States has increased strongly.

Construction of the Fehmarn Belt fixed link will in functional terms shorten the distance between the Öresund region and the metropolitan area of Hamburg, thus providing a better access from Scandinavia to the European pentagon. At a regional scale, it will have a major impact on the STRING corridor connecting the German and Danish side of the Fehmarn Belt. These coastal areas are thinly populated, with tourism and agriculture as major



economic branches. Expectations are therefore, that the new link may provide new opportunities for both business and economic development. Preparations are being pursued in both countries of making the hinterland infrastructure in operable condition. However, at present efforts are concentrated on the road system, where motorways are constructed in both Denmark (between Eskilstrup and Saksøbing) and in Germany (between Oldenburg and Heiligenhafen). The main bottlenecks occur on the railway lines, where there will be a need for extension of the capacity in both Denmark and Germany, and carry out electrification of rather big parts of the system in both Denmark and Germany.

In order to make full use of the Fehmarn Belt connection from a rail point of view it is required to solve the capacity problems on the rail lines around Copenhagen and around Hamburg. This project is a priority project in the TransEuropean Network.

The development of the STRING corridor will create a very efficient road link connecting Scandinavia on one side and west Europe and Germany on the other side. The development of the motorway system in the northern Germany including A20, A27 and A21 will provide good access to Fehmarn Belt from all parts of Germany. Therefore, the Fehmarn Belt axis will become a serious threat to the parallel corridors between Travemünde and Rostock on one side and Trelleborg and Gedser on the other side. A study on the effects on the impact of the Great Belt fixed link on the ferry connections in Denmark shows, that the 7 formerly existing services have now been reduced to 3 connections, all of them requiring public support after the latest reduction of fixed link fees. To further sustain, the services on the adjacent ferry routes ought to develop specific competencies winning on the driving time regulations for cargo transport and increased regulations imposed on the road freight transport.

The STRING corridor has comparatively lesser potential than the Øresund region. Population density is less, major development centres are not located on the brink of the Baltic Sea and a century long co-existence across the Baltic Sea is less evident. However, one of the purposes of the STRING-labelled projects is to develop the transverse areas in the functional region, for which the fixed link will serve as a catalyst for socio-economic growth.

Conclusions/necessary development measures:

- Fixed link across the Fehmarn Belt;
- Increase of railway traffic capacity around Copenhagen and Hamburg;

4.2 Alternative routes conveying transport flows between Scandinavia and Germany

Apart from the three corridors described above, dense transport network in the western part of the South Baltic Sea includes two ferry routes channelling cargo flows between the Swedish region of Scania and metropolitan areas of Hamburg and Berlin. They are both served by the port of Trelleborg specialising in the ro-ro turnover and gaining the status of the leading Swedish port in this segment. Information on the latest developments in the



port of Trelleborg is cited after the Baltic Gateway report 'Port twinning activity Trelleborg-Rostock' drafted by BMT Transport Solutions GmbH.

The Trelleborg – Travemünde link (supplemented by the Malmö – Travemünde ferry service) features the most intense exchange of goods transported by road between Scandinavia and the Continent, improving its share of the truck transport from 34% in 1990 to 39% in 2004. The passenger traffic on this link is limited (5% of all south Baltic Sea passenger transports in 2004).

The route to Rostock/Sassnitz carries about 12% of the passenger transport across the south Baltic Sea split almost evenly between the two destinations. In 1990 the total passenger transport in this corridor amounted to only 7% yet with the slowly rising figures. Since 2000 the market share has been under pressure dropping from about 15% to the present 12%. The route maintains, however, its importance with regard to the transport of cargo. In 2004 almost 23% of all trucks carried aboard ferries across the south Baltic Sea used the routes Trelleborg- Rostock/Sassnitz ports, with almost 90% of all the transfers passing through Rostock.

Transfer of rail goods is an important asset for the two routes. In last years, however, the rail traffic conveyed towards Travemünde has stagnated due to the opening of the fixed link route via Öresund - Great Belt and redirection of some major industry flows. As accounts for the Trelleborg-Rostock/Sassnitz route, altogether a significant drop in the 2000-2004 period was noted (from 3.4 to 2.7 million tonnes). Here, only the service to Sassnitz, not experiencing that heavy impact from the Öresund/Great Belt fixed links, recorded an increase in the goods transfer.

The port of Trelleborg is presently improving the rail accessibility to the quays and berths. The combination of units transported by rail to/from the port and transhipped to/from the ferry show a promising development in line with Swedish national policy goals to achieve sustainable transport solutions. During the last years, the growth in demand has lead to capacity problems in the intermodal terminal in the port, which has resulted in plans for reallocating and - at the same time - expanding the terminal. Corresponding developments are taking place in the ports of Travemünde and Rostock. The Lübecker Hafen Gesellschaft (LHG) has opened a new terminal "Baltic Rail Gate" to cater for the increasing demand in Travemünde. Combined transport services to/from Rostock have also started to develop and from the beginning of October 2003, a rail service is available between the Ports of Rotterdam and Rostock 3 times/week.

Facilities in Sassnitz (Neu Mukran) are sufficient to accommodate the traffic. The shunting yard in Neu Mukran is extremely large and the berths can accommodate ferries with trains in two storeys. The accessibility to Neu Mukran, however, is subject to improvement, as is the track from Stralsund to Berlin. The ferry route between Trelleborg and Sassnitz could face strong competition when the Fehmarn Belt fixed link is constructed, particularly if the rail capacity problems around Copenhagen are solved with the assistance from EU. Therefore, particular emphasis should be put on development proposals to ensure a sustainable traffic development on the Trelleborg – Sassnitz route. Presently, a serious bottleneck for the road traffic is being removed with the construction of the new Strelasund high bridge being operational in summer 2007, and the improvement of the main road (B96) from Stralsund to Bergen (Rügen). Also the main road along the coast (A20)



will be finished till 2006, and thus create an efficient road link between Szczecin and Lübeck, with branches to Stralsund, Rostock and Wismar.

Conclusions/necessary development measures:

- Rail access to the port of Trelleborg and alignment of construction projects for the intermodal transport service with the port of Rostock;
- ITS system for the monitoring of goods (including dangerous cargo) transported along the Trelleborg- Travemünde route;
- Road and rail accessibility to the Neu Mukran port (Trelleborg-Sassnitz route);
- Capacity improvement on the Stralsund-Berlin rail connection

4.3 The South East Baltic Transport (SEB-TRANS) corridor

The SEB-Trans corridor features a missing link between the TEN priority road and rail projects ending in Gdansk/Gdynia and the TEN priority project Nordic Triangle. Striving to develop a well functioning network integrating southern Sweden and northern Poland, the SEBTrans project and its follow-up of SEBTrans-Link identified necessary elements of the transport infrastructure to be improved or constructed. These include: intermodal service along the Karlskrona-Gdynia ferry link, road and rail access in the two ports, as well as road and rail improvements along the Swedish (Gothenburg – Borås – Växjö – Karlskrona) and Polish (Gdynia-Łódź) parts of the corridor – all contributing to local, regional and interregional cohesion.

Rationale for the corridor is built on the predicted doubling of the cargo volumes transhipped across the South Baltic Sea area, in exchange between the old and new members of the European Union. The current ferry service between Karlskrona and Gdynia has been in existence for about 10 years (starting in late 1994), and although the traffic started with low figures, its past and present growth rate is impressive. In the trailer segment, the yearly increase in the carried volumes amounted to over 30% in the 2001-2004 period.

A recent survey undertaken by the port of Karlskrona as part of the Baltic Gateway project indicated that the freight users of the link are shippers and consumers located in central Sweden and in central Poland. The freight users in Blekinge and Småland are few. However, the link is important also in this area as a means for rationalising the five local labour markets (Karlskrona, Kalmar, Växjö, Värnamo and Borås) and stimulating business renewal.

The Polish part of the corridor is subject to recent construction and modernisation projects, part-financed from the EU Structural Funds within the Sectoral Operational Programme for Transport and the Integrated Operation Programme for Regional Development. Construction of the principal artery of the A1 motorway, connecting important industrial areas around Katowice and Krakow with the main Polish ports of Gdansk and Gdynia, is acknowledged under the TEN-T label and therefore planned to combine both national funds and the EU Cohesion Fund. The same applies to the trunk railroad connecting north and south of Poland through Warsaw.



The Swedish partnership in the SEBTrans-Link project managed to make an inventory of all infrastructure investments present and planned in the state budget (Swedish National Road Administration) and supplemented them with a list of necessary improvements. In terms of rail infrastructure, there is presently no direct access to the ferry port of Karlskrona, but railroads are provided both running along the coast towards Scania and Copenhagen, and running to the north from Karlskrona, linking via Emmaboda and Alvesta to Gothenburg and Stockholm.

Taking the result of the traffic survey, the road development focusing on the SEB-Trans link should ensure a well-functioning road system towards the north and north-west. Therefore, as a consequence - the development of the E22 north of Karlskrona and the road 27/30 should be a priority goal within the SEB-Trans corridor. The municipalities and regional administrations in the area have formed an alliance to promote and support the investments.

Conclusions/necessary development measures:

- Formation of the Baltic Link to combine European status roads in Sweden (E4, E6, E22) and Poland (E75, E77)
- Road investments allowing the transit flows to bypass settlements on the Gothenburg – Borås – Växjö – Karlskrona route
- Provision of a railroad to the ferry port in Karlskrona in order to stimulate the intermodal transport development

5 Description of the corridors Copenhagen-Wroclaw and Copenhagen-Minsk

For each corridor a general description including topics of demography, geography and economy is provided.

For each of the two analysed corridors a description of passenger transport and freight transport with respect to both all road solution and intermodal rail solution is provided. Also a status is given with respect to the use of inland waterways.

Finally, accessibility considerations in each corridor are presented.

5.1 Copenhagen – Ystad – Swinoujscie – Wroclaw

This internal EU corridor passes through Denmark, Sweden and Poland,.

5.1.1 General description

In table 5.1 below outlines different key information about the countries and regions in the transverse of the corridor.

Table 5.1. Key information of corridor countries.

	Denmark Copenhagen area	Sweden Scania	Poland Zachodniopomorskie Wielkopolskie Lubuskie Dolnoslaskie
Population, 2004	1,822,569	1,152,697	8,963,104
Population change 1999 - 2004	+2.0%	+2.9%	-1.4%
Area, sq km	2,863	11,369	86,659



Population density	637	101	103
Labour force, 2003	1,234,752	755,858	6,340,903
Unemployment 2003	5.6%	6.7%	22.4%
GDP/cap. in PPS, € 2003	35,100	25,400	10,500
Railway, km *	430	691	8,500
Motorway/expressway, km	204	258	418
Important paved roads, km	1,202	6,245	21,624

* *Excl. metro, but incl. local and freight railways*

East Denmark/Copenhagen area and South of Sweden are more or less comparable with respect to parameters like population change, population/labour force ratio, unemployment rate and GDP. The Copenhagen area deviates significantly from South of Sweden with a very high population density and a fairly high amount of railway and motorways. Also the GDP per capita is quite high, which on the other hand is expected for a large city.

The Polish provinces of Zachodniopomorskie, Wielkopolskie, Lubuskie and Dolnoslaskie represent the largest part of the corridor, which of course results in a much larger population and area. The population density in the four Polish provinces is very much the same as in Scania. The Polish provinces have more or less the same population/labour force ratio as Denmark and Sweden, but the unemployment rate is remarkably higher and the GDP per capita is significantly lower. With respect to infrastructure, the Polish provinces have a high amount of railways but only a very limited motorway network. Also the quality of traffic infrastructure in Poland is considered to be below average (compared to EU standards). However, the latter is expected to change fast in the future, particularly concerning the major roads, due to granting the Polish provinces the Objective 1 area status and provision of EU Structural Funds for construction and modernisation projects.

Trade flows are presented in the following table.

Table 5.2. Trade 2003 in bill US\$.

	DK-SE	DK-PL	SE-PL
Internal trade, bill. US \$	14-15	2½-3	3½-4

Denmark and Sweden have a large internal trade, whereas the trade with Poland is more limited.

Traffic volumes in units along the corridor links are presented in table 5.3.



Table 5.3. Traffic volumes on selected links in the corridor and in competing corridors, 2004.

Link	Company	Pax	Passenger cars	Lorries and trailers
Öresund Fixed Link	-	-	4,036,000	231,000
Ystad-Swinoujscie	Unity Line Polferries	363,000	82,000	124,000
Copenhagen-Swinoujscie	Polferries	99,000	14,000	8,000
Trelleborg-Sassnitz	Scandlines	708,000	162,000	36,000

Source: Shippax Statistics

Passenger cars include motorcycles and caravans.

The link of Trelleborg-Sassnitz is also carrying rail wagons. Except for the transported trucks, also 66,175 railway wagons were moved in 2004 with a load of about 2.0 m. tons. Polferries are also carrying rail wagons between Swinoujscie and Ystad. In 2004 the number was about 17,000 wagons with a load of about 400,000 tons.

The number of freight railway wagons crossing the Öresund Fixed Link is not available.

Measured in 1000 tons the figures are as follows for 1994, 2000 and 2004.

Table 5.4. Freight volumes with railway and trailers measured in 1000 tons in the corridor and on competing corridors.

Link	1994	2000	2004
Öresund Fixed Link	-	n.a.	n.a.
Ystad-Swinoujscie	830	800	1,960
Copenhagen-Swinoujscie	100	90	50
Trelleborg-Sassnitz	3,040	2,350	2,430

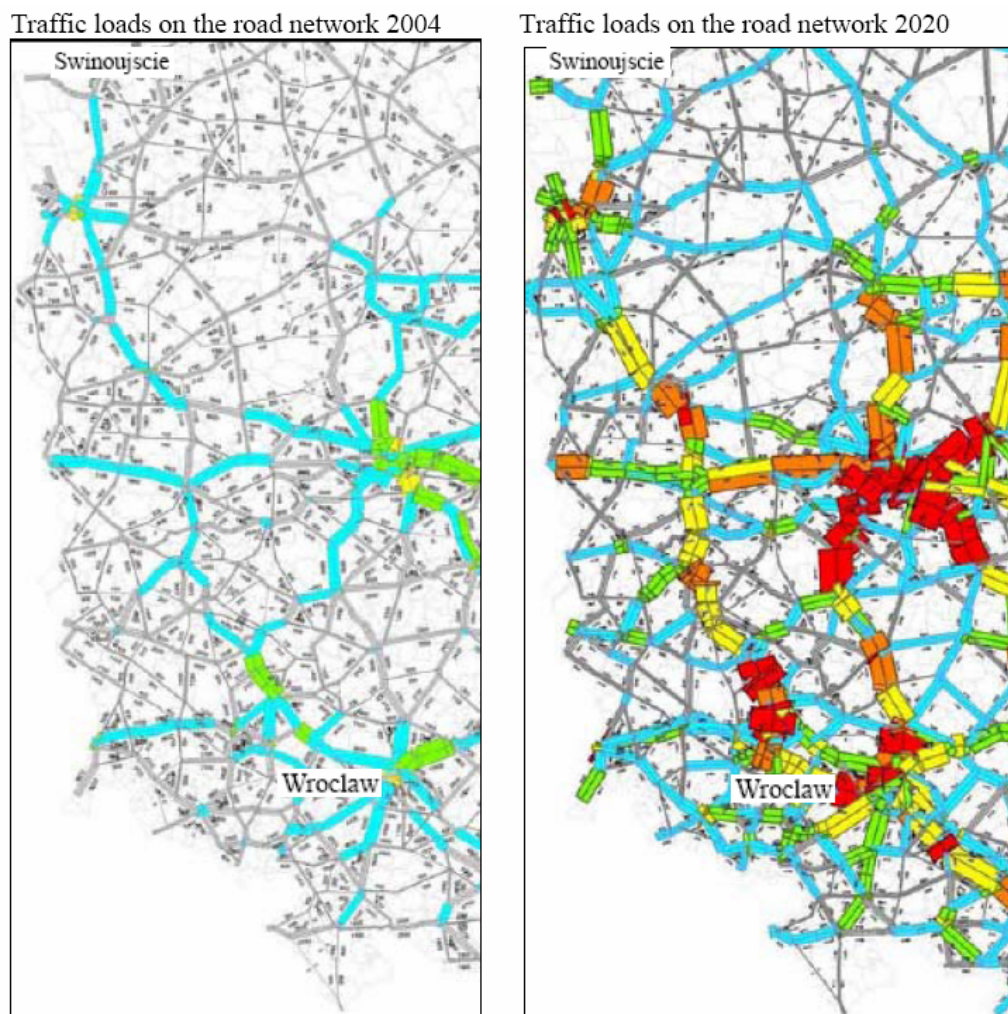
Source: Statistics Denmark, Statistics Sweden

It is worth to note that the ferries between Ystad and Swinoujscie have experienced a large increase in the amount of transported tons from 2000 to 2004. After a general decline up to 2000, it seems that some of the increase of Ystad-Swinoujscie has been gained after Poland accessed EU and border formalities were removed with a pen's stroke.

The traffic on the road network on the Polish end of the corridor is depicted in the following figure. The traffic is shown for 2004 and 2020.



Figure 5.1. Traffic loads in the corridor Swinoujscie - Wroclaw



As can be seen from the figure traffic loads per day are expected to grow substantially in the corridor. Particularly the link north of Wroclaw will have high traffic volumes in 2020. But also around Szczecin will the traffic be quite heavy.

Presently, about 1/3 of the heavy traffic on the Szczecin – Swinoujscie road is trucks heading to or coming from the ferry boats.

5.1.2 Passenger transport

The details related to the description below are all based on data collected in 2005.

Train journey from Copenhagen in Denmark to Wroclaw in Poland can easily be arranged by the national state railways. The trip lasts around 15-17 hours including 3-5 shifts respective of the connections. The price of a return ticket is 190-210 EUR depending on the number and type of necessary reservations.

However, none of the suggested routes of the state railways go along the defined corridor, i.e. via the Öresund Fixed Link and the ferry link Ystad-



Swinoujście. Instead the route go to Germany via the ferry link at Rodby-Puttgarden, further on to Hamburg or Hannover, then Berlin and finally to Wrocław Główny, if necessary via Poznan in Poland.

Nevertheless, it would be possible to travel along the Ystad-Swinoujście route “on your own”. The railway stations in the ports of Ystad and Swinoujście are located less than 200 metres from the ferry terminal. Trains and busses run directly between Copenhagen and Ystad. Between Swinoujście and Wrocław there exist 7 connections in each direction per day. The timetables are not harmonised with the ferry schedule, but the journey would be feasible with 0 (one connection), 1 or 2 shifts during the 7-8 hours of the trip between Swinoujście and Wrocław. Travel “on your own” along the corridor takes around 20-24 hours depending on the coordination of the timetables. The return ferry ticket for an adult costs around 90 EUR and with an overnight crossing an additional fee for a cabin cost 20-35 EUR per person one way depending on the number of beds in the cabin. On the top of the ferry price one should remember to add the ticket price of the two railway sections, and the total price is estimated to exceed the price offered by the state railways.

Establishing a direct rail route along the defined corridor would be manageable. In the port of Ystad the railway tracks lead directly to the quays, and the ro-ro ferries of Unity Line, which is one of two shipping companies in service between Ystad and Swinoujście, are equipped with a train deck. Also in the port of Swinoujście the railway tracks lead directly to the quays, which enable the passenger train to carry on towards Wrocław. So the ferry-rail connection does in fact already exist, but according to the port authorities of Swinoujście the market has not been sufficiently developed.

The electricity systems are different from each other in the countries affected, i.e. Denmark, Sweden and Poland. Nevertheless, this is not considered a large barrier as modern locomotives are able to run on different voltage systems. Furthermore it is not plausible that the locomotive is transferred with the ferry to/from Poland.

Finally it should be mentioned that also airplane connections exist. Scandinavian Airlines SAS and Cimber Air fly directly from Copenhagen to Wrocław several times per week, but also Lufthansa and Polish Airlines LOT do have connections to Wrocław via Munich and Warsaw. The price starts at 280 EUR return. Also Poznan can be reached with direct flight from Copenhagen.

Alternative route

A ro-pax ferry route operated by Polferries provides direct service from Copenhagen to Swinoujście 5 days a week. The return ticket fee for an adult is 100 EUR and if travelling overnight a cabin costs 20-25 EUR per person one way depending on the number of beds in the cabin. On top of the ferry cost the price of the railway ticket in Poland has to be added. The total price is estimated to be competitive to the price offered by the state railways.

5.1.3 All road freight transport

The distance from Copenhagen to Wrocław via the ferry link Ystad-Swinoujście is composed of a road section of around 600 kilometres plus a ferry link of 180 kilometres. A very large part of the road section in Poland, which is around 475-500 kilometres in total, does not hold an expressway standard.



The ferry link is operated by the shipping companies Unity Line and Polferries. Unity Line offers direct service to Swinoujscie with 27 return cruises per week with respect to freight transport. Polferries offers 7 weekly return departures – one per day.

The road from Copenhagen to Ystad is in a very good condition and combines sections of motorway and expressway standard. The condition of the road infrastructure in Poland is reasonable but changing respective of the section. The road from Swinoujscie to Szczecin is in the course of modernisation but the further section from Szczecin to Wroclaw is characterised by a limited number of well maintained roads. .

Another problem is the main road passing through crowded towns. This creates congestion and considerably reduces the speed. However, in the Draft National Development Programme for Transport Infrastructure the construction of bypasses is among the priorities.

The overall result is an average speed of around 40-45 km/h when driving in Poland.

Administrative regulations in the Polish transport business are not considered as a problem, allowing for smooth cargo passage, let alone the standard of the roads. After the entrance of Poland in EU time-consuming border control procedures have vanished. This is confirmed by interviewed Danish and Swedish truck haulage companies operating in Poland.

The total transport time is hard to assess, but an estimate of around 22-24 hours for the journey from Copenhagen to Wroclaw seems to be realistic. If an accompanied transport is arranged, the ferry crossing time can with advantage be used to comply with the regulations on working time for lorry drivers.

Direct cost in the specified corridor is the crossing fee on the Öresund Fixed Link and the charge for the ferry link Ystad-Swinoujscie. The price of crossing the Öresund Fixed Link with a truck of more than 12 metres in length is 100 EUR one way, excl. VAT. The ferry crossing Ystad-Swinoujscie costs 370-435 EUR one way, excl. VAT, for an accompanied truck of 16,5 metres and 350-415 EUR, excl. VAT but incl. loading and unloading, for an unaccompanied semi-trailer of 13,6 metres. All prices are public tariffs. In general the trucks will have a discount which depends on the number of annual ferry trips and whether the truck is full or empty. This discount is not included in the prices mentioned above.

Operating costs depend on the nationality of the driver and the transport company. According to Scandinavian haulage companies and the Danish Transport and Logistics Association (DTL), it seems that a transport by road in the corridor will be conducted exclusively by Polish drivers and Polish trucks due to a much lower level of costs. However, the trailer might very well be of another nationality. Based on analysis of the cost structure and an interview with Polish logistic providers the operating cost of a Polish truck is assessed to 0.70 EUR per km.

Finally, it should be mentioned that road transports along the specified corridor are likely to experience serious competition from other ferry links, like Gedser-Rostock, Trelleborg-Rostock, Copenhagen-Swinoujscie, Karlskrona-Gdynia etc. Polish drivers are paid either exclusively per kilometre or by a combination of a fixed salary plus payment per kilometre. Since payment per kilometre is very fundamental in the payment of drivers, many transports with origin or destination in the Copenhagen area are likely



to use the ferry links Gedser-Rostock or Rödby-Puttgarden. In addition the ferry ticket costs only 255 EUR one way excl. VAT, for an accompanied truck of 16,5 metres, which has to be compared with the fee for crossing the Öresund Fixed Link (100 EUR one way, excl. VAT) plus the price of the ferry crossing Ystad-Swinoujscie (435 EUR one way, excl. VAT).

Due to this significant price disadvantage, the road transport logistics along the defined corridor might probably be established as an unaccompanied haulage between Ystad and Swinoujscie.

Alternative route

As mentioned earlier a ro-pax ferry link exists from Copenhagen to Swinoujscie with 5 days a week service. The ticket price Copenhagen-Swinoujscie is only 425 EUR one way, excl. VAT, for an accompanied truck of 16,5 metres and 390 EUR, excl. VAT but incl. loading and unloading, for an unaccompanied semi-trailer of 13,6 metres. When travelling from Copenhagen to Wroclaw it seems that the ferry link Copenhagen-Swinoujscie is very competitive with respect to price as the fee of passing the Öresund Fixed Link is avoided. Furthermore, a 100 kilometres long road section to Ystad is left out. However, one has to remember that frequency of departures is much lower – 5 times per direction per week between Copenhagen and Swinoujscie compared to 32 times per direction per week between Ystad and Swinoujscie. All quoted prices are without any discounts.

Another and perhaps more often used alternative could be via the Rostock-Gedser route. After introduction of the German Maut this route has become less attractive as a motorway route. However, officials in Germany claim that a number of Polish trucks are using the secondary road network in Germany in order to avoid paying the Maut, but also in order to avoid the long and more expensive ferry routes from Swinoujscie.

5.1.4 Intermodal freight transport

A combined rail transport between Copenhagen and Wroclaw can be arranged by the Danish kombi operator Kombi-Dan. However, it will not run along the defined corridor. Instead the transport goes from Copenhagen to Hamburg via the Great Belt Fixed Link. In Hamburg several partners of Kombi-Dan exist, who are able to arrange the final leg to Wroclaw and if necessary also the end distribution by truck.

The fact is, that for the time being no one-stop-shop concept exists, and there is no easy solution if one wants to arrange an intermodal transport of a (single) loading unit along the specified corridor combining ship and rail or truck, ship and rail.

On the way to Ystad no rail forwarders are in operation. The Danish combined transport operator Kombi-Dan provides service for the southbound routes to Germany, Italy and the Netherlands. The Swedish combined transport operator Swe-Kombi closed down all activities in 2002, and Intercontainer-Interfrigo, who formerly had a very strong position in Scandinavia, closed down almost all activities in Scandinavia in June 2005. The Danish traction company Railion does not offer any open systems across the Öresund Fixed Link, but operates some closed full load transports to central Sweden.

Therefore, no rail solution exists within the corridor segment between Copenhagen and Ystad, and transport by truck is the only possible means to cover this distance.



In Ystad the shipping companies Unity Line and Polferries operate directly to Swinoujście 32 times per direction per week. Approximately half of the departures are operated by ferries, which contain a train deck. In other words, a ferry-rail connection is already in place.

In Poland Polkombi is able to offer an intermodal transport solution between Swinoujście and Wrocław.

However, the infrastructural setting is suitable for establishing an intermodal rail solution in the corridor, including transferring railway wagons via the link Ystad-Swinoujście.

Railway tracks exist from Copenhagen to Ystad. Differences in electrification systems in Denmark and Sweden are not considered as a barrier due to modern freight locomotives with the ability of changing power system. Although a third voltage system is applied in Poland, transfer of a locomotive aboard the ferry it is not very realistic. As already mentioned, both the port of Ystad and Swinoujście have railway tracks that lead directly to the quay, and the ro-ro ferries of Unity Line between Ystad and Swinoujście have a train deck. All together it would be possible to establish a direct freight line between Copenhagen and Wrocław without any transshipment.

In addition it has to be stressed that if a significant and regular flow of goods develops, it will most probably be possible to make an agreement with the Danish rail freight operator Railion to run a full load train between Denmark and Sweden. Railion has a license to run transports in Sweden and is in possession of locomotives with the double power system.

Also it has to be noted, that the conclusions might differ if the nodal point of the analysed corridor was Malmö or any other site in southern Sweden instead of Copenhagen. First of all, the section through the Öresund Fixed Link is skipped, while in Sweden a large number of rail traction companies with just one or two locomotives might easily establish a rail transport to Ystad.

Transport costs are very difficult to estimate. Only infrastructure charges seem to be clearly extractable. If infrastructure charges are calculated per 20 tons the following figures come up:

Denmark 0.049 EUR per 20 ton per km

Sweden 0.014 EUR per 20 ton per km

Poland 0.221 EUR per 20 ton per km

Especially the infrastructure charges in Poland are remarkably high. The reason is that infrastructure charges in Poland are calculated based on average costs including maintenance and construction costs. In Denmark and Sweden the costs are based on marginal costs related to costs for driving one extra train along the tracks. As a comparison one can mention the road infrastructure charge in Germany (Maut), which is 0.12 EUR per km for a 40 ton truck, which approximately carries around 20 tons of goods.

5.1.5 Inland waterway

Inclusion of inland waterway in the intermodal transport pattern is actually a possibility in the Polish part of the corridor. The river Odra connects Swinoujście/Szczecin with Wrocław and further with Silesia (via Gliwicki Canal) and the Czech Republic. Odra is the most viable waterway in Poland



connecting to the West European waterway network via Oder-Havel and Oder-Spree canals. Both canals undergo now comprehensive reconstructions.

However, the Odra River is over long distances categorised as a low class waterway, available only for barges of a total cargo capacity of about 500 tons and push convoys of up to 1600 tons. The counteracting factors about the waterway are its limited draught and limited air draught of some bridges. Also the low water level causes a serious problem between Kostrzyn and Brzeg Dolny (north of Wroclaw). In combination with insufficient maintenance the Odra River needs to undergo a comprehensive improvement, including establishment of effective terminals for shunting of goods, if a commercial transport system has to work profitable along the river.

Furthermore, today no one offers integrated services from door-to-door in the corridor using inland waterway transport. The process of planning an intermodal transport with 3-4 different means of transportation and 2-3 handling processes in 3 different countries is simply too complex, and is one of the obstacles for the use of inland waterway along the corridor.

Altogether an intermodal solution using inland waterways is not considered as a realistic alternative both for the time being and in the near future in the corridor of Copenhagen-Wroclaw, although it is a real alternative for the bulk-cargo transports.

5.1.6 Accessibility considerations in the corridor Copenhagen - Wroclaw

The situation in 2003

Travel times and travel costs in the corridor have been established for 2003 and for the three scenarios. The result for 2003 are provided in terms of absolute figures as indicated below. It should be mentioned that the figures are based on calculations in the road network, and therefore certain rough assumptions have been made concerning the speed and the costs for travel on the different components of the network.

Table 5.5 provides the travel times in 2003. The average speed applied takes into account waiting time at the ferries and to a certain extent resting time because a fairly low speed is applied. Therefore, the travel times indicated in the table below are too long for very short trips, but quite consistent with actual travel time for the longer trips. In some of the depicted relations other ferry routes are chosen, e.g. the Gedser – Rostock route for Berlin – Copenhagen and Wroclaw – Copenhagen, and Trelleborg – Rostock for trips between Berlin and Kristianstad. Transport times in these relations via Ystad – Swinoujscie are longer than indicated in the table.



Table 5.5. Travel times in hours, 2003.

	Berlin	Szczecin	Swinouj- jscie	Poznan	Wroclaw
Kristianstad	13.5	12.1	9.8	17.2	20.4
Ystad	11.9	10.1	7.8	15.2	18.4
Karlskrona	15.8	14.4	12.0	19.4	22.6
Växjö	16.1	15.0	12.6	20.0	22.4
Gothenburg	15.8	15.6	13.3	20.7	22.1
Copenhagen	8.7	12.0	9.7	17.1	15.0

The costs for a full loaded 40 tonnes truck with semi-trailer have been estimated based on average transport costs for a Polish truck and based on the ferry tariffs mentioned above. It has to be stressed that it is average costs for a Polish driver based on kilometres only. There will be differences both because the cost profiles are different for different countries and different driver nationalities, but also because not all elements of costs have been included in details in the calculations, e.g. the German Maut.

Table 5.6. Transport costs, 2003, in EUR.

	Berlin	Szczecin	Swinouj- scie	Poznan	Wroclaw
Kristianstad	639	526	453	661	763
Ystad	586	468	396	603	705
Karlskrona	711	593	520	727	830
Växjö	708	606	533	740	954
Gothenburg	759	693	620	827	1006
Copenhagen	485	635	562	769	831

Scenarios

Figures similar to those above have been established for three scenarios (TREND, Liberalisation and Regulation). The assumptions for the scenarios are partly based on expectations concerning the infrastructure development in the corridor, partly based on assumptions concerning speed and costs. In general speeds are quite similar to 2003. Speed on motorways is higher than on ordinary roads, and since the motorway system has been extended in 2020 some reductions in travel time can be seen from table 5.7. It is assumed that costs for road transport have been harmonised throughout EU leading to general cost increases of about 30-40% in TREND compared to 2003.

Percentage differences in transport time and transport costs between the situation in 2003 and TREND are shown in the following two tables.



Table 5.7. Percentage differences in transport time between TREND and 2003 for selected relations in the Copenhagen – Wrocław corridor.

	Berlin	Szczecin	Swinouj- scie	Poznan	Wrocław
Kristianstad	-5	0	-1	-7	-9
Ystad	0	0	0	-7	-10
Karlskrona	-5	-1	-1	-6	-9
Växjö	-2	0	0	-5	-4
Gothenburg	-1	-11	0	-5	0
Copenhagen	0	-15	0	-6	-4

Particularly improvement of the road network between Szczecin, Poznan and Wrocław has an effect on the transport time. The improvement of the E22 has also a visible effect on the transport time from Karlskrona to other centres.

Table 5.8. Percentage differences in transport costs between TREND and 2003 for selected relations in the Copenhagen – Wrocław corridor.

	Berlin	Szczecin	Swinouj- scie	Poznan	Wrocław
Kristianstad	35	27	21	37	43
Ystad	31	23	15	35	42
Karlskrona	38	33	28	41	46
Växjö	46	33	29	41	29
Gothenburg	39	46	33	43	36
Copenhagen	42	32	18	33	44

Table 5.8 indicates that in certain specific cases the route choice has changed, and use of motorways has increased even if the costs have also increased.

In the following two tables are the differences from TREND to LIB indicated between the same centres as indicated above.

Table 5.9. Percentage differences in transport time between LIB and TREND for selected relations in the Copenhagen – Wrocław corridor.

	Berlin	Szczecin	Swinouj- scie	Poznan	Wrocław
Kristianstad	-8	-13	-12	-10	-8
Ystad	-9	-15	-15	-11	-9
Karlskrona	-7	-11	-10	-8	-7
Växjö	-7	-10	-10	-8	-7
Gothenburg	-7	1	-9	-8	-7
Copenhagen	-4	3	-12	-10	-2

In the LIB scenario improvement of the ferry speed reducing travel time between Ystad and Swinoujscie with about 1 hour has the biggest effect.



Table 5.10. Percentage differences in transport costs between LIB and TREND for selected relations in the Copenhagen – Wrocław corridor.

	Berlin	Szczecin	Swinouj-scie	Poznan	Wrocław
Kristianstad	-13	-12	-13	-13	-13
Ystad	-17	-12	-13	-13	-13
Karlskrona	-13	-12	-13	-13	-13
Växjö	-13	-12	-13	-13	-13
Gothenburg	-13	-18	-13	-13	-13
Copenhagen	-13	-17	-11	-11	-12

Table 5.10 indicates that the costs assumed in the LIB scenario in general are 13% higher than the costs in TREND. In case where there is a higher increase it is most likely due to a change in route choice.

Transport time increases in the REG scenario because 1) road infrastructure is not reconstructed in any major scale and 2) speed restrictions are introduced for the sake of environment. The resulting transport time increases compared to TREND as depicted in the following table.

Table 5.11. Percentage differences in transport time between REG and TREND for selected relations in the Copenhagen – Wrocław corridor.

	Berlin	Szczecin	Swinouj-scie	Poznan	Wrocław
Kristianstad	16	12	12	18	22
Ystad	15	10	10	17	22
Karlskrona	17	13	13	35	36
Växjö	12	12	12	17	20
Gothenburg	12	12	11	16	8
Copenhagen	12	12	11	-7	12

The missing improvements of a number of important road links have a profound effect on the travel times (table 5.11) which in many relations are considerably higher than in the TREND scenario.

Table 5.12. Percentage differences in transport costs between REG and TREND for selected relations in the Copenhagen – Wrocław corridor.

	Berlin	Szczecin	Swinouj-scie	Poznan	Wrocław
Kristianstad	13	13	12	10	12
Ystad	7	13	13	11	12
Karlskrona	13	12	12	-22	-20
Växjö	13	12	12	10	12
Gothenburg	13	13	13	11	21
Copenhagen	13	11	11	22	12

Table 5.12 indicates that in general transport costs increase by about 13% compared to TREND, but in a few relations the transport costs increase more and in other relations the costs are reduced. The latter is the case where the route preference is considerably changed, as exemplified with the flow between Karlskrona and Poznan/Wrocław redirected to the Karlskrona – Gdynia link. This increases the transport time but decreases the costs.



5.2 Copenhagen – Blekinge – Klaipeda – Minsk

The corridor passes through Denmark, Sweden, Lithuania and Belarus, where Belarus is the only country outside the EU.

5.2.1 General description

In table 5.13 below different key information about the affected areas is presented.

Table 5.13. Key information of corridor countries and regions.

	Denmark Copenhagen area	Sweden		Lithuania	Belarus Grodno Minsk Oblast Minsk city
		Scania	Blekinge		
Population, 2004	1,822,569	1,152,697	150,335	3,607,899	4,390,500
Population change, 5- years 1999 - 2004	+2.0%	+2.9%	-1.1%	-2.5%	-0.8%
Area, sq km	2,863	11,396	2,941	65,200	65,800
Population density	637	101	51	55	67
Labour force, 2003	1,234,752	755,858	95,457	1,640,000	1,800,000
Unemployment, 2003	5.6%	6.7%	7.2%	8.1%	n.a.
GDP/cap. in PPS, € 2003	35,100	25,400	22,800	9,800	n.a.
Railway, km **	430	691	169	1,905	1,747
Motorway/ expressway, km	204	258	14	500	543
Important paved roads, km	1,202	6,245	1,257	19,806	11,457

**Labour force for the specified area is estimated on the basis of the total labour force in Belarus. ** Excl. metro, but incl. local and freight railways*

Blekinge in Sweden differs from Copenhagen area and Scania with a declining population and a quite low population density. Apart from that no significant deviation is demonstrated.

Lithuania and Belarus represent the largest population and land area in the corridor. The population density is very much the same as in Blekinge in Sweden, but much lower compared to Copenhagen area and Scania.

Lithuania and Belarus has a negative population change, but even of more interest - the labour force represents only around 40-45 % of the population compared to around 65 % in the other areas in Denmark and Sweden.

In Lithuania the unemployment rate is quite high and the GDP per capita is significantly lower. The rate of unemployment in Belarus is low (2.1% in 2000), and this has probably to do with the economic system existent in



Belarus. Regionalised GDP is not available, but in Belarus as a whole the GDP per capita is as low as € 5,200.

With respect to traffic infrastructure, Lithuania and Belarus have a very limited amount of railways and roads. The quality of infrastructure is reasonable in Lithuania, yet not matching with quality standards in West Europe. However, the main road network is in good condition, and in many places has a standard of motorways or expressways. The infrastructure in Belarus is very poor. The infrastructure quality of Lithuania is expected to increase due to the investment projects financed within EU Structural Funds, but in Belarus the infrastructure is expected to remain poor due to very low economic activity combined with a rigid political system.

Trade flows are presented in the following table.

Table 5.14. Trade 2003.

	DK-SE	DK-LT	DK-BY	SE-LT	SE-BY	LT-BY
Internal trade, bill. US \$	14-15	0.5	< 0.1	0.5	< 0.1	0.5

Only a few data of trade is estimated. Denmark and Sweden have a large trade, whereas the Swedish and Danish trade with Lithuania has the same value as Lithuania's trade with Belarus. Danish and Swedish trade with Belarus is very limited.

Traffic volumes in units along the corridor links are presented in table 5.15.

Table 5.15. Traffic volumes in corridor crossings, 2004.

Link	Company	Pax	Passenger cars	Lorries and trailers
Öresund Fixed Link	-	-	4,036,000	231,000
Karlshamn-Klaipeda	Lisco Baltic Service	54,000	12,000	23,000

Source: Shippax Statistics

Passenger cars include motorcycles and caravans. Karlshamn-Klaipeda is operated by Lisco Baltic Service.

The number of freight railway wagons crossing the Öresund Fixed Link is not available.

Measured in 1000 tons freight transport is as follows for 2000 and 2004.

Table 5.16. Freight volumes with railway and trailers measured in 1000 tons on selected crossings in the corridor.

Link	2000	2002	2004
Öresund Fixed Link	n.a.	n.a.	n.a.
Karlshamn-Klaipeda	28	358	600

Source: Statistics Denmark, Statistics Sweden

First of all it has to be underlined that the ferry route Karlshamn-Klaipeda first began operations in spring 2001, and therefore the 2000 figure is a little



misleading. However, from 2002 to 2004 the ferry link experienced a very positive increase in the amount of transported goods.

5.2.2 Passenger transport

Travel by train from Copenhagen in Denmark to Minsk in Belarus can be arranged with assistance of the national state railways. The trip lasts around 28-30 hours including 3-5 shifts respective of the connections. The price of a return ticket is 200-220 EUR depending on the number and type of necessary reservations.

However, again none of the suggested routes by the state railways go along the defined corridor, i.e. via the ferry link Karlshamn-Klaipeda. Instead the rail route goes to Germany via the ferry link at Rödby-Puttgarden, further on to Hamburg or Hannover, then Berlin, Warsaw and Brest in Belarus and finally to Minsk.

It might be possible to travel along the defined route “on your own”, but the trip would obviously consists of several hindrances. Rail connections between Copenhagen and Karlshamn are in use (even though under reconstruction until 2007). There are hourly departures in each direction and the trip lasts 3 hours. From 2007 there will be an hourly direct connection. Unfortunately the railway station of Karlshamn is situated around 5 kilometres away from the ferry terminal in the port. LISCO Baltic Service operates a night ferry route between Karlshamn and Klaipeda 6 days a week. The ferry trip takes 14 hours. Also in Klaipeda the railway station is located quite far away from the ferry terminal – around 2-3 kilometres. Between Klaipeda and Minsk regular connections exist. The railway trip takes around 10-12 hours and only 1 shift is needed (in Vilnius). The total travel time is estimated at around 30-35 hours depending on the connections. The price of the plain return ferry ticket is 90-120 EUR and including a cabin it costs 150-180 EUR per person depending on the number of beds in the cabin. On the top of the ferry price one should add the price of the two railway sections, and the total price is estimated to exceed the price offered by the state railways.

Establishing a direct rail route along the defined corridor would be possible as both Karlshamn and Klaipeda have railway tracks leading directly to the quays in the port area. However, the ferries in service are not able to carry railway wagons and due to the differences in rail gauge in Sweden and Lithuania it might not even be suitable at all to carry railway wagons aboard the ferry. Therefore, a rail route along the corridor will undoubtedly include at least two shifts, i.e. in the port of Karlshamn and Klaipeda, and the missing links between the railway stations and the ferry terminals has to be solved, e.g. by bus service.

Finally it should be mentioned that also airplane connections exist. However, no direct connections from Copenhagen to Minsk are in service. Austrian Airlines, Lufthansa and Air Baltic offer flights to Minsk from Copenhagen (and vice versa) via Vienna, Frankfurt and Riga respectively. The price starts at 490 EUR for a return ticket. However, directly connections to Vilnius are available from Copenhagen with Scandinavian Airlines SAS and Air Baltic. The price for a return ticket starts at 240 EUR. From Vilnius direct train connections link to Minsk, Klaipeda (Palanga) and Kaunas.



5.2.3 All road freight transport

The distance from Copenhagen to Minsk via the ferry link Karlshamn-Klaipeda is composed of a road section of 710 kilometres plus a ferry link of 410 kilometres. On the stretch between Vilnius in the eastern part of Lithuania and Minsk no motorway is present. This distance amounts to approximately 200 kilometres.

The E22 road to Karlshamn has no particular hindrances apart from traffic speed bottlenecks within some local settlement areas and holiday resorts (e.g. Linderöd, Norje and Pukavik) where the speed limit is 50 km/h. The road through Lithuania until Vilnius is a motorway of West European standard, however, the motorway is used by a large variety of different vehicles, which slow down the traffic and can cause dangerous situations. Apart from that, no major obstacles occur until the Lithuanian-Belarusian border. There, significant time delays and administrative problems are unavoidable. According to Scandinavian haulage companies, specialised in East-European transports, a waiting time of 1 day (24 hours) is normally to be expected when driving to Belarus – provided that all papers are correct, weight limits are respected etc. However, at the border random checks are made, and in that case the waiting time extends to 4-5 days. According to the Belarusian law the custom officers are allowed to hold back a transport up to 10 days without stating any reason at all. In general, the legislation in Belarus is considered to be very hard and difficult to handle by foreign operators.

Furthermore, due to roads that are in a very poor condition the speed is as low as 15-30 km/h on many road sections in Belarus.

Therefore the total transport time along the specified corridor is very hard to calculate. A cautious estimate ranges from 50-70 hours depending very much on the waiting time at the Lithuanian- Belarusian border. However, if an accompanied transport is arranged, the 14 hours ferry link can with advantage be used to comply with working time regulations for the lorry drivers.

Another problem in the road transport operations is crime and the scale of corruption. Several Scandinavian haulage companies mention these factors as a large barrier to perform service in the Baltic States and Belarus. However, in recent years after the EU accession the level of crime has been reduced in Lithuania. To exemplify, Lithuanian authorities provide fenced parking areas where the truckers can make safe rests. Therefore additional insurance, previously highly recommended for the operations in the Baltic States and Belarus, now relates only to the Lithuanian- Belarusian border and the trip in Belarus.

Inquired companies also mention language problems and no one seems to perform in the Baltic States and Belarus without having a local partner or their own office.

Direct cost in the specified corridor is the tariff of crossing the Öresund Fixed Link and the ticket price for the ferry crossing Karlshamn-Klaipeda operated by the shipping company AB Lisco Baltic Service. The price of crossing the Öresund Fixed Link with a truck of more than 12 metres of length is 100 EUR one way, excl. VAT. The ferry passage Karlshamn-Klaipeda costs 653 EUR one way, excl. VAT, for an accompanied truck of 16,5 metres and 600 EUR, excl. VAT but incl. loading and unloading, for an unaccompanied semi-trailer of 13,6 metres. In general the trucks will have a discount which



depends on the number of annual ferry trips and whether the truck is full or empty. This discount is not included in the prices mentioned above.

The total costs will depend on the nationality of the driver and the transport company. According to Scandinavian haulage companies it seems obvious that a transport by road in the corridor will be carried out exclusively by Lithuanian or Belarusian drivers in local licensed trucks due to a much lower level of costs, the language skills and the cultural understanding. In theory, the trailer might very well be of another nationality, e.g. Danish or Swedish, but in general Scandinavian haulage companies cannot compete with the prices offered by East European haulage companies. According to the Danish Transport and Logistics Association (DTL) an immediate effect is that no Danish licensed trucks are anymore in service to the Baltic States.

Due to the long ferry link, road transport systems along the defined corridor might with advantage being established as unaccompanied transports between Karlshamn and Klaipeda.

It has not been possible to establish the level of the driving costs of a Lithuanian truck. According to International Transport Denmark the cost level in the Baltic countries is around 10-20% below the cost level in Poland. This would result in a cost of a Lithuanian truck of around 0.55-0.65 EUR per km. It has to be stressed, that this is a cautious estimate.

Finally it should be mentioned that road transports are unlikely to follow the specified corridor due to the salary principles for East European drivers. The drivers are paid per kilometre and therefore many truckers choose to drive the whole way through Poland instead of using the existing ferry routes in the Baltic Sea. This tendency is confirmed by the DFDS TorLine and AB Lisco Baltic Service, who are important ferry operators in the Baltic Sea. However, also the scarce frequency of ferry departures is mentioned as an obstacle for using the ferries.

5.2.4 Intermodal freight transport

A combined rail transport between Copenhagen and Minsk can be arranged by the Danish kombi operator Kombi-Dan. However, it will not run along the defined corridor. Instead the transport goes from Copenhagen to Hamburg via the Great Belt fixed link. In Hamburg several partners of Kombi-Dan, e.g. Polzug, will be able to arrange the final leg to Minsk.

Similar as for the Copenhagen - Wroclaw corridor - no one-stop-shop concept exists, and there is no easy solution if one wants to arrange an intermodal transport of a (single) loading unit along the specified corridor. In addition, until 2007 the rail section between Kristianstad and Karlshamn (and further on to Karlskrona) is closed for traffic as the section is being electrified.

Again it is remarkable that no operator provides services for the Copenhagen-Karlshamn section. Therefore, no rail solution is in use along this segment and transport by truck is the only possible way to cover the distance.

In Karlshamn the shipping company AB Lisco Baltic Service operates directly to Klaipeda 6 times per week. The operating tonnage does not allow railway wagons on board.

In Lithuania and Belarus no clear information on combined transport operators is available. No companies are registered as members of UIRR (International Union of combined Road-Rail transport companies). An



exception is the train operators, and at the homepage of the International Union of Railways, UIC (www.uic.asso.fr), one can find a state owned railway operator in each country.

A very interesting concept applicable to the defined corridor is the combined shuttle train Viking, which operates from Klaipeda in Lithuania, through Belarus and ends in Odessa in Ukraine linking the Baltic Sea and the Black Sea. The shuttle runs once a week and is able to carry trucks (“rolling highway”), semi-trailers, containers and other unitized cargo. The Viking shuttle train has been in use since 2004 and a total of about 3,800 units were transported on this line. Recently a new service, Mercury, was established between Klaipeda/Kaliningrad, Minsk and Moscow.

Transport time is almost impossible to estimate. Crossing borders are smoother by rail, but administrative problems and long handling time do occur for rail as well. In addition, the rail infrastructure of the East European countries is very run-down with respect to both tracks and signalling systems. An important condition to strengthen the rail transport is a thorough modernisation of the rail infrastructure.

However, the infrastructure is in place for establishing an intermodal rail solution in the specified corridor.

Railway tracks connect Copenhagen to Karlshamn. In the port of Karlshamn railway tracks are widely distributed in the port area and even indoor rail handling is possible. The tracks lead directly to the quays, but the ro-ro ferries operating at the moment do not have a train deck. However due to differences in rail gauge between Sweden and Lithuania, it might not be suitable to carry railway wagons to Klaipeda. Fortunately, the port of Karlshamn uses Mafi trailers in order to handle unitised cargo, and therefore the missing train deck aboard the ferries should not be considered a barrier.

In the port of Klaipeda a wide network of tracks exist, and the port is very familiar with handling both whole railway wagons by ferries and single units like containers, swap-bodies etc.

It seems obvious to use the already established Viking shuttle train from Klaipeda to Odessa, even though it is not quite clear to what extent Minsk can be reached. If the Viking line is not appropriate due to low frequency of departures (once per week) or if the scheme does not allow to including a stop in Minsk, one has to set up a new service. Altogether it is considered to be possible to establish a direct connection from Copenhagen to Minsk, but some degree of shunting and transshipment has to be accepted, which unfortunately affect both price and travel time.

However, a crucial point is the question of sufficient amount of goods in the corridor. The Danish freight traction operator Railion was trying to set up a shuttle line between the sea port of Esbjerg in the west of Denmark via Copenhagen and the fixed Öresund Fixed Link to Karlshamn in Sweden, but the project was never realised due to too small amounts of freight goods. In Lithuania and Belarus it seems that the necessary amount of goods is available, especially in west-east relations, and also no-charge rail infrastructure is provided in Belarus. In Lithuania infrastructure charges have been introduced in the early 2005.

As already mentioned, it will most probably be possible to make an agreement with the Danish rail freight operator Railion to run a full load train between Denmark and Sweden, if a significant and regular flow of goods develops.



Also it has to be noted once again, that the conclusions might differ if a nodal point for the corridor consideration was Malmö or any other site in southern Sweden instead of Copenhagen. However, the change of assumption is expected to have less influence in the Copenhagen-Minsk corridor.

5.2.5 Inland waterway

Using inland waterway in the Swedish part of the corridor is not considered realistic.

In Lithuania the largest and most important inland waterway is Nemunas river from Klaipeda to Kaunas in the centre of Lithuania. Nevertheless, the depth is only guaranteed to 1.2 metres. From Kaunas and further on to Vilnius the river is only of local significance, and the guaranteed depth is as low as 0.75 metres. There is no connection further on to Belarus.

Domestic inland waterway transport in Lithuania consists mostly of mineral building materials (gravel, sand, break stone etc.) and timber.

The infrastructure of inland waterway is characterised as insufficient and basic efficient port cargo-handling equipment is missing. In addition the inland waterway shipping business operates on a low and old fashioned level with old and poor quality barges.

Finally, it is important to mention that the inland waterway shipping season in Lithuania is around 7 months due to icing of rivers and lakes.

Altogether an inland waterway transport is not seen as a realistic alternative in the corridor of Copenhagen-Minsk.

5.2.6 Accessibility considerations in the corridor Copenhagen - Minsk

The situation 2003

Travel times and travel costs in the corridor have been established for 2003 and for the three scenarios. The result for 2003 are provided in terms of absolute figures as indicated below. As for the corridor Wroclaw – Copenhagen the figures are based on calculations in the road network, and therefore certain rough assumptions have been made concerning the speed and the costs for travel in the different modes in the network.

Table 5.17 provides the travel times in 2003. The average speed applied takes into account waiting time at the ferries and to a certain extent resting time. Also a specific border crossing time period has been applied for crossing the Belarusian – Lithuanian border. However, many options are available for transports between cities in the East Baltic area and Scandinavia. Ystad - Swinoujscie is the selected route for the relation Copenhagen – Kaliningrad , Karlskrona – Gdynia for the relation Gothenburg - Kaliningrad and Karlshamn – Liepaja for the relation Copenhagen - Liepaja . The Karlshamn – Klaipeda is hence the route chosen between the Scandinavian cities and the Lithuanian cities and Minsk. Transport times on the selected routes are shown in the table.

Table 5.17. Travel times in hours, 2003.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	19.9	23.7	22.3	18.2	18.1	57.6
Karlskrona	18.0	21.8	20.3	16.2	16.2	55.7



Karlshamn	19.4	20.7	19.3	15.2	15.1	54.6
Göteborg	25.2	26.5	25.0	21.0	20.9	60.4
København	20.5	24.5	23.1	19.0	18.9	58.4

The costs for a full loaded 40 tonnes truck with semi-trailer have been estimated based on average transport costs for a Lithuanian truck (0.6 EUR per km) and based on a ferry tariff of about 600 Euro. It has to be stressed that it is average costs based on kilometres only. There will be differences both because the cost profiles are different for different countries, but also because some elements of costs have not been possible to include in the calculations.

Table 5.18. Transport costs, 2003, in EUR.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	724	897	841	699	703	1001
Karlskrona	513	841	786	644	647	946
Karlshamn	548	813	758	616	619	918
Göteborg	719	984	929	787	790	1088
København	847	1025	969	827	830	1129

Scenarios

The similar figures have been established for the three scenarios. The assumptions for the scenarios are partly based on expectations concerning the infrastructure development in the corridor, partly based on assumptions concerning speed and costs. In general speeds are quite similar to 2003 except for differences between ordinary road links on one side and motorway and expressways on the other side. Costs are about 10-20% higher than 2003 in the LIB scenario, about 20-40% higher in the TREND scenario and 40-60% higher in the REG scenario.

Percentage differences in transport time and transport costs between the situation in 2003 and TREND are shown in the following two tables.

Table 5.19. Percentage differences in transport time between TREND and 2003 for selected relations in the Copenhagen – Minsk corridor.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	7	-3	-3	-4	-4	-36
Karlskrona	-2	0	0	0	0	-36
Karlshamn	-2	0	0	0	0	-37
Göteborg	-2	0	0	0	0	-33
København	-3	-3	-3	-4	-4	-35

The table clearly demonstrates the effect of assumed easier border crossing procedures between Lithuania and Belarus, cutting the transport time with approx. one third. The improvement of the E22 has a visible effect on the transport time from Copenhagen and Malmö to the Baltic destinations.



Table 5.20. Percentage differences in transport costs between TREND and 2003 for selected relations in the Copenhagen – Minsk corridor.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	26	26	22	8	8	33
Karlskrona	33	22	17	1	1	30
Karlshamn	37	20	14	-4	-4	28
Göteborg	50	32	29	17	17	38
København	40	26	22	10	10	32

The main result shows that a more uniform cost structure throughout EU results in major increases in transport costs. The very cheap transport labour force available in Lithuania in 2003 has been replaced with a transport labour force whose salaries are about the same as in other parts of EU. The table also indicate that the assumption that ferry costs are slightly less in 2020 than in 2005 has a particular impact on the cost structure for the trips to and from Klaipeda (and Liepaja). The basic assumption is that more goods will increase the utilisation of the ferries and thus create the basis for a reduction of the ferry price. Also, the competition from other transport routes may force a lower price.

In the following two tables are the differences from TREND to LIB indicated between the same centres as provided above.

Table 5.21. Percentage differences in transport time between LIB and TREND for selected relations in the Copenhagen – Minsk corridor.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	-20	-2	-2	-3	-3	-23
Karlskrona	-4	-2	-3	-3	-3	-24
Karlshamn	-4	-3	-3	-4	-4	-25
Göteborg	-14	-2	-2	-3	-3	-21
København	-10	-2	-2	-3	-3	-23

In the LIB scenario the improvement of the road accessibility to and from Kaliningrad in terms of the completed via Hanseatica has a large effect on transport time and the route choice. Malmö, Copenhagen and Gothenburg all use the Ystad – Swinoujscie line in order to reach Kaliningrad. Also the free trade existing between EU and Belarus having cut the border transit time to 3 hours has a large effect. Finally is it assumed that the transit time between Klaipeda and Karlshamn is reduced slightly, due to a higher speed of the ferry.

Table 5.22. Percentage differences in transport costs between LIB and TREND for selected relations in the Copenhagen – Minsk corridor.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	25	-13	-13	-13	-13	-13
Karlskrona	-13	-13	-13	-13	-13	-13
Karlshamn	-13	-13	-13	-13	-13	-13
Göteborg	30	-13	-13	-13	-13	-13
København	-11	-12	-12	-12	-12	-12

The table indicates that the reduced costs assumed in the LIB scenario have an average cost reducing effect of 13%. Between Kaliningrad on one side and



Malmö and Gothenburg on the other side the change of route has resulted in a higher cost, which is compensated by travel time savings.

Transport time increases in the REG scenario because 1) road infrastructure is not reconstructed in any major scale and 2) speed restrictions are introduced for the sake of environment. The resulting transport time increases compared to TREND as depicted in the following table.

Table 5.23. Percentage differences in transport time between REG and TREND for selected relations in the Copenhagen – Minsk corridor.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	8	23	23	26	26	16
Karlskrona	3	20	20	22	22	14
Karlshamn	4	20	21	23	23	14
Göteborg	6	19	19	20	20	14
København	9	22	23	25	25	16

The missing improvements of a number of important road links have a profound effect on the travel times, which in many relations are considerable higher than in the TREND scenario. This is particularly valid for the travel time between Malmö on one side and Karlshamn and Karlskrona on the other side.

Table 5.24. Percentage differences in transport costs between REG and TREND for selected relations in the Copenhagen – Minsk corridor.

	Kali-ningrad	Vilnius	Kaunas	Klai-peda	Liepaja	Minsk
Malmö	13	-6	-8	-16	-16	-4
Karlskrona	13	-8	-11	-21	-21	-5
Karlshamn	13	-10	-12	-24	-24	-6
Göteborg	13	-4	-5	-11	-11	-2
København	12	-5	-7	-13	-13	-3

The table indicates that in relations not using the long ferry routes from Karlshamn the cost increase is about 13%. In the REG scenario it is assumed that the intermodal transport is strengthened, and this result in cost reductions for the ferry leg of the transport, of about 25%. This has a considerable impact on the cost in a number of relations.

The conclusion of the accessibility analysis in the corridor points to the fact that the long ferry routes in the corridor is in a fragile competitive position, and need to be strengthened by:

- Consolidating the goods flows in order to create a sufficient potential
- Ensure a high utilisation of the available ferries
- Prepare for a future competition from direct road and rail links along the southern shore of the Baltic Sea.

6 Summary of barriers and bottlenecks

A schematic summary of indicators of influence in the corridors Copenhagen-Wroclaw and Copenhagen-Minsk is presented below.

Each indicator is evaluated in terms of a 5 point scale, as known in the scenario analysis, ranging from very good condition (/no barrier or bottleneck) to very bad condition (/large barrier or bottleneck).



The importance of indicators is evaluated according to the following scale:

Notation	Description
++	Very good condition. No barrier/bottleneck at all.
+	Quite good condition. Not considered as a barrier/bottleneck.
0	Reasonable condition. Neutral influence.
-	Bad condition. A barrier/bottleneck.
--	Very bad condition. Large barrier/bottleneck.

6.1 Corridor Copenhagen-Wroclaw

Indicators are evaluated in the table below.

Indicator	Passenger Rail	Freight	
		Road	Intermodal
One-Stop-Shop. Existence of forwarders	--	++	--
Timetable coordination	-		-
Electrification	0		0
Rail gauge	++		++
Infrastructure cohesion	++	+	++
Crossing borders	++	++	++
Transport capacity	++	+	++
Administrative matters (custom papers etc.)		+	+
Language	0	-	-
Corruption	++	++	++
Crime	+	+	+
Infrastructure condition	-	-	-

With respect to the indicator “One-Stop-Shop”. For both passenger transport and freight transport by rail it is not possible to buy a joint ticket if one wants to move along the defined corridor, and therefore an evaluation of “- -” is stated. However, if one just wants to travel from Copenhagen to Wroclaw, regardless of the route, a joint ticket can easily be purchased at the national state railway companies or at kombi operators, which would result in an evaluation of “++”.



With respect to the indicator “Language” it is only considered as a smaller barrier in freight transport in relation to administrative matters when filling in declarations, custom related forms etc.

When the indicators “Corruption” and “Crime” are stated as “++” and “+”, of course it means that this does not occur in any significant degree in the countries along the corridor and it is not considered as a problem.

The indicator “Infrastructure condition” presents an aggregated result for road, rail and port infrastructure quality at the overall scale of the corridor. It must be noted, however, that some of its sections (e.g. in the western part of Scania) are in the good condition and do not feature any specific bottlenecks.

6.2 Corridor Copenhagen-Minsk

Indicators are evaluated in the table below.

Indicator	Passenger	Freight	
	Rail	Road	Intermodal
One-Stop-Shop. Existence of forwarders	--	0	--
Timetable coordination	-		-
Electrification	0		0
Rail gauge	--		--
Infrastructure cohesion	-	+	-
Crossing borders	0	--	--
Transport capacity	++	++	++
Administrative matters (custom papers etc.)		--	-
Language	-	--	-
Corruption	0	-	0
Crime	0	-	-
Infrastructure condition	-	-	-

With respect to the indicator “One-Stop-Shop. For both passenger transport and freight transport by rail it is not possible to buy a joint ticket if one wants to move along the defined corridor, and therefore an evaluation of “- -” is stated. However, if one just wants to travel from Copenhagen to Minsk, regardless of the route, a joint ticket can easily be purchased at the national state railway companies or at kombi operators, which would result in an evaluation of “++”.

With respect to the indicator “Rail gauge” it is a problem for the rail transport that the Belarusian and Lithuanian system is based on the 1520 mm gauge,



while the Swedish and Danish system is based on European normal gauge (1453 mm). Therefore it is not possible to establish continuous rail transport in the corridor without any kind of reaxling/transshipment. Nevertheless, systems have been developed which makes it possible to transfer units from rail to ferry in the port of Klaipeda, and similar systems are being established in Karlshamn presently. Therefore it is not considered feasible to prepare the ferries for transport of railway wagons.

The indicator “Infrastructure condition” presents an aggregated result for road, rail and port infrastructure quality at the overall scale of the corridor. It must be noted, however, that some of its sections (e.g. in the western part of Scania) are in the good condition and do not feature any specific bottlenecks. The main road system in Lithuania is also in good condition, but problems exists where the minor roads are being used for the international transports, e.g. for access to the port of Klaipeda.

Corruption is mainly a problem related to the passage of the border between Lithuania and Belarus. Crime is also mainly related to unsafe conditions in Belarus, since Lithuania has done a concentrated effort to establish fenced parking lots for long-distance trucks.

7 SWOT analysis

The SWOT-analysis is focused on freight transport.

Many of the statements in the SWOT analyses concern the end countries of each corridor, i.e. Poland in the Copenhagen-Wroclaw corridor and Lithuania and Belarus in the Copenhagen-Minsk corridor.

7.1 Corridor Copenhagen – Ystad – Swinoujscie – Wroclaw

Strengths:

- Low salaries and high unemployment rate in Poland providing for a competitive labour force (including salaries of lorry drivers)
- Well developed network of high quality road links in Denmark and Sweden
- Access to railway infrastructure in the ports of Ystad and Swinoujscie
- High frequency of ferry operations between Ystad and Swinoujscie
- Very good infrastructure conditions for interregional airline traffic in the corridor

Weakness:

- Lower purchase power of the Polish citizens hampering balanced trade exchange along the corridor
- Very limited network of motorways and lower quality of transport infrastructure in Poland with a large number of bottlenecks
- Low trade volumes exchanged between the areas across the sea compared with the corridors and routes between the old Member States



- Low level of familiarity with advanced transport solutions
- Lack of integrated intermodal concepts along the corridor, especially in the segment between Copenhagen and Ystad
- Low quality of inland waterway infrastructure (Odra river)
- High rail infrastructure costs in Poland
- Language barriers

Opportunities:

- New infrastructure investments proceeding fast in Poland. Financing is based on the National Road Fund, EU Structural Funds and Cohesion Funds.
- Fast growing volumes shipped to and from Poland along the corridor on account of EU enlargement and related market integration processes
- Economic growth in Poland faster than in old Member States
- Good rail infrastructure setting for the integrated intermodal transport solutions along the corridor
- No hindrances at the border control points
- Administrative regulations in the Polish transport business not considered a problem (crime and corruption rather low)
- Proposed traffic improvements in specific parts of the corridor resulting in substantial decrease of time and costs for the passage of cargo in the entire corridor

Threats:

- Serious competition to the road transport pattern along the corridor from other links and corridors (e.g. Gedser-Rostock or Trelleborg-Rostock)
- Market too weak to allow for establishment of rail cargo services, thus hampering development of a seamless intermodal transport system

7.2 Corridor Copenhagen-Minsk

Strengths:

- Low salaries and high unemployment rate in Lithuania providing for a competitive labour force (including salaries of lorry drivers)
- Good condition of the main road network except for Belarus
- Good rail infrastructure setting for the integrated intermodal transport solutions along the corridor



Weakness:

- Low share of labour force population in Lithuania and Belarus
- Very limited trade exchange volumes between Denmark/Sweden and Lithuania
- Very low economic activity combined with a rigid political system in Belarus
- Lack of integrated intermodal concepts along the corridor
- Several traffic hindrances along the corridor (e.g. long distance between passenger train stations in Karlshamn and Klaipeda and the ferry terminals, bottlenecks on Swedish E22 and on the Lithuanian/Belarusian border etc.)
- Different rail gauge in Denmark/Sweden and Lithuania/Belarus to be overcome with technical solutions
- Low frequency of ferry departures between Sweden and Lithuania
- Poor quality of inland waterway installations in Lithuania
- Low level of knowledge in advanced transport solutions
- Lack of wide-spread information on intermodal freight operators in Lithuania and Belarus
- Cultural differences and language problems in business activities

Opportunities:

- Economic growth in Lithuania faster than in old Member States
- New infrastructure investments on the way in Lithuania planned within the framework of the EU Structural Funds programmes and under the Cohesion Fund
- Proximity of the huge Russian market for processed goods, rendered available through infrastructure facilities for transit traffic in Lithuania and Belarus (e.g. wide gauge tracks)
- Very positive increase in the amount of transported goods on the ferry link Karlshamn-Klaipeda
- Traffic improvements in specific parts of the corridor resulting in substantial decrease of time and costs for the passage of cargo in the entire corridor
- New infrastructure investments in the ports of Karlshamn and Klaipeda (e.g. new intermodal terminals), making it possible to handle Intermodal Transport Units (ITU) in a rail/ferry interface
- Potential of the corridor to become an important pan-European corridor giving access to China and its market

Threats:

- Market too weak to allow for establishment of rail cargo services, thus hampering development of a seamless intermodal transport system



- High scale of crime and corruption in the transport business (Lithuanian-Belarusian border and in Belarus)
- Administrative regulations and working culture in Belarus very hard and difficult to deal with, thus increasing the costs of business operations
- Competition from other links and corridors, especially from those requiring long road section trips (driver salary aspects), like national road no.6 in Poland (Via Hanseatica)

8 Development potentials

The development potentials of each corridor are briefly evaluated in the following chapter and afterwards put into a scenario perspective. Each section is completed with a list of present and future projects, which are considered to support the development.

8.1 Corridor potentials for Copenhagen-Wroclaw

The corridor is characterised by general good conditions – regarding infrastructure, connections and administrative matters. The amount of motorways in Poland is for the time being limited, but this factor is expected to improve significantly in line with huge infrastructure investments in Poland part-financed by EU Cohesion Fund and Structural Funds.

For Scandinavian travellers Poland will for certain be of interest. Poland has great potentials within the areas of so-called “health tours” to spa and health resorts. In addition the very beautiful and attractive coast line of the Baltic Sea and the Mazurian lake land are of interest. However, also the moderate load of cargo transport along the inland waterways creates very good opportunities for water tourism. Finally also more active holidays such as golf trips, skiing holidays, mountain bike trips in the mountains, hunting in the forests etc. would be attractive to Scandinavian travellers. The interest is supported by the very favourable price level in Poland. However, more large scale tourism is difficult to see without an intensive and targeted marketing process combined with information and better cooperation between different agents. Furthermore, an extension of the offers and facilities in Poland is needed. Tourism in Poland could definitely develop to a very significant industry, which could create many jobs and be an important factor in order to bring down the high rate of unemployment of today.

Inflow of Polish tourists to Scandinavia has in recent years substantially increased. Although the majority of Poles still choose local resorts or Mediterranean and overseas countries as summer destinations, incentive sightseeing tourism done with private vehicles has become a promising offer for better-off residents. For that reason as well as for the opening of the domestic labour markets - Sweden and Norway provide attractive opportunities for the Polish travellers. Its evidence is given by a quite balanced proportion of Polish and Nordic ferry travellers between Ystad and Swinoujscie as well as Karlskrona and Gdynia.

With respect to passenger transport one should mention the very good infrastructure conditions for flights in the corridor, as both Copenhagen, Malmö, Szczecin, Poznan and Wroclaw have airports with international connections. This might be a good basis for setting up low price airline routes.



	2004	TREND, 2020
Border crossing traffic, passengers	363,000 passengers (Y-S) 99,000 passengers (C-S)	675,000 passengers (Y-S) 120,000 passengers (C-S)
Border crossing traffic, Freight tons	1.55 m tons by road 0.45 m tons by rail	2.5 m tons by road 0.6 m tons by rail
Public transport	5 daily departures each way 25 train connections back and forth per day between Ystad and Malmö 8 train connections back and forth per day between Swinoujscie and Szczecin	8 daily departures each way 30 connections Ystad – Malmö 16 connections Swinoujscie – Szczecin – Berlin
Road transport	205,000 vehicles per year of which 123,000 lorries	310,000 vehicles per year of which 160,000 lorries
Accessibility	12.1 hours by road between MLM and SZC 20 hours by rail between MLM and SZC via Swinoujscie	10.1 hours by road between MLM and SZC 18 hours by rail between MLM and SZC via Swinoujscie
Intermodal transport	Nodes in Ystad, Malmö, Swinoujscie, Szczecin and Poznan	Development of Ystad and Swinoujscie as intermodal nodes.

(Y-S) Ystad – Swinoujscie; (C-S) Copenhagen – Swinoujscie

Source: Fehmarn Belt Forecast 2002, Final report + own assumptions

The corridor has a good potential for trade and exchange of products, especially after the entrance of Poland in EU. However, it might not result in equal balances of goods (measured in tonnes). Consumer goods expect to go south, and more bulk orientated goods heading north, i.e. no balance in type of goods. It might most probably also apply to different modes of transport.

However, the corridor offers a good potential to develop both road and rail freight services for central and eastern parts of Europe. However, especially road transport has to expect serious competition from parallel corridors and their ferry links, such as Gedser-Rostock, Trelleborg-Rostock, Copenhagen-Swinoujscie, Karlskrona-Gdynia etc. The improvement of the German A20 from Ueckermark to Lübeck along the coast makes the German ports more competitive until the improvement of the infrastructure in the corridor has been concluded.

The use of inland waterways is not considered to be a serious alternative in the foreseeable future as almost all infrastructure investments in Poland give priority to road and railway modes as well as for ports and handling terminals in relation hereto. Furthermore, the planning of including inland waterways in the transport chain is too complex and would require harmonisation of interest from responsible organisations and new IT-tools for planning and management purposes at the trans-national level.

Very good potentials for Polish road transport businesses are due to significantly lower costs.

Finally, the high rate of unemployment in Poland might ironically very well be an advantage in order to maintain the competitive power also in the future, as high rate of unemployment means easy access to labour force and helps keeping cost (of salary) down.

Potentials in a liberalisation scenario

Following a general increase in trade exchange intensity within the EU, the corridor has transformed to a notable central European corridor.



Despite higher cost in road transport, primarily due to scarcity in labour force, the road sector has developed markedly. This development has been encouraged by a better infrastructure with an expressway starting in Swinoujscie and almost ending in Wroclaw, and a Polish society where production, trade and services are developing fast. This promotes the road transport mode as high value products are more likely to go by truck than by rail.

Nevertheless, intermodal rail transport has developed positive as well, but to a much lesser extent than the road transport business. The positive development is primarily caused by an upgrading of the railway from Swinoujscie to Poznan, and very large freight volumes in the corridor, which due to capacity and congestion problems are not absorbed fully by the road sector and therefore go by rail.

The free movement of labour has resulted in many Polish workers being engaged in the West European and Scandinavian industry and construction sectors. This has increased the passenger potential for the ferry routes.

Tourism in Poland has developed very positive. Apart from a very good infrastructure for road transport, the development has been supported by low cost airline companies, which have emerged widely securing cheap and high frequent connections along the corridor.

However, also the fast ferries operating between Ystad and Swinoujscie have resulted in a significant increase in one-day visits (cruise tourism) to Szczecin from the south of Sweden and eastern parts of Denmark.

Potentials in a regulation scenario

The general economy within EU has developed more restrained. This has lead to moderate increases in the total amount of freight goods.

However, intermodal rail solutions have gained a larger market share. This development is caused by a combination of massive investments in rail infrastructure including the rail to Ystad and further on from Swinoujscie and towards the south, and a much more modest investment in especially the road infrastructure in Poland.

Due to the increase of intermodal transport solutions also the amounts of transshipment terminals have increased.

Also in a regulation scenario the tourism in Poland has developed very positive. Low cost airline companies have established fairly widely but with a more moderate amount of departures and moderate prices due to maintained charges and fees in the airline business.

Conclusions/necessary development measures:

- Provision of infrastructural setting for the Central European Transport Corridor (CETC), composed of an expressway, trunk railway line and inland waterway of the Odra river to connect the ports of Szczecin-Swinoujscie with the economic activity areas in southern Poland and central Europe
- Elimination of bottlenecks around and in Szczecin to combat traffic capacity problems on inward and outward roads to the port area
- Construction of bypass links around densely populated areas on the track of the southbound road from Szczecin (national road no. 10)



- Provision of integrated intermodal concepts along the corridor, with a special attention to harmonise Danish and Swedish logistic systems (the segment between Copenhagen and Ystad)
- Harmonisation of time schedules for investments in the ports of Ystad and Swinoujscie to provide intermodal service for increasing traffic in the north-south direction
- Change of basis for calculation of infrastructure charges in Poland from recovering total investments to assessment of marginal costs of utilisation of infrastructure, leading to a reduction of railway infrastructure charges.

8.2 Corridor potentials for Copenhagen-Minsk

The corridor is characterised by obstacles for all modes and types of transport regarding infrastructure, interoperability and administrative matters. Some of the obstacles concerning especially infrastructure, e.g. bottlenecks on E22 in Sweden, the length of motorways in the corridor and standard of infrastructure in Lithuania and Belarus, are expected to be partly tackled upon in the coming years, whereas other obstacles, such as administrative matters when entering Belarus, are expected to maintain for years.

Concerning tourism in the corridor it is hard to see any large scale potential. For Scandinavian travellers Lithuania might be of some interest of historic reasons. This interest might grow after the entrance of Lithuania in EU, but the segment for historic and cultural trips will attract interest of a limited share of tourists. Travelling to Belarus for tourist purposes seems to be very limited. Belarus does not contain any well-promoted tourist potentials, e.g. like summer holiday resorts in Romania and Bulgaria, and in addition the present political system does not encourage, especially not Scandinavian people with a deep fundamental democratic observance, to discover Belarus further. Another important obstacle is the very limited transport accessibility with few or no direct flights from Scandinavia to Lithuania and Belarus, and a transport time by train (round the corridor) lasting around 30 hours.

For travellers from Lithuania and Belarus, Copenhagen and the south of Sweden might very well be of interest, but due to a high level of travel costs and consumer prices it is most certain that only a very limited amount of Lithuanian and Belarusian tourists can manage to spend their leisure time in Denmark and Sweden. It is considered more likely that internal Eastern European tourism will develop positively in the coming years, i.e. tourists from Lithuania and Belarus may visit Poland, Slovakia, Ukraine, Romania, Bulgaria etc.

It is not considered as realistic to establish a direct rail connection between Copenhagen and Minsk with respect to the passenger transport. The passenger volumes seem not sufficient and the competition from private cars and cheap airlines is expected to be too tough. Furthermore, it seems that a passenger train connection would gain more profit from the passage through Germany and Poland like according to the today's schedule. However, making a combined trip along the corridor by means of improved railway transportation (with some transfers) would be feasible.

Provided no investments are made in the field of intermodal rail transport, a direct freight railway line along the corridor would show low profitability. This is on account of a small amount of goods suitable for rail transport and too much transshipment. .



Lithuania might have some potential for trade and exchange of products, especially after the entrance in EU. With respect to Belarus it is more difficult to see the potential. Between Lithuania and Belarus the picture is slightly different, and trade among these countries is for sure of importance. Looking at the corridor as a whole it is after all difficult to see its potential to develop as an important freight corridor, especially due to unbalance in goods with respect to both tons and type of goods.

Significant freight volumes are expected to go to the northern part of Germany or Poland by feeder ships and trucks (to Poland) and only a more limited amount of freight volumes is expected to go directly to Scandinavia. In addition, goods heading for Scandinavia have several ferry alternatives, e.g. Karlshamn-Liepaja (Latvia), Klaipeda-Fredericia/Aarhus (Denmark), Klaipeda-Kiel, Klaipeda-Sassnitz, Lübeck-Ventspils (Latvia) etc. In general, the corridor will presumably experience large competition from the road transport business driving round the corridor, i.e. via Poland.

Nonetheless, completion of investments allowing, as an example, for provision of a train-bearing ferry link and mitigation of differences in rail gauge would uplift the Copenhagen-Minsk corridor to become an interesting alternative to the existing east-west land and sea routes.

Good potentials for Lithuanian and Belarusian road transport businesses are noted on account of significantly lower costs.

Finally, the high rate of unemployment in Lithuania and Belarus might ironically very well be an advantage in order to maintain the competitive power also in the future, as the high rate of unemployment means easy access to labour force and helps keeping cost (of salary) down.

Potentials in a liberalisation scenario

Trade between Scandinavia and Lithuania has increased significantly. Trade with Belarus is a little more uncertain and depends very much on the political situation of Belarus, and if Belarus contrary to expectation is a member of EU or more likely - has made some kind of trade arrangement with EU. Nevertheless, freight volumes have increased remarkably in the overall East-West relation.

In the East-West relation also the port of Kaliningrad and Baltijsk have turned out to be important players. The establishment of a self-government in Kaliningrad has turned Kaliningrad to a very serious freight transport competitor for transit traffic.

Investments in road infrastructure have been huge, including an upgrade of E22 to Karlshamn. The road haulage has increased dramatically and has affirmed its role as the leading mode of transport. The road flows have increased within the corridor, but a large part of the freight volumes by road go round the corridor, i.e. via expressways in Poland.

Freight transport by railway has experienced a recession, which has caused a decline in both market shares and volumes (measured in tons). The main reason for this decline is the extreme competition from other corridors and road transport combined with a rail infrastructure, which in many years has been suffering from insufficient investments. Freight transport by rail is exclusively used for bulk products like oil, coal, wood etc.

Sea transport has experienced an increase in volumes but has at the same time lost market shares to road transport in the East-West relation. Within the corridor the port of Klaipeda has seen large investments, and the immediate



result is a higher efficiency in the port turnover and increasing volumes. However, volumes to/from the Scandinavian market are more or less kept at the same level as before, and the increase has entirely happened on the “continent routes” to Germany and ports in the western parts of Poland.

The free movement of labour within the EU has resulted in some amount of Lithuanian workers being engaged in the West European and Scandinavian industry and construction sectors. This has increased the passenger potential for the ferry routes.

Tourism within the corridor has experienced only a marginal development, and is not a significant industry. Therefore, passenger transport has not gained much attention and only a limited amount of low cost airlines are present in the corridor.

Potentials in a regulation scenario

The general economy within EU has been more restrained. This has led to moderate increases in the total amount of freight goods.

Kaliningrad has developed to an important player on the Baltic scene, but to a large extent the ports of Kaliningrad and Baltijsk are used for discharging products from the Russian market.

All modes of transport in the corridor have experienced an increase in freight volumes.

In addition, rail and sea transport have increased their market share. The increased market share has been obtained through subsidies to support rail and sea transport, e.g. to keep down transshipment costs. Moreover, improved rail infrastructure and the widespread use of charges and dues in road transport have supported the positive development in rail and sea transport.

Also in a regulation scenario the tourism has experienced only a marginal development, and is not a significant industry. Therefore, passenger transport has not gained much attention, and the continued presence of charges and fees in the airline business have resulted in a very little amount of low cost airlines in the corridor.

Conclusions/necessary development measures:

- Elimination of bottlenecks on E22 in Sweden (e.g. links bypassing settlement areas with the present 50km/h speed limits)
- Further upgrade of road standards in Lithuania to allow for smooth passage of goods and passengers along the corridor (especially with regards to the section east of Vilnius towards the Belarusian border)
- Essential investments in road and rail infrastructure in Belarus, supplemented by the mitigation of control procedures at the Lithuanian-Belarusian border
- Consolidation of freight transport in transit ports in order to obtain sustainable freight loads for intensification of frequency of ferry departures between Sweden and Lithuania
- Improvement of cargo and passenger access to the ports in Karlshamn and Klaipeda related to the change from train to ferry mode



- Harmonisation of time schedules for investments in the ports of Karlshamn and Klaipeda to provide intermodal service for increasing traffic in the east-west direction
- Provision of traffic-accompanying infrastructure for road haulage in the easternmost part of the corridor (parking areas, car-repair areas, catering and accommodation facilities etc.)
- Provision of integrated intermodal concepts along the corridor, applicable to both western (Danish-Swedish) and eastern (Lithuanian-Belarusian conditions), e.g. a one-stop-shop concept
- Preparation of investments to improve quality of the Nemunas river inland waterway in Lithuania
- Better availability of information on intermodal freight operators in Lithuania and Belarus
- Change of basis for calculation of infrastructure charges in Lithuania from recovering total investments to assessment of marginal costs of utilisation of infrastructure, leading to a reduction of railway infrastructure charges.



9 References

Interview with (/contact to):

Danish Transport & Logistics (DTL)
International Transport Denmark (ITD)
Sveriges Åkeriföretag, Sweden
Anneberg Transport A/S, Denmark
Karlshamns Expressbyrå AB, Sweden
FoodTankers AB, Sweden
Institute of Logistics and Warehousing, Poland
Kombi Dan A/S, Denmark
Railion A/S, Denmark
Hupac Ltd, Switzerland
Szczecin and Swinoujscie Port Authority, Poland
Danish State Railways, Denmark

Literature and figures

Statistics 05 – The yearbook for passenger shipping traffic, Shippax 2005
Belarus – Investment Profile, Business Forum 2001
Description of E22, overhead presentation from “Sydsvenska Industri- och Handelskammaren”, September 2003
Several reports from the INTRASEA project, Baltic Sea Region INTERREG IIIB
Several reports from the Baltic Gateway project, Baltic Sea Region INTERREG IIIB
Available material from Workshop on Rail Infrastructure Charges, Efficiency, Cost Recovery and the Development of International Train Services, ECMT, Paris, 1-2 February 2005
Fehmarn Belt Traffic Consortium; Fehmarn Belt forecasts 2002, ministry of transport, Denmark, 2003

Several homepages, among them

www.siteresources.worldbank.org

Advantage Lithuania (www.lda.lt)

