The Fehmarn Belt fixed link and effects on logistic strategies and industrial development zones

Project part-financed by the European Union (European Regional Development Fund)
Baltic Sea Region Programme 2007–2013
SKÅNE

Malmö 2012-06-25

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Summary

The objective of this report is to explore how building of the Fehmarn Belt fixed link might affect companies´ logistic solutions and thereby increase the knowledge base for policy formulations. The fixed link is expected to be in operation at about year 2020/21.

A large number of studies of relevance for Fehmarn Belt has been performed. The approach used is primarily green corridor development with focus on the railway system. Forecasts show substantially increase in railway volumes, where the shorter transport time via a new Fehmarn Belt fixed link would increase railway competitiveness. The studies handles capacity on the railway, but put less focus on terminal development. Even though the the studies are performed in a green corridor context, sea transport is notably absent analysing development of intermodal solutions.

Interviews with companies representing a broad range of businesses have been carried out in this study. The companies confirm the expectations of increased railway transport, but as a general trend. The Fehmarn Belt fixed link can be described as enhancing this trend, not a major cause.

It is difficult to generalize conclusions concerning companies logistic desicions as a consequence of building the Fehmarn Belt fixed link. Partly because every company is unique, and partly because companies does to little extent consider infrastructure changes eight years ahead. Logistic desicions will rather be in question when the fixed link is in operation and transport cost and other variables are knowned.

The main variables affecting companies desicions are primarily transport cost and secondarily transport time. For road hauliers also rest time regulations are crucial. Current structure of production, terminals and warehousing is of course a basis for companies desicions.

Companies using railway transport is expected to gain in competitiveness with the fixed link. Also truck transport with time sensitive goods will benefit, depending on their logistic solutions with regard to rest time regulations. For most road transport the fixed link will have little impact unless the cost for using the fixed link will be substantially lower than using current ferry between Rødby Havn and Puttgarden.

The structure of terminals and warehousing is not expected to change. Lübeck and Öresund might become more important as terminal areas, while logistic areas like Taulov and Padborg might become less important. There are no expectations for development of new logistic areas.

The Fehmarn Belt fixed link will substantially improve the competitiveness for railway transport but several obstacles remain. BInterviewed companies claim that bottlenecks in the railway system surrounding Fehmarn will prevent the potential benefits for railway transport. Upgrading of the railway between Fehmarn and Lübeck, as well as increased capacity for rail freight transport between Denmark and Sweden are considered necessary measures to exploit the benefits of the Fehmarn Belt fixed link. Other measures that companies perticularly emphazises are not connected to the physical infrastructure, but to regulations like taxes and fees.

The policy implications of this study can be summarized in following bullet points:

- Intermodal transport, with railway as backbone, needs to be planned as a corridor concept. Capacity bottlenecks must be removed in the entire corridor and railway corridors should be planned to offer redundancy and reliability.
- Technological differences should be removed. A railway corridor through several countries ought to be harmonized concerning for example signalling systems and technical standards.
- A major change in the infrastructure might affect where truck drivers need to rest. Relevant authorities need to plan for truck stop services along actual route. In this particular case the demand for truck stop service might increase in southern area of Copenhagen.
- Changes regarding terminal and logistic areas might happen within the current structure. In the case of Fehmarn Belt fixed link elevant authorities need to be prepared for increased freight handling in Öresund and Lübeck area, e.g preparedness for increased demand of space.
- Harmonizing regulations, taxes and fees between countries is crucial for a competitive railway system.

Introduction

Background

The overall objective of TransBaltic is to provide regional level incentives for the creation of an integrated multimodal transport system in the Baltic Sea Region (BSR). This is to be achieved by means of joint transport development measures and jointly implemented business concepts.

As underlined in the European Union Strategy for the Baltic Sea Region, appropriate public policy response is needed to increase the accessibility of territories and the quality of connections, and to master the increasing flows in and across the Region. TransBaltic is going to contribute to the implementation of the EU Baltic Sea Strategy by adding a sustainable regional growth dimension to the harmonisation actions, which are planned by the national transport ministries (Priority Area 11). Furthermore, the project aspires to develop and test specific transport and logistics solutions, which stem from needs of the Baltic Sea business community and may be introduced to relevant EU and national level policies.

One of the aims of TransBaltic is to formulate a BSR action plan. Several studies and analyses contribute in this process. This analysis contributes as a case study concerning company responses to increased accessibility by the construction of the Fehmarn Belt fixed link.

Purpose

Several studies have analyzed the expected consequences of new fixed links in southeast Baltic area, e.g. Fehmarn Belt and a second fixed link crossing Øresund. Most of these studies have a macro level approach in forecasting expected volumes, modal split and route choice.

The objectives of this report are to explore how the Fehmarn Belt fixed link will affect supply chains and terminal structure for a selected group of commodities. The study also explores how the fixed link will affect logistic development zones within southwest BSR. In contrary to macro flows this study focus on company flows and distribution chains.

To support Green corridor development by political decisions and policy making the study draw conclusions, and argue, for further infrastructure investments to promote railway transport for selected commodity groups as well as consider other measures as for example pricing.

Methodology

This study started with an inventory of projects of relevance for the actual transport corridor. The main source has been the TransBaltic inventory of EU-funded projects[1] in the BSR. Project partners and other contacts have also contributed with other studies of importance. The inventory forms the basis for the case analysis where 18 companies have been interviewed of their strategic choices as response to the completion of the Fehmarn Belt fixed link by year 2020, and possible response to a future second fixed link between Sweden and Denmark around year 2030.

Task force

A task force has performed this project with participants from the TransBaltic partner group and Transport Data Lab, where Region Skåne has been project leader. The participants are:

- Thomas Ney, Region Skåne
- Henrik Sylvan, Transport Data Lab
- Tom Granqvist, Østlandssamarbeided
- Leif Gjesing Hansen, Region Sjælland
- Henrik Kaalund Jørgensen, Region Sjælland
- Patrik Rydén, University of Lund
- Kaj Ringsberg, Region Västra Götaland

The analysis in this project have been performed and written by Maria Nilsson, Region Skåne. Thomas Surasto, University of Lund, has participated in interviews as part of his master thesis.

[1] Eide, 2010.

Fehmarn Belt fixed link – a strategic investment for southwestern Baltic Sea Region

The Danish and German governments have agreed upon building a combined motorway and railway tunnel between Rødby and Fehmarn. The tunnel is expected to open at year 2020. Until then, the current motorway between Copenhagen and Rødby will be complemented with double track, and electrified railway. At year 2020 the remaining bottleneck in Denmark is the single-track railway bridge over Storstrøm.

The agreement between Denmark and Germany includes that sufficient investments (e.g. between Fehmarn and Lübeck) will be made within seven years after the fixed link is taken into operation. This means primarily that railway capacity will continue to be limited with single-track bottlenecks. There will also remain bottlenecks on road network.

The transport network by year 2020 describes capacity and standard according to decided investments. This scenario forms the base information used to interview companies about effects on logistic strategies.

To widen perspectives of effects of infrastructure investments a second scenario was presented to the interviewed companies. The horizon year is 2030 and bottlenecks at the opening of the Fehmarn fixed link is assumed to have been fixed. Furthermore, in this scenario a second fixed link for road and rail transport, between Helsingborg and Helsingør (HH) is assumed to have opened. In connection to the second fixed link it is assumed that the transport corridor Route 5 is built. Railway in Route 5 is essential to carry through he strategy to lead freight trains north and west of Copenhagen in order to provide more efficient use of existing railway capacity in southern Öresund, primarily for passenger transport.

Källa: IBU-Öresund

Expected consequences of Fehmarn Belt fixed link

The inventory have found 38 studies of relevance whereof 34 have a macro level approach where expected transport flows are calculated with traditional transport modelling methods. Only four studies are qualitative and focus on company decisions. This chapter summarizes the conclusions from the literature inventory, and some complementary interviews, concerning expected consequences of the Fehmarn Belt fixed link. The literature study is presented in Appendix 2.

The main expectations on effects of the Fehmarn Belt fixed links can be summarized as:

- Increasing railway volumes and intermodal transport
- Increasing capacity problems on remaining railway bottlenecks after the fixed link is in operation
- increased importance of Southwest BSR as logistic area by connecting logistic facilities in the Öresund and Hamburg areas
- Limited effects on route choice for road transport

Effects on localization

The Fehmarn Belt fixed link enables new organizational and possibilities to reach larger market. Hamburg and Öresund regions are two important logistic areas, which are expected to be integrated into one large logistic region with a large population base. The fixed link will also create a direct connection between Scandinavia and some of the largest container ports in Europe. There are expectations that the improved accessibility and regional integration will lead to, among other effects, changes in companies´ localization strategies and establishment on new markets.

Experiences from other comparable accessibility improvements like Great Belt Bridge and Öresund fixed link show that there are effects on relocalization of for example warehousing and production. Three years after the opening of the Öresund fixed link Toyota established a distribution centre in Malmö. The fixed link was a decisive factor for the establishment since it gives good conditions for distribution to the Nordic market from one hub that also covers potential growth markets in Baltic States and parts of Russia.

Five years after the opening of the Great Belt Bridge an investigation were made concerning four companies[2] responses to the bridge. The investigation showed that the companies had relocated logistic facilities in connection to the building of the Great Belt Bridge[3]. The companies claim that the relocations had taken place regardless the bridge. The reasons for relocations to new facilities depended on cost and time efficiency but also increased requirements on the work places. It also gave new possibilities for time windows for deliveries, as for example during night.

The author of the investigation claims that the companies may have difficulties remembering the exact causes of decisions five years earlier on relocalization, and whether the decisions were connected to building of the bridge. What the author might mean is that the bridge had impact on companies choices of localization but that they did not consider the fixed link as essential for their strategies.

There are several arguments why a fixed link should have impact on decisions of localization. Some benefits are that a fixed link, in comparison to ferries can reduce risk of delays in transportation. There will be fewer reloading of goods that reduces the risk of damages, which in turn leads to reduced costs and less delays. This means that companies can transport their goods longer distances on shorter time[4] and with better time precision. This increases the possibilities for just-in-time services e.g. the goods is transported directly from production site to costumer without intermediate storage. Postponement, which means customer adapted production, is another way to reduce costs and this strategy is an option with concepts like just-in-time[5].

Freight flows and modal split

Several studies concludes that there will be options for freight flow structure and increased accessibility on railway when the Fehmarn Belt fixed link is in operation. With the fixed link companies will have better possibilities reducing transport time and transport cost by rail transport[6]. The link will also increase capacity between Scandinavia and continental Europe. This is mainly beneficial for railway transport[7].

[2] TeleDenmark, Carlsberg, Danisco and Danæg.
[3] Stora infrastrukturprojekter og deres strategiske virkninger med saerlig fokus på effekter for virksomheder Av: Technical University of Denmark, Sten Hansen (2004-2)
[4] Stora infrastrukturprojekter og deres strategiske virkninger med saerlig fokus på effekter for virksomheder Av: Technical University of Denmark, Sten Hansen (2004-2)
[5] Den faste Femern Belt forbindelse -Regionale udviklingsperspektiver (2009-1)
[6] Godstrafiken utvecklingsmöjligheter som följd av en satsning på Europakorridoren – KTH Avdelningen för trafik och logistik (2008-09)
[7] Infrastruktur och byutveckling i Öresundsregionen – IBU Samlade rapporter

The transport time reduction for railway transport will be larger than for road transport, since current route for rail is by Jutland while trucks can use both the route by Jutland and the ferry between Rødby and Puttgarden. Transport distance by railway will be reduced by 160 kilometres by using the Fehmarn Belt fixed link[8] and transport time between Copenhagen and Hamburg will be reduced by two hours[9]. For road transport the reduction in travel time will be approximately 1,5 hours. Changes in time and cost are expected to have impact on increase in railway traffic and intermodal transport[10].

The Fehmarn Belt fixed link is not expected to have major impact on route choice for road transport. Reduced transport time by truck will have positive impacts on transport cost but in particularly for some commodities like foodstuff[11], and fixed link gives a better flexibility (lesser risk of delays) since transport are no longer dependent on ferry time table. But, the longer transport time by ferry can be used to provide the rest time obligated by law[12]. This also affects the route choice for road traffic.

The route choice will also be affected by surrounding infrastructure, in particular for rail transport. The railway from Puttgarden to Lübeck is single-track without electricity and upgrading will not be completed until seven years after the Fehmarn Belt fixed link is opened. In Denmark there are capacity problems in Copenhagen and around Kastrup and the Öresund fixed link. There will also be remaining single-track distances in Denmark at year 2020 at Storstrøm and Guldborgsund.

There are several factors that have impact on companies' logistic solutions. The planning of transports and flows are made at the tactical and operational level, but with a major infrastructure investment like the fixed links there might be a more long term planning, in particular in companies with large and stable transport flows. But, as this study shows, many goods owners consider delivery service and not route or modal choice. So far, few studies have been made on impacts on logistic strategies as consequence of infrastructure improvement.

[8] www.femern.com
[9] Godstrafiken utvecklingsmöjligheter som följd av en satsning på Europakorridoren – KTH Andelningen för trafik och logistik (2008-09)
[10] Gränsöverskridande godstransporter genom Skåne år 2030 Ramboll (2011-06)
[11] Ibid
[12] Öresundsregionen som international transportknudepunkt IBU Öresund delaktivitet 2 (2010-12)

Intermodal transport solutions

The literature study shows expectations on increasing intermodal transport when the Fehmarn Belt fixed link is in operation. There are reasonable arguments for these expectations.

The logistics industry has high requirements on time precision, frequency and costs that many times favour road transport. Railway transport is considered by companies to be unreliable, having to low frequency and does not have competitive prices. There is a challenge with intermodal solutions since the load factor needs to be around 80% to reach economic break even[13]. However, on longer distances railway can be competitive regarding cost, but lack reliability.

Railways is not always an option since there need to be large freight volumes to be cost effective. To increase transported volumes, goods often needs to be consolidated from several companies which means more goods needs to be handled in terminals. This takes time, creates uncertainties in time precision and excludes concepts like just-in-time.

At the same time there is a trend towards greener transport where railway is an environmentally better option than road transport. To develop green transport the railway needs increased volumes and to attract more companies to use railway transportation. The possibilities to develop railway transport require intermodal solutions[14].

As earlier discussed the expectations are that railway will benefit more than road transport from the Fehmarn Belt fixed link, and this will increase intermodal transport[15]. Even though transport time will be affected by time-consuming freight handling in terminals, the transport cost has a larger impact on transport solutions than transport time[16]. This indicates the importance of developing the handling process at the terminals.

[13] Kjell-Åke Hvittfeldt - Volvo Logistics Corporation (2011-08-22)
[14] Scandria Output 3.11-1 "Optimised connection of intermodal terminals in Berlin-Brandenburg to north-south-transport" Baltic Sea Region Project #026 "Scandinavian-Adriatic Corridor for Growth and Innovation" Av: Philip Michalk (Version 1, 11-06-07)
[15] Gränsöverskridande godstransporter genom Skåne år 2030 Ramboll (2011-06)
[16] Godskunders värderingar av faktorer som har betydelse på transportmarknaden - KTH- Avdelningen för Trafik och logistik- Sofia Lundberg (2006)

Effects on logistic strategies

A case study has been performed where 18 companies in Sweden, Denmark, Norway and Germany have been interviewed on how their logistic strategies will be affected by the Fehmarn Belt fixed link. This chapter discusses the results from the interview study. The entire study is presented later in this report.

The case study shows clearly that each company is unique in its logistic strategies and that infrastructure measures are part of a large set of parameters that influences logistic choices. The interviews also indicate that companies in general do not consider new transport possibilities until the link is in operation or soon before. Apart from uncertainties about transport costs by the fixed link, also other variables that effect companies' decisions might have changed when the fixed link is opened. Those variables can for example be changes in the market demand, competition and business models as well as in political decisions about taxes and regulations.

One example of changes in logistic decisions is *Alex Andersen Ølund* that can benefit in transport time to use the Fehmarn belt fixed link instead of alternative routes. The change in route can itself lead to changes in logistic structures regarding potential expansion at existing terminals. The effects of infrastructure changes like the Fehmarn belt fixed link is thereby complicated to draw conclusions about cause and effect.

The effects indicated by this study is that the Fehmarn Belt fixed link will have impact on companies´ logistic structures since one or a few terminals might become of larger importance in relation to other terminals within company structure. The reason is, like in the case with *Alex Andersen Ølund*, will carry through changes at tactical level resulting in transport time and cost reductions by rerouting their flows using the fixed link.

At strategic level this means that companies´ supply chains will have another structure and that goods will be distributed to costumers on several alternative routes. This might result in new company approaches regarding transport planning.

Companies might also need to consider current terminal structure where the relative importance of each terminal might change. Some terminals need to be expanded while others might be closed down. However, this study does not indicate establishing new terminals in new locations. Potential changes within company structures are primarily dependent on its current structure and if the fixed link has a potential for optimizing this structure. Companies' work after current structures and these structures differs from company to company.

The Cargo owner *Stora Enso* foresees a possible expansion at their terminals in Malmö and Trelleborg. The forwarder *Alex Andersen Ølund* foresees a potential expansion at their terminals in south and central Sweden. Several of interviewed forwarders view the areas around Helsingborg, Malmö and Copenhagen as attractive for investments in logistic facilities if the fixed link will provide options for more efficient transport structures.

The driving and rest time regulation is an important parameter for road hauliers whether the Fehmarn Belt fixed link will become of importance for companies organization and planning of transport flows. For companies that cannot use the time in the ferry between Rødby and Puttgarden for drivers resting periods, the fixed link might be beneficial for more effective transport with regard to driving and rest time regulations.

Freja Transport is one company that might benefit from the fixed link. With current organization the company cannot effectively use the time on the ferry for drivers rest times. Currently *Freja Transport* transports 15 000 trucks yearly by Fehmarn Belt ferries and the fixed link will make it possible for more effective transport flows since rest times can be planned more efficiently in the transport chain. The company will gain transport time and thereby be able to reach a larger geographical area. The option for shorter lead times will also increase reliability in supply chain processes. This is also valid for time dependent goods where shorter lead times and reliability is of utmost importance.

From the interview study it can be concluded that supply chain strategies concerning companies´ organization of freight flows will have the largest impacts of the fixed link depending on commodity and current organization. Railway operators will gain mostly by shorter transport times that will attract the route by Fehmarn on behalf the route by Jutland. The sorter lead times can increase railway competitiveness and result in changed supply chains. The effect will also be increased geographical market penetration with higher reliability of precision in delivery.

However, the positive effect on railway competitiveness by the Fehmarn Belt fixed link is dependent on surrounding bottlenecks. Without measures removing bottlenecks like single-track distances or capacity measures between Scandinavia and Germany, e.g. Öresund capacity, the positive effects will not show.

With removing of railway bottlenecks in the corridor it can be expected that the demand for railway transport will increase. This will in turn lead to increased frequency and thereby increased volumes in terminals. This means that terminal capacity can become critical. If increased volumes at terminals could lead to time losses at terminals, then gains in transport time will be lost.

Increased reliability in railway transport is to a large extent connected to reliability in intermodal transport. Handling at terminals and technology development are also important (as discussed before in this report). An international robust railway system will give companies new options for organizing transport resources and make supply chains more efficient, thereby increase companies competitiveness. The Fehmarn Belt fixed link is one component to increase railway reliability and efficiency, but without removing surrounding bottlenecks the effects will not show. Apart from upgrading single-track distances, mainly in Germany, also increased capacity over Öresund needs to be fixed. Investment in a second fixed link crossing Öresund, e.g. Helsingborg-Helsingør and Route 5 are essential to take benefit of the investment in the Fehmarn Belt fixed link.

The companies have hard to potential changes in logistic structures as a result of infrastructure changes ten years from now. One example of how infrastructure has impact companies' logistic structures is Toyota. Three years after the opening of the Öresund fixed link Toyota established a distribution centre in Malmö. The Öresund fixed link became the decisive factor for choice of location since the entire Nordic market could be covered from Malmö as well as the location can serve growing markets in Baltic states and Russia.

Company case studies

Effects on localization

Carriers

According to interviewed forwarders neither the Fehmarn Belt fixed link, nor a future second fixed link crossing Öresund will have impact on localisation strategies. But several of the companies could see possibilities of changes within current terminal structures. On the other hand, several companies could foresee possible expansions at already existing terminals, or shifting importance between current terminals within company structure as an effect of the Fehmarn belt fixed link. One of the reasons can be that transport routes might change when the fixed link will be taken in operation.

To understand the complexity of company structures and decisions basis a number of interviewed companies are referred to below.

Alex Andersen Ølund is a Danish carrier that transports mainly time sensitive products like plants by truck. The company have warehousing in Odense in Denmark and in Helsingborg and Eskilstuna in Sweden. The company also have a terminal in Katrineholm in central Sweden. The products are transported from Holland and Germany to Odense by Jutland. Deliveries to Sweden must arrive in the morning.

The company says that the transport route might change with the Fehmarn Belt fixed link, since transport time is critical for transported products. A route change would give Swedish warehouses/terminals greater significance, while the warehouse in Odense would become less important. The distance would be 50 kilometers longer than the route via Jutland. On the other hand does the company calculate that a fixed link could save about 45 minutes in transport time because less risk of delays and waiting time at the ferry port. The consideration of time saving and cost for using the fixed link will be decisive for route choice.

The railway operator *TX logistik* can see a possible expansion at existing terminals. Theoretically can the fixed link result in shorter lead-time for outgoing goods that can result in more frequent transports. The forwarder *Bring* find that increased intermodal transport and thereby increased railway transport will increase the importance of Malmö and the area around Lübeck as freight nodes. Padborg, which is one of the nodes that *Bring* uses, would become of less importance. Also *DB Schenker Norge* see possibilities of expansion at existing terminals as a result of increased railway transport, but the expected expansion is not dependent on the Fehmarn Belt fixed link.

Carriers that do not expect any changes in logistic facilities dependent on the fixed link are *Gödecke logistics* in Germany, *Cargonet* in Norway and *Kim Johansen*, *DB Schenker Rail* and *Freja Transport,* which are established in Denmark. *Gödecke logistics* states that;

"We will not relocate closer to the railway route since we are not oriented towards railway transport, which are those with most possibilities with the Fehmarn Belt fixed link"

Kim Johansen regard that their network of terminals are logically localized because of transport distances to the main terminals in Oslo, Stockholm, Gothenburg and Jönköping. *Freja transport* believes that their network can be developed and with stronger position in the Nordic countries but not because of the Fehmarn Belt fixed link.

Goods owners

For goods owners the opinions are dependent on the company background like geographical location, turnover and market. However, there were more similarities in the goods owners than among the carriers. One of the similarities is the importance of the historical localisation of production. Goods owners does not see any change, or need for change, of production with regards to infrastructure changes.

Hydro Aluminium Rolled Products has its production in Holmestrand, south of Oslo. The company claims it is not an optimal localisation but production site will not be moved. *Royal Unibrew* and *Norske skog* have similar arguments. *Ikea* see a possible expansion of warehouses but no future relocation dependent on infrastructure changes, and no changes dependent on the Fehmarn Belt fixed link.

One company can predict localisation changes because of the fixed link. *Stora Enso* have production sites in several places in central and south Sweden. Most of these production sites have access to railway that is used for approximately 80% of outgoing goods. There are terminals in Malmö and Trelleborg that are used as service complements, even though the volumes are relatively small. *Stora Enso* uses the ferry from Trelleborg to Germany. This volume could possibly be rerouted to the Fehmarn Belt fixed link and would also have impact on the terminals in Malmö and Trelleborg. Both these terminals could increase in importance as an effect of the fixed link.

Both German goods owners *Carl Spaeter GmbH* and *Alpla* claims that Skåne can be an interesting area for localization with regard to infrastructure improvements, that is both the Fehmarn belt fixed link and a second fixed link crossing Öresund including Route 5. Carl Spaeter GmbH think that, hypothetically, both Copenhagen and Helsingborg would be interesting but they have no plans for relocalization. Alpla are located in Lübeck and consider Skåne interesting since it is closer to costumers but first of all need to consolidate on the market in this geographical area.

There are other barriers that have impact on localization like railway fees. *SSAB* claim that production in China or South America is more attractive if railway transport in Sweden will not become more competitive. SSAB claims that:

"…Fehmarn Belt is not so interesting but the Swedish infrastructure is highly interesting. De Swedish infrastructure is very important for our business and it has big problems as lack of capacity and reliability in railway network. There is also a question about the political alignment concerning fees and taxes. Sweden have tripled the track access charges for a system that we today not get what we pay for. There is also a question of fees for sulphur emissions that will increase costs for shipping and also CO2 taxes. This is not, in our opinion, coordinated governance. We want to move goods from road to rail from en environmental perspective but if track access charges are tripled, it will be hard to accomplish. The non-coordinated increase in fees affects the entire Swedish export industry in a negative way. If we look at the entire cost picture with increasing fees, as mentioned above, we see possibilities to establish on other markets like for example Asia and America where we have a market. The Fehmarn Belt fixed link will not have any impact on this decision."

Freight flows – carriers view

Companies' actions concerning freight routes differ because of different conditions like localisation, market and freight volumes. Total cost for the route and transport time are two basic pillars that where discussed, and the two most important factors for route choice. The price for crossing the Fehmarn Belt fixed link is one main factor that will affect attractiveness for this route.

Price and cost

Gödecke logistics does not see the Fehmarn Belt fixed link as an attractive route choice since they expect increased cost compared to the ferry connection. The increased cost is due to fuel consumption driving, instead of standing still on the ferry. Gödecke logistics is a small company that does not have the same possibilities to compete with larger actors. In the current situation the company has better possibilities to negotiate prices with ferry operators than with the owner of Öresund fixed link. The cost saving, driving larger volumes by the fixed link is small, and if the same development would occur with the Fehmarn Belt fixed link the company prefer the ferry connection.

Freja transport are using the route by Rødby - Puttgarden with approximately 15 000 passages a year. The price for using the Fehmarn Belt fixed link will be essential for using alternative routes. On the other hand, the company state that the will most likely continue using the route by Fehmarn even if it turns out more expensive than the alternatives.

For *Kim Johansen* will the fee for the fixed linked be crucial deciding which route to use. *"For a major part of our goods the use of the Fehmarn Belt fixed link will be dependent on cost crossing the link. As it is today the prices on the ferry between Rødby and Puttgarden have increased. This means that it is cheaper to use the route by Jutland to the continent."*

DB Schenker Norge states that it is more expensive to transport goods by truck via Fehmarn Belt than to use the ferry Oslo - Kiel, or Trelleborg – Travemünde. If the route by the Fehmarn Belt fixed link will be used is dependent on whether costumers want to pay for shorter transport time. The company does not consider the route by the fixed link as competitive regarding the cost, but the fixed link might be advantageous for time sensitive goods like foodstuff.

According to the carriers the cost is decisive for route choice, but there are more parameters that matters. The time saving using the Fehmarn Belt fixed link will have less importance than cost unless the time saving itself leads to lower total transport cost.

For the railway operators *Cargonet*, *DB Schenker Rail* and *TX logistik* the time saving using the fixed link will determine the route choice. Transport time has an indirect effect on transport cost and TX Logistik states that it is the total cost that matters.

Transport time

Several companies see a gain with the Fehmarn Belt fixed link, in particular carriers who transport time sensitive products like *Alex Andersen Ølund*. *Gödecke logistics* also see positive gains for express transport. **DB Schenker Norge** states that the main advantage with the fixed link is for transport of goods, like foodstuff and medicine. They also mean that costumers without stock have higher demands on shorter lead times, particularly in food industry, but most important is that the goods delivers on time.

For *Bring*, which transport perishable goods, the shorter transport time is the most decisive factor for route choice. The company will gain 1,5 hours using the Fehmarn Belt fixed link instead of current route via Jutland. Thereby one of the company's freight nodes in Padborg will become of less importance. The most important, though, is to deliver on time. Transport cost has importance but: *"We will not make any cost savings but shorter transport time will be decisive"*.

For *DB Schenker Rail* the Fehmarn belt fixed link will result in a transport time saving of two hours, compared to the current route by Jutland. *Cargonet*, an intermodal transport operator, believes that railway competitiveness will increase thanks to shorter lead times on the distance between Malmö/Copenhagen and continental freight nodes like Hamburg and Duisburg. The bottom line is that a more efficient railway system will increase tits competitiveness.

The time saving is not that important for *Freja transport*, but the fixed link will improve how to reach the continent and is important for that reason. In addition, Hamburg and Lübeck will get closer to the Öresund region.

Driving and rest time regulations

Driving and rest time regulations have an important impact on route choice for road transport. This will affect if road hauliers will use the route by the fixed link. **Kim Johansen** is an example of a company that has organized its terminal structure to be able to take advantage of time on the ferry. Thereby they do not see the Fehmarn Belt fixed link as a positive option for their company.

Kim Johansen states that: *"Because of our concept, we must consider the drivers rest time. This means that if its possible to cross the Fehmarn Belt in shorter time the whole transport chain will be affected by that change. The result is that we have to consider if we will become more efficient for that particular transport"*.

However, *Freja transport* look upon the Fehmarn Belt fixed link as beneficial concerning driving time. For the company it comes quite natural to use the fixed link. Hauliers that are their suppliers will have an advantage when they can choose to produce or take a break that fits into the regulations. The company mean that rarely suitable for a rest time when the driver arrives to the ferry. One example is that driving time have been only three hours when the driver arrives to Rødby, and take the rest time 1,5 hour to early. Using the ferry for rest time is not optimal for the company and a fixed link can give opportunity to better plan for rest times.

Gödecke logistics has another point of view. They consider the fixed link is negative concerning rest times. *"We are very bound to the chauffeurs driving time, which means that also frequency and distance depends on that. The fictive time we gain from the Fehmarn Belt fixed link therefore are of no benefit for us when drivers need to pause on the road, which today is achieved with waiting time before, and transport time on the ferry".* Further on, the company discusses whether rest time should take place before or after reaching the fixed link. Probably willl there be a need for expanded truck parking both in Denmark and Germany.

Carriers view on scenario 2030 with Fehmarn Belt fixed link, HH and Route 5

The carriers had in general difficulties to relate to a year 2030 perspective with the assumption that a second fixed link crossing Öresund and Route 5 are in operation. The time perspective is considered to distant. Even though, the carriers are positive to mentioned investments and several of them mean that the Fehmarn Belt fixed link is only one of the infrastructure improvements that needs to be done in the area. Without further investments, the bottlenecks will only be moved which decreases the possible benefits of the Fehmarn Belt fixed link.

DB Schenker rail argues that the Öresund fixed link is already a bottleneck for railway transport. A second fixed link will be important for the Öresund region, and for the Swedish and German industry which are dependent on railway transport. If the Öresund fixed link would be temporarily closed, or reach its maximum capacity use, a second fixed link would provide an alternative route.

Cargonet consider both Fehmarn Belt fixed link and a second fixed link crossing Öresund as important for Norway. *"I consider that the Helsingborg – Helsingør connection should be partly financed by the Norwegian state, since it contributes to our trade and industry"*. Cargonet emphasizes that it is the system perspective on the railway structure that matters and Fehmarn Belt fixed link does not alone create major improvements in the railway system.

Gödecke logistics is positive on further investments in Helsingborg – Helsingør connection but mainly for railway transport. For road transport via a new connection it is, according to Gödecke logistics, difficult to determine the consequences since the current ferry trip only takes 15 minutes. One important factor can be how payments for using the connection will be handled. If there would be queues at payment stations, there will be no time gain for road transport.

Freigtht flows – goods owners view

In discussions about freight flows with goods owner they recurrent references to the carriers. The goods owners outsources transports with exception for Stora Enso. Even though the goods owners have influence on the transports, they are no fully conscious about routes and how transports are performed. The important factors for the goods owners are that the transports fulfil their demands as for example: cost, time, handling of goods and environmental demands.

SSAB see the Fehmarn Belt fixed link as an option for choice of route, but that decision will be taken when the link opens. That decision is dependent on total cost, lead times as well as pros and cons for their costumers.

Royal Unibrew regards the Fehmarn belt fixed link as an option for alternative routes that can be more cost effective. However, since the cost for the link is not known it is difficult to do any predictions. They primarily refer to the carrier who will make possible changes. The most important, though, is total cost and that the carrier perform the transport according to demands. A potential lower transport cost can improve the companys competitiveness. On the other hand, the main production site is in Odense and their outgoing transports by railway uses the route via Jutland to Italy. Royal Unibrew does not see any gain in using the Fehmarn Belt fixed link.

German *Alpla* also refers to the carrier, and says that the cost will determine route choice. The company have two costumers on the Swedish market (Tomelilla, Skåne and Hedemora, Dalecarlia). The costumer price consists to 30% by transport cost. They would become more competitive on the Swedish market if they would be able to reduce this cost.

Norske skog transports their products by truck to the railway terminal in Taulov, Denmark via Öresund fixed link and the Great Belt Bridge. From Taulov the products are transported by railway to primarily Germany and Italy. The Fehmarn Belt fixed link would increase cost efficiency, but like other goods owners they refer to carriers.

For *Carl Spaeter GmbH* the transport time is crucial for deliveries to their costumers in northern Sweden. Time savings would have to be done for road transport since the company does not use railway. The company cannot predict whether the fixed link will result in time gains.

Ikea transport part of their goods with intermodal solutions from Sweden to distribution centres in Dortmund and Saltzgitter. The Fehmarn Belt fixed link will save transport time, compared to the route via Jutland, and might also affect transport frequency in the intermodal solutions. For road transport Ikea uses the ferries between Trelleborg and Travemünde because of driving and rest time regulations.

"Time is decisive and led time can improve. This in turn can lead to a larger volume that fits into an intermodal solution via Fehmarn Belt. With goods lead times and possibly larger volumes there is a possibility on the long run to also increase frequency that will make intermodal solutions even more interesting. But we cannot send to much goods at the same time because of limitations in unloading and warehousing at our stores, that is why we need higher frequency in our freight flow. We want to increase our deliveries directly to our stores and then time precision is very important".

Stora Enso does not see any practical gains with shorter lead times, since they do not have time sensitive products. They deliver goods to terminals on the continent where it can be stored for up to a week before the costumers call off. The conditions are that the goods shall be on place at a certain date for call off, and the costumers have one or two weeks to collect the goods. Even though time is not of importance, the Fehmarn Belt fixed link increases railway capacity. The company sees a possibility to use railway for transports that today use trucks via Trelleborg and Germany. However, the capacity problem on the railway in general is an obstacle.

Europe is the largest market for Norwegian *Hydro*, and Germany the single largest market. Thereby all transport corridors between Norway and the continent of interest. Current transport routes are via ferry Larvik – Hirtshals or by land transport through Sweden. Route choice depends on cost, driving and rest times and capacity on the carriers. About 40% of their outgoing goods passes through Fehmarn. Which route choices that will be selected when the fixed link opens is too early to say. It also depends on factors like road taxes and environmental fees. A decision of possible new route will not be taken until the link is in operation.

Goods owner's views on the year 2030 perspective are similar to the carriers. It is too early to consider infrastructure improvements in such a long time span. But, emphasized that Fehmarn Belt fixed link will not be used to its full potential if surrounding restrictions remain. Without investments in remaining bottlenecks and in Öresund area the bottlenecks will only be moved.

Intermodal transport

Both carriers and goods owners look upon intermodal transport as a future potential and that the railway will become more competitive. Of the interviewed carriers *TX logistik*, *Cargonet*, *DB Schenker Rail*, *DB Schenker Norge*, *Freja Transport* and *Bring* uses railway transport and to different extent intermodal transport. *Alex Andersen Ølund* does primarily use road transport while *Gödecke logistics* and *Kim Johansen* only uses trucks.

Carriers with intermodal transport concept

Carriers see the main reason to use intermodal transport as more environmentally friendly transport. *TX Logistic* see a trend towards intermodal transport to be able to use *"the best of two worlds"*, that is to combine the flexibility of truck with railway efficiency. The trend towards more environmentally friendly transport increases but it is still economy that determines how transport is performed.

TX Logistic means that there are some important perspectives to consider to increase railway transport via the Fehmarn Belt fixed link. The road network is already heavily used and the sulphur directive will affect ferry transport. Increasing prices on fuels for road transport also increases the attractiveness of railway. There is also a technical perspective like which signal system that will be used. TX Logistic have, since January 2012, access to multisystem locomotives since signal systems differ between countries.

Cargonet is specialized on railway transport in intermodal solutions. The company were focus on possibilities and obstacles in the railway system.

" I want to say two things that accounts for both Sweden and Norway. Intermodal transport has its largest market share within the national boarders. This depends on two things. One is that it takes a closer relation between carriers and customers, both concerning transport flows and route planning. This works well on the national level but not so good between countries. The responsibility for goods that are transported across boarders, can be divided between two companies in two countries with different management and culture. Many times the do not speak the same language. This can also be valid for companies within the same company group but which are active in different countries. This affects the efficiency and precision of intermodal transport.

The other factor that results in better working intermodal transport nationally , is that the infrastructure is not optimal for international transport. The Öresund region is to a large extent built for passenger traffic. This depends on that Malmö is not an optimal hub. The reason that Malmö is used as a hub is because it is possible to use longer freight trains across the Öresund Bridge to Malmö, but not further on. Many long freight trains arrives to Malmö, are reloaded to smaller transports for distribution in Sweden and Norway. The customers want more direct transport without goods handling on the way.

Within Norway we transport cargo on railway and want to continue towards the continent because we see competitiveness for the railway transport. Swedish cargo are to a large extent transported by truck since a large amount of goods arrives to Malmö were it is divided and carried on by truck. For Norway it is a natural limitation that we cannot use railway all the way. With a developed European infrastructure with less technical differences and equal conditions will results in that transport companies can work globally on equal terms. The management of transport can become more efficient. There need to be a balance between restrictions, laws and infrastructure investments. One measure will not solve the problem, but a combination of measures has to be implemented."

DB Schenker Rail states that society has to develop into a more environmental friendly direction, in particular the large companies and industries. The company uses intermodal transports but does not organize them. Increasing use of intermodal transport is, according to the company, because of environmental aspects and less competitive, than earlier, road transport. The obstacle with railway transport is its problem with economic competitiveness.

Also *DB Schenker Norge* concludes that railway lacks in economic competitiveness. They use intermodal solution for long distance transport with large amounts of goods, which is how large companies provide these possibilities. There are several restrictions with the railway system that affects the mode choice. Weather conditions might cause problems. Lack of flexibility is another obstacle. There are difficulties to handle a railway transport if it stops, as you can with road transport and the amount of goods is much larger. For goods with high demands on time precision, railway is not an option.

However, the company do believe that there will be more freight transport by railway. One of the reasons is that roads in Germany are highly used which can create delays for road transport. If the Fehmarn Belt fixed link will become an attractive option depends on infrastructure improvements in the entire railway network.

Freja Transport look upon intermodal transport as a competitive alternative. The environmentally friendly transport, but mostly the economy determines choice of transport mode.

Freja Transport consider railway, as a bureaucratic form for transport and it is a political issues that affects on their mode choice. There is a development of intermodal transport in the company, but the development is slow because of restrictions in the railway network. There are several bottlenecks in the area around Fehmarn Belt that need to be fixed. The company also find it problematic that passenger traffic always has higher priority.

Bring emphasizes their wish to use railway more extensively considering environmental issues. Bring transports foodstuff with high demands on time precision. They have tried to use an intermodal concept between Scandinavia and the continent, but because of infrastructure and quality problems the concept was closed down in favour to road transport. The railway system is currently not considered reliable enough, but want to use intermodal solutions to a larger extent in the future.

Bring consider that the Fehmarn Belt fixed link will contribute to find intermodal solutions, but refers to other infrastructure to realize the potential:

"With the fixed link and increased accessibility and shorter transport time we can get an increase in intermodal transport solution. With better control of transport time both our competitors and we will surely increase the amount of goods on railway substantially. The fixed link will contribute to this but there is a whole network in Europe that need to be improved. Directives from EU are necessary to accomplish this. The intermodal development is dependent on the EU White book, and that costs and fees must be competitive in comparison to road transport."

Road hauliers

Alex Andersen Ølund uses the railway to some extent, when it is peak season and need to transport a larger amount of goods. There are benefits with the concept of intermodal transport, but the flexibility is decisive. If they send a transport from Germany early morning to Katrineholm in central Sweden, where it arrives in the evening, the transport has to wait for 12 hours over night to be transported further on because there are no departures from the terminal in the evening or during night. Since the company primarily transport time sensitive products waiting times are negative. Even though, the company supports a general trend of using railway to a larger extent. Fehmarn Belt fixed link will result in more competitive railway transport, which also is beneficial when congestion on road network increases.

The truck operator *Gödecke Logistics* have in mind to eventually consider intermodal transport, but there are some limitations. There are obvious barriers concerning capacity and some technical aspects. Railway transport is not flexible and has to go point-to-point. The company also need to leave the trailer to other operator, thereby loosing control, and there is a risk of wrongful handling and thereby risk for damages. There is also a risk that the trailer cannot be loaded on a railcar and not transported to its destination.

Gödecke logistics emphasizes that it is railway transport that benefits from the Fehmarn belt fixed link. The company will thereby meet stronger competition for companies with intermodal solutions, above all will competition increase with companies that have had to use the route via Jutland.

Kim Johansen believes that the intermodal concept is applicable for larger operators that have possibilities to load entire trains. Their view on competition between road and rail operators is:

"Intermodal transport has not possibility to be fast and flexible enough compared to road transport. With road transport it is possible to order one day and have the goods delivered the next, with a transport from the Continent. For the railway to compete, delivery precision and lead-time have to be reduced. The railway has had problems with difficult winter conditions. We have seen this when costumers in the north, that usually use railway/intermodal transport, have turned to us when the railway cannot deliver."

Goods owners

As for the carriers also goods owners are positive to the possibility of intermodal transport that they considered as a more environmental friendly solution, and a reasonable alternative when prices for road transport are increasing due to for example oil prices. However, the important factor is the delivery from one point to another with the demands goods owners have on the transport.

For *Stora Enso* it is decisive if intermodal transport can be more efficient than conventional rail transport. The benefit with conventional rail transport is the possibility to transport more goods, since conventional railway loads about 60 tonnes, while for intermodal transport 20-25 tonnes of cargo. It is favourable for intermodal transport that you do not need to handle the goods during the transport. Economy of scale is, apart from environment, one important factor for Stora Enso. Another factor is that it will be increasingly more expensive with road transport due to oil prices and road taxes.

For *Hydro* intermodal transport are most competitive for long distance transport. The intermodal concept is optional for Hydro with outgoing goods to southern Germany, Spain and France. They are currently using the intermodal concept for transports to Switzerland and Italy. Within Scandinavia road transport is more attractive. In general, increasing costs for road transport will increase competitiveness for intermodal solutions. But to realize the intermodal potential the railway need increased capacity, and thereby improve flexibility. As for carriers, Hydro finds it difficult, and takes resources, to have control of the freight flows in intermodal solutions.

Ikea believe that railway transport and intermodal solutions will develop. It will become more expensive with road transport due to oil prices and road taxes. Developed intermodal solutions could compete with road transport as well as reduce CO2 emissions. Increasing volumes can also be beneficial competition on the market, which is considered positive.

Norske skog are using intermodal transport to possible extent. Technical issues like the construction of goods carrier is important for transportation of their products. Norske skog produces paper rolls that cannot be handled outdoors. The products need to be weather protected during transport and transhipment. The intermodal concept with few goods handling

steps is therefore attractive, but the company wants to develop the organization and quality of equipment for intermodal transport is not sufficient.

The products are very sensitive to water and last year, with a lot of snow in Sweden there where damages when water leaked into the carriers. One reason that the company no longer uses swap bodies is that the equipment was getting old and caused goods damages.

Norske skog consider railway capacity as the main obstacle for intermodal transport. When the competition of railway capacity is high, so will prices increases. There should be capacity enough to promote competition between carriers, and thereby lower prices. Norske skog summarizes the point of view on intermodal transport that is shared by most goods owners:

"As long as you can keep lead-times down, good delivery precision and a good quality of equipment it wil be a competitive solution. Everybody wants an environmentally friendly solution, but no one will pay extra. Thereby it is important to cater for the logistic factors."

Like the carriers does the goods owners enhance lack of flexibility and weather conditions as disadvantages for intermodal transport. If a train stops, according to *Royal Unibrew, Ikea* and *Stora Enso*, there are large volumes of goods that will not be delivered on time. This also leads to that goods owners need a buffer storage to be able to deliver to their costumers on time. The concept of just-in-time can thereby not be used. The weather conditions lead to stop in transports each winter, which is not considered acceptable. Stora Enso tells that they, at longer stops, need to solve the situation by using trucks. But it is problematic that there is not enough capacity with trucks for their volumes. At some time the company had to stop production.

Yet another disadvantage with railway transport is lack of competition. As Stora Enso puts it:

"The disadvantage with railway transport, apart from winter conditions, is lack of competition in railway transport in Europe. Even though the railway has been opened for competition formally, it has not happened in reality. This means that price and, above all, quality of the service we provide is affected. There are more actors than us that want to increase on railway. This because of efficiency improvements made in production often lead to increased transport. This will lead to increased competition of railway capacity, and thereby important to solve tea capacity problem."

Conclusions from the case studies

Localization

Neither carriers nor goods owners believes that the Fehmarn Belt fixed link alone would lead to relocalization of terminals and warehouses. For that, other factors are decisive. But several of the companies could predict expansion of existing terminals and shifting importance of terminals within their logistic structure. A potential shift of importance for existing logistic facilities are dependent on changed transport flows, or increased railway capacity because of the Fehmarn Belt fixed link. The interviews indicate that western Skåne and Copenhagen can become more important as logistic nodes.

In conclusion, the general trend towards increased railway transport would lead to need for expansion of terminal facilities for companies with railway/intermodal transport. For road hauliers with time sensitive goods the Fehmarn belt fixed link can lead to a shift of importance between logistic facilities.

0= ingen påverkan 1= svag påverkan 2= måttlig påverkan 3= stark påverkan	Omlokalisering	Expansion
Transportör väg	0	2
Transportör järnväg	0	0
Varuägare	0	2

Bild 2:Sammanställning av vilka effekter som förväntas vid Fehmarnbelt från indikationerna 1-3

Goods owners that do not see any effect of the fixed link refer to historic localization of production sites that are difficult to move. For carriers that do not see any effect of the fixed link claim that they have optimal structure regarding distances to major hubs and considering driving and rest time regulations. Potential changes in companies' localization of logistic facilities are mainly dependent on each company's logistic structure.

The goods owner SSAB is dependent of railway transport and regards the general transport policy as important for potential relocalization to other markets outside Europe. Politically uncoordinated taxing and regulations as well as increased track access fees without improvements in railway reliability and capacity can lead to business strategies where localization in different markets are considered.

Freight flows and routes

The possible effects of Fehmarn Belt fixed link on are dependent on several factors, like transport cost, goods that is time sensitive or not, regulations and current logistic structure. The general conclusions are:

- Transport cost is the most important parameter for route choice, time is also important but the value of time is estimated in relation to transport cost.
- Railway operators will change their routes to the Fehmarn Belt fixed link because of significant transport time gains.
- The Fehmarn Belt fixed link will increase reliability with alternative routes, but first of all move railway bottlenecks.
- Capacity improvements at single-track distances and for crossing Öresund (e.g. HH and Route 5) are necessary to meet higher demand for railway/intermodal transport
- For road hauliers the most decisive factors for route choice are:
    - type of goods (time dependent),
    - transport cost (distance cost and fee for ferries and fixed links),
    - driving and rest time regulations and,
    - current logistic structures.
- For road hauliers the Fehmarn Belt fixed link can become an attractive route primarily for carriers of time sensitive goods
- Goods owners do generally refer to the carriers concerning transport choices.

0= ingen påverkan 1= svag påverkan 2= måttlig påverkan 3= stark påverkan	Tid	Kostnad	Kör/vilotid
Transportör väg	2	3	3
Transportör järnväg	3	2	0
Varuägare	3	3	0

Bild 3: Sammanställning av vilka parametrar som från en skala 0-3 indikerar på val av rutt vid Fehmarnbeltförbindelsen

The Fehmarn Belt fixed link will have its major impact on railway transport because of significant shorter lead times. As the current route via Jutland already includes cost for the Great Belt Bridge, the shorter distance via Fehmarn would also lead to lower transport cost.

The Fehmarn Belt fixed link can also improve reliability for railway transport by offering alternative routes between Denmark and Germany. But the reliability would still be dependent on removing single-track distances and for crossing the Öresund. By removing these bottleneck would open up for more direct railway transport between Sweden and Germany, which can have impact on companies logistic structures.

For road hauliers with time dependent goods the route Fehmarn Belt would become attractive because of time saving and increased reliability with a fixed link, at least for transports between Germany and Zealand/Sweden. For these companies driving and rest time regulations will change the need for truck stops along the route. Also companies that already use the Fehmarn route where time on the ferry is planned for drivers rest time will change demand for truck stops.

Shorter lead times can have impact on companies competitiveness since it lead to cost reductions. For some companies shorter lead-time on railway transport can have impact on the volume of goods that can fit into an intermodal solution. The solutions for handling larger volumes, that is longer trains or higher frequency, can be dependent on capacity in terminals and warehouses.

Road hauliers, for which time savings is not the most important factor, the Fehmarn belt fixed link will have no impact since current logistic solutions are adapted to market and driving and rest time regulations. The cost for using the Fehmarn Belt fixed link will be crucial. Already today there are companies using the route via Jutland because of the prices on the ferry.

Intermodal transport

The conditions and potential for intermodal transport were discussed with the companies with an overall perspective, not particularly in relation to The Fehmarn belt fixed link, since the emphasise was on the railway as network. The interviews indicate that there is a trend towards increased intermodal transport and the companies see several advantages with the concept. However, the companies adapt after available infrastructure. The potential demand for intermodal transport will not be realized until infrastructure permits.

The environmental aspect is of course positive, but also the potential cost efficiency when transporting large volumes. Another advantage is less reloading of goods that reduces risk for damages. Intermodal transport will also become more competitive with increasing cost for road transport because of fuel prices and taxes. Intermodal transport cannot compete with road transport concerning flexibility. Some key factors for intermodal competitiveness are to reduce lead times and improve delivery precision.

There are several obstacles for using intermodal transport. The railway system lacks capacity and flexibility. Also quality of equipment can be problematic, for example for winter time transport. The economy in an intermodal transport cannot be competitive when extra storage or production stop can be the result of the quality in infrastructure and equipment

Another obstacle is cross boarder transport. Cargonet claims that intermodal transport works nationally, but not internationally. Differences in technical systems (for example signal systems, electric systems, train length) are limitations for direct intermodal transport between Scandinavia and Germany are obstacles.

Several companies consider the question of intermodal transport as a political issue. Apart from improving the infrastructure and reducing technical differences, the political agenda with uncoordinated decisions about taxes, fees and regulations affects the possibilities for intermodal solutions.

With a more reliable and cost effective railway system the competitiveness for railway transport would increase. Growing volumes and shorter lead-times can in turn change how companies consider intermodal solutions in their transport and production planning.

Policy implications

Provide stable conditions for private business

The consequences of the futures Fehmarn Belt fixed link on logistic strategies are difficult to predict. The companies do to a small extent consider potential changes in logistic strategies based on infrastructure changes ten year ahead. There are several factors that influence choice of logistic strategies that can change until the fixed link is in operation. Even a hypothetical discussion about effect on logistic strategies is difficult since the cost for using the link is unknown. Also, the case studies show that the companies' responses to infrastructure changes are difficult to generalize since companies have different logistic structures, and since logistic decisions are based on several factors.

This implies the importance of political decisions and public measures to providing stable long-term conditions for private business. This concerns both infrastructure development, land use planning as well as pricing, taxes and regulations. Apart from harmonized policies at European level, coordination between regional, national and European policies are necessary.

Corridor planning for railway/intermodal transport

A general opinion by interviewed companies is that the demand for intermodal transport will increase as a result of general tendencies. Fehmarn Belt fixed link can improve efficiency for companies with railway transport and thereby increase competitive power for actual companies. However, the railway network does not fulfil necessary standards to realize the potential for intermodal transport. The Fehmarn Belt fixed link will improve conditions for intermodal transport, but the capital cost for investment will not be used to its potential benefit until surrounding bottlenecks are fixed. Both for promoting intermodal transport and to fully benefit from large capital investments a corridor planning approach is suitable, where priority railway corridors will be completed within reasonable time.

Bottlenecks that remain after a large investment are obstacles for the socio-economic benefit of the investment. In the case of Fehmarn Belt fixed link, single-track distances in Denmark and Germany will prevent development of intermodal transport solutions and potential economic growth due to more favourable transport conditions for business, as well as development of more environmentally friendly transport solutions. National investment policies need to be directed to complete railway corridors and, as in the Fehmarn Belt case, national investments need to be coordinated between countries.

Technological differences can lead to increased cost for railway transport. For cross border transport between Scandinavia and Germany railway operators need to change locomotives or invest in dual-system locomotives that are constructed to use different electric systems. Other differences that would be desirable to harmonize are for example signalling systems and technical standards, for example train length, weight and profile.

Reliability is a key performance factor since delivery on time is crucial for railway competitiveness. Capacity measures are of course important to ensure reliability, but also maintenance to guarantee reliable transport through entire railway corridors. Trans-national corridor governance models should be developed to enable reliability for cross-border railway corridors. For the Fehmarn Belt fixed link corridor such a model would need to include Sweden, and possibly Norway, as well as Denmark and Germany.

Redundancy is highly important to guarantee reliability. A general planning policy increasing capacity should also consider the options to use capacity investments to ensure redundant solutions. In the Danish – German relation the railway system will become redundant, as the Fehmarn belt fixed link will provide a second railway route between the countries. For transports between Sweden and Germany railcar ferries provide already today an alternative to the route via Jutland. However, the railcar market is weak and can only to some extent compete with the land-based route.

Implications for the Öresund region stand clear from the case study. The positive effects of the Fehmarn Belt fixed link (increased capacity, shorter lead-times, increased reliability and redundancy) will not fully capitalize in competitiveness for the railway sector and the railway dependent businesses since the bottleneck will be moved to the Öresund fixed link. This will be an obstacle to promote intermodal solutions that is highly prioritized in the political agenda. Also, it has implications for business strategies since we cannot expect companies to adapt their logistic strategies towards rail-based transport until the system is fully functional. The interviewed companies unanimously claims that investments in a second fixed link crossing Öresund and Route 5 has to be made for a functional railway corridor between Scandinavia and Germany.

Efficient road transport for time sensitive goods

The Fehmarn Belt fixed link has little impact on road transport, according to interviewed companies. Transport of time sensitive goods will have advantage from the fixed link. However if the cost for crossing the fixed link will be comparable to the current ferry cost few changes in route choice can be expected.

However, logistic strategies will be affected. For some companies the time on ferry is not optimal with regard to rest time regulations. These companies will benefit from more efficient transport and contribute to their competitiveness. For companies, which have time on ferry scheduled according to rest time regulations, the fixed link will have negative impact on their transport cost. This suggests that there might be a market to continue with ferry transport competing with the fixed link, and thereby influence prices.

Nevertheless, the fixed link might have impact on where drivers need to take their rest time. This might change the demand for geographical location of truck stop services.

Development of logistic industrial zones

The companies do not, in general, expect major changes in the structure of terminals and logistic zones because of the Fehmarn Belt fixed link. But expected growth in transported volumes will increase need for capacity in logistic facilities, in particular for railway transport, and the fixed link has impact on which areas that are of intrest for expansion. For railway operators both Malmö and Lübeck have been mentioned, and in general western Skåne (Helsingborg, Malmö, Trelleborg) and Copenhagen. For carriers of time sensitive goods expansion of Swedish terminals, both in Skåne and central Sweden might be expected at the expense of Danish terminals/warehouses (Odense).

The case study also indicates that terminals and logistic zones quite far away from the Fehmarn area (as for example central Sweden, can increase in importance due to shorter lead-time in the railway system. It can also be expected that the logistic area around Taulov, and particularly in Padborg, might face a decline or lack of growth. There are no indications that new logistic areas would develop.

A second fixed link crossing Öresund and Route 5 can further strengthen the logistic importance of Öresund region. It can increase the interest for expansion for Höje-Taastrup (Copenhagen) and Helsingborg because of improved accessibility of these particular nodes. Because of different technical standards in Swedish and Danish railway systems, the development of Helsingborg as railway node can also be dependent on possibilities to increased marshalling yard capacity for international freight trains.

The companies do not, with one exception, foresee changes in localisation of logistic facilities. Interviews indicates that is to early for companies to consider effects of both the Fehmarn Belt fixed link, and even more, for a second Öresund fixed link. On the other and, historical experience as for example for Toyota establishment in Malmö and recent business developments in Malmö Port area, suggests that relocalizations can take place.

In conclusion, the study indicates an expected increased demand for space for logistic facilities in Öresund region as effect of the Fehmarn Belt fixed link, which will be further strengthened with a second fixed link at Helsingborg - Helsingør and Route 5. Also Lübeck area can become more important for railway facilities. This calls for a public preparedness regarding land use planning and reservation of land for logistic facilities, as well as preparedness for structural changes in the railway system at the regional level with regard to, for example, marshalling yards.

The study does not support expectations, and thereby public investments, in new potential logistic areas. Existing logistic areas in western Denmark can, according to this study, loose in competitiveness. Whether this will result in declining volumes can be dependent on the general trend of growth in trade.

Harmonize taxes, fees and regulations

Interviewed companies have expressed severe criticism regarding uncoordinated decisions about taxes and regulations that have impact on transport costs. The question of harmonizing taxes, fees, road pricing measures and cost driving regulations needs to be addressed. Harmonization is difficult since decisions are taken on global level (like IMO regulations – the sulphur directive), European level (like driving and rest time regulation) and on national level. Companies have highlighted the Swedish situation where the sulphur directive is expected to move transport from sea to land modes, at the same time the track access fess are increased.

Private actors also affect southwestern Baltic Sea Region transport cost by deciding on ferry cost. Additionally, fixed link fees are set to finance the investment. There is a risk of sub optimization unless prices are coordinated. The case study concludes that the cost for passing the Fehmarn Belt fixed link, in relation to cost for using other routes, is crucial. An additional question is if ferry operators will continue to be in operation and compete with the fixed link.

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Appendix 1: Case studies – methodology and interviewed companies

Several studies have analyzed the effect of the Fehmarn Belt fixed link on transport flows and modal split. Most of these studies have a macro level approach, which does not take into account the actual behaviour of companies and their logistic strategies. The purpose of this study is to explore the possible effects of the Fehmarn Belt fixed link on companies logistic strategies. That is how internal logistic decisions can be affected by the fixed link and possible underlying causes. The study also aims to explore how mentioned decisions might affect logistical industrial zones in Fehmarn-Öresund area.

The analysis is performed as a structured interview survey where 18 companies have been interviewed. 18 companies in Sweden (5), Denmark (5), Norway (5) and Germany (3) have been interviewed. The companies represent a broad range of goods owners (18) and forwarders (18). The interviews have been made by phone, or meeting with the company in question. In two cases a questionnaire have been answered by e-mail.

Danmark	Sverige	Norge	Tyskland
Freja Transport & Logistics A/S	TX logistik	CargoNet AS	Gödecke logistics
DB Schenker Rail Scandinavia A/S	Stora Enso Logistics	DB Schenker AS	Alpa
Alex Andersen Ølund A/S	SSAB EMEA	Bring Linehaul AS	Carl Spaeter GmbH
Kim Johansen Transport Group AS	IKEA	Norske skog Saugsbrugs	
Royal Unibrew A/S	Anonymt företag	Hydro Aluminium Rolled products	

Bild 1: Interviewed companies.

Interviews were prepared with a background description of two scenarios and thematic questions. The scenarios are Year 2020 with Fehmarn Belt fixed link in operation, and Year 2030 where also Helsingborg – Helsingør and Route 5 are assumed to have been built. Interviews have been carried through to promote discussion. Each company has been interviewed during 30-40 minutes. The interviews have been recorded, summarized and sent back to respondents for approval.

The interviews have been structured from three thematic issues, established by the task force of this study:

1. What underlying causes affects company decisions concerning localization and development of logistic structures as a consequence of the completion of the Fehmarn Belt fixed link?
2. Will transport flow change, and in that case how, when the fixed link is completed? Which is the underlying causes driving such a change?
3. Which are the potential consequences for companies with intermodal transport solutions, and what is the potential for developing competitiveness for intermodal transport in general?

Interviewed companies are presented below.

Stora Enso Logistics (SE)

Turnover: 10,3 billion Euro (2010).
Number of employees: 30 000.
Line of business: paper- and timber industry.
Transport organization: Stora Enso Logistics.
Transport modes for Scandinavia-continental Europe:
train, truck, ship and in combination. Outgoing flows are dominating.

SSAB EMEA (SE)

Turnover: 4,5 billion Euro (2010).
Number of employees: 9 000, in 45 countries.
Line of business: steel.
Transport organization: third part logistic company.
Transport modes for Scandinavia-continental Europe:
train, truck, ship and in combination. Outgoing flows are dominating.

IKEA (SE)

Turnover: 21,5 billion Euro (2010).
Number of employees: 123 000, in 25 countries.
Line of business: Retail including, purchase, distribution, wholesale and supporting activities.

Transport organization: organized "inhouse", transports are performed by other companies
Transport modes for Scandinavia-continental Europe: train, truck and ship, primarily in combination. Air transport at particular circumstances. Incoming flows are dominating.

Anonymous (SE)
Turnover: 6,8 billion Euro (2010).
Number of employees: 6 400, in Sweden.
Line of business: Retail.
Transport organization: Mostly outsourced. Distribution is mostly handled by 3PL companies. Incoming flows to a larger extent controlled by the company, using other transport companies.
Transport modes for Scandinavia-continental Europe: truck, train, ship and in combination. Mostly truck. Incoming flows (international flows) are dominating**.**

TX logistik (SE)
Turnover: < 150 million Euro.
Number of employees: 300 (globally).
Line of business: transport, warehousing, 3PL, forwarding.
Transport modes for Scandinavia-continental Europe: train, truck (in intermodal solutions) and ship.

DB Schenker Rail Scandinavia A/S (DK)
Turnover: -
Number of employees: 32 600.
Line of business: provide transport opportunities by rail between Scandinavia and Central Europe. Responsible for railway transport to and from Denmark.
Transport modes for Scandinavia-continental Europe: Rail, truck and ship.

Kim Johansen Transport Group A/S (DK)
Turnover: 66,7 million Euro (2009).
Number of employees: 640 drivers, 60 in office and workshops.
Line of business: forwarder (truck).
Transport modes for Scandinavia-continental Europe: truck.

Alex Andersen Ölund Blomster A/S (DK)
Turnover: -
Number of employees: 550. Ehereof 340 drivers.
Line of business: transport of flowers and other cargo.
Transport modes for Scandinavia-continental Europe: primarily truck, to some extent rail during high season.

Freja Transport & Logistics A/S (DK)
Turnover: 240 million Euro (2010).
Number of employees: 580.
Line of business: transport/forwarding (owner of 1 500 trailers), warehousing, 3PL. Transport of temperate cargo.
Transport modes for Scandinavia-continental Europe: road, rail, air and intermodal transport.

Royal Unibrew A/S (DK)

Turnover: 0,5 million Euro (2010).
Number of employees: 2 200.
Line of business: production, marketing, sales and distribution of beverages.
Transport organization: 3PL.
Transport modes for Scandinavia-continental Europe: train and truck, and in combination. Primarily train.

CargoNet A/S (NO)

Turnover: 190 million Euro (2010).
Number of employees: 800.
Line of business: transport of unitized goods on rail.
Transport modes for Scandinavia-continental Europe: train, in intermodal solution.

DB Schenker A/S (NO)

Turnover: 450 million Euro (2009).
Number of employees: 1 400.
Line of business: forwarding.
Transport modes for Scandinavia-continental Europe: truck, train and ship and in intermodal solutions.

Bring Linehaul A/S (NO)

Turnover: 2 million Euros in operating revenues (mail services) third quarter 2011.
Number of employees: 2 000.
Line of business: mail, parcel and express deliveries. Forwarding and logistic services, warehousing and 4PL.
Transport modes for Scandinavia-continental Europe: Truck, rail and ship and intermodal transort.

Norske Skog Saugbrugs (NO)

Turnover: 2,7 billion Euro (2009).
Number of employees: 6 000.
Line of business: production of paper/newsprint paper.
Transport organization: material flow and terminal activities are handled inhouse. Transports are outsourced.
Transport modes for Scandinavia-continental Europe: Ship (64%), train and truck and in combination.

Hydro Aluminium Rolled Products (NO)

Turnover: 10 million Euro (2010).
Number of employees: 23 000.
Line of business: production of aluminium, metal and rolled products.
Transport organization: transport are outsourced.
Transport modes for Scandinavia-continental Europe: train and truck.

Gödecke logistics (DE)

Turnover: -
Number of employees: -
Line of business: forwarding/truck transport.
Transport modes for Scandinavia-continental Europe: truck.

Carl Spaeter GmbH (DE)

Turnover: -
Number of employees: -
Line of business: steel production.
Transport organization: -
Transport modes for Scandinavia-continental Europe: -

Alpla (DE)

Turnover: 2,6 billion Euro.
Number of employees: 12 000.
Line of business: production of plastic bottles and tubes.
Transport organization: transports are outsourced.
Transport modes for Scandinavia-continental Europe: truck.

Appendix 2: Literature study

Introduction

Based on the TransBaltic inventory of EU funded projects in the Baltic Sea Region, and with the knowledge among task force partners a literature study has been carried out to investigate haw the consequences of the completion of the Fehmarn Belt fixed link is analyzed and discussed. This Appendix summarizes the findings of the literature study.

Some overall findings are:

- Most studies (34 of 38) have a quantitative approach with regard to development of the transportation system and future flows. Furthermore, the four studies with a qualitative approach were all Danish. Three of them had the same author. Most studies are Danish and/or Swedish, which come naturally with regards to geography. A better understanding of companies' responses to infrastructure investments should be developed with studies using a qualitative approach.
- The inventory indicates that there are less focus on terminal structures and their importance for network capacity over the boarders. Most studies are focused on a national perspective. With regards to development of intermodal transport solutions terminal structure is decisive for capacity and accessibility to transport network. An overall picture of terminal structure should be developed.
- Shipping is rarely considered in the studies, Intermodal solutions are basically considered as the combination of road and rail.
- Most studies conclude that there is a need for cooperation among regions, countries and institutions as well as there is a need for increased focus on environmentally issues. That is that the conclusions address the issue of creating platforms for infrastructure development. However, there are few conclusions how this cooperation should be implemented to promote investments and other actions.
- With regard to the Fehmarn Belt fixed link there are expectations on increasing use of railway transport, which also is supported by macro model analyses, and changes in companies localisation strategies.

Quantitative studies

Most of the studies draw conclusions based on quantitative analysis, that is calculations and forecasts. Conclusions often focus on need for investments and obstacles to develop the infrastructure in line with the concept of green corridors. The perspective is at macro level.

Den faste Femern Belt forbindelse -Regionale udviklingsperspektiver (2009-1) discuss development issues in a region including Fehmarn Belt, Store Bält and the Öresund fixed link. Other studies like *Redegørelse om erhvervsmæssige potentialer ved en fast HH-forbindelse Av: Damvad (2010-7)* och *Öresund-Femern – En grön logistikkorridor? IBU 2 Öresundsregionen som internationel Transportknudepunkt (2010-03)* have focus on the Öresund region and how infrastructure investments affects this geography.

Studies concerning large geographical areas tend to result in very general conclusions. That is the question what should be done might be answered, but rarely how. More well defined areas or passages/corridors, as well as more defined questions to investigate, result more often in concrete solutions like measures in infrastructure capacity. However these studies tends to end with overall discussions. Some of the studies with defined areas or corridors are good platforms for for continued development of these areas and gives a clear picture of how sthe work should continue.

Common charachteristic among most studies is that the have similar approaches, using forecasts and calculations. Common conclusions are the need for increased cooperation between countries, regions and organizations as well as increased focus on environmental issues. This also gives a good platform for continued work. But, without suggestions on concrete measures there is risk that investments andother actions cannot be implemented.

Qualitative studies

In the literature inventory only four studies with qualitative approach were found. They handle effects of investments in fixed links and the transport indusry´s view on freight transport through the Öresund region including mode and route choice. Both goods owners and forwarders have been interviewed on the concequences of infrastructure investments on their business. All four studies are Danish, and three of them have the same author.

Øresundsregionen som internationalt transportknudepunkt includes the transport industry view on on freight transport through the Öresund region and development of transportation with regard to a future fixed link crossing Fehmarn Belt. *Stora infrastrukturprojekter og deres strategiske virkninger med saerlig fokus på effekter for virksomheder* investigates how large large infrastructure investments effect companies behaviour and the possibilities to quantify these effects for modelling purposes. The studies *Redegørelse om erhvervsmæssige potentialer ved en fast HH-forbindelse* and *Impacts of InfrastructureInvestment on Logistics and Transport* have investigated the effects of Store Belt bridge and Öresund bridge after the connections were built. No qualitative study with companies in the region concerning concrete effects of the Fehmarn Belt fixed link has been found.

Analyses of a future fixed link crossing Öresund results in overall expectations of effects. Increased cooperation between regionsand partnerships among companies is suggested, but there are no concrete conclusions. Analyses of expected effects might catch hypotheses and guesses rather than concrete effects. On the other hand, it might contribute to raise thoughts and to companies considerations regarding infrastructure changes and thereby get an idea of possible changes within companies logistic structures.

Qualitative studies after new infrastructure has been built have better possibilities to analyse actual changes within companies and relate these changes to the investment. However, it might be difficult to prove causal relations between changes in logistics and infrastructure investments since companies might not be able to state cause and effect after some years. Since effects of infrastructure inestments can be developed for a very long period of time, and the strategic perspectives for companies are only a few years, it is difficult to relate logistic changes with respect to new infrastructure.

Even with the methodological difficulties there is a need to execute studies both before and after building of new infrastructure. All four studies are important aspects on developing infrastructure in the actual area, and to understand companies' perspectives and effects on logistic solutions.

Perspectives

Most studies have a Danish or Swedish perspective. Six Nowegian reports and one German have been found. Common for all reports is that they focus emphazise environmental issues and the development of green corridors.

Development of the railway system and intermodal concepts are central issues, in particular in Norwegian studies. Danish and Swedish studies have a broader approach including cooperation between regions and business development. It appears that the Norwegian perspective is concentrated on railway development, even though it does not have to be so. Danish and Swedish studies are to a larger extent produced in cross border cooperation.

Studies of the railway system is to a large extent oriented towards rail infrastructure capacity issues. Only five of the reports go deeper into the question of terminal development and suggest concrete measures concerning terminal development. These are:

- *Scandria WP 3.1 Intermodal Nodes - Report on the Potentials for Intermodal Transport at the Ports of Koege and Gedser in Region Zealand (2011-4)*
- *Scandria Output 3.11-1 "Optimised connection of intermodal terminals in Berlin-Brandenburg to north-south-transport"* Baltic Sea Region Project #026 "Scandinavian-Adriatic Corridor for Growth and Innovation" Av: Philip Michalk (Version 1, 11-06-07)
- *Hallands hamnar och Kombitrafik* Av: NextPart Eric Nilsson (11 03 31)
- *Järnvägens konkurrenskraft och utveckling i Skåne* – VECTURA (2011-06)
- *En jernbane for framtiden – Perspektiver mot 2040 - Jernbanverket (2011)*

There is also a tendency that each country is focused on the infrastructure in the own country. The Norwegian report *Konkurranseflater i godstransport* analyses the competitive power for several transport modes. One of the conclusions is that the potential of increasing railway competitiveness is in international transport. This would motivate studies of terminal developments in a larger geography.

Few studies analyses sea transport as a part of intermodal transport solutions. In these cases ferry connections between Scandinavia and Germany is analysed with regard to future fixed links. Sea transport can have an important role for developing intermodal solutions and more effrort should be put on possible development of shipping.

Summary of studies

Danmark som transportland i det internationale transportsystem

Geography: Denmark

Purpose: The purpose is to show the possible development of Denmark as transport country, from an international perspective. Transportation system and flows are described by regions and modes, as well as important transport connections. Development possibilities at strategic level are described concerning infrastructure, research and innovation.

Conclusions: The report is primarily descriptive but also formulates overall goals for regions and development of modes.

Den faste Femern Belt forbindelse -Regionale udviklingsperspektiver

Geography: Öresund region

Purpose: Discusses the effects of the Fehmarn Belt fixed link with a broad approach. Topics like development of logistics and transport, labour market, housing market, commuting and cultural differences are all covered.

Conclusions: The study proposes extended cooperation to promote regional development, and how the regin should deelop as transport node.

Developments in railway freight transportation between Scandinavia and Germany

Geography: Scandinavia and Germany

Purpose: Investigation of railway functionality concerning capacity and technological standards in Sweden, Denmark, and Germany.

Conclusions: The study recommends for example standardization of technological solutions to allow for longer trains, increased axel-load and load profiles.

Effektiva tågsystem för godstransporter

Geography: Europe

Purpose: identifying need for technical research of railway infrastructure concerning axelload and speed.

Conclusions: There is a need for continued research to improve reailway quality. Cooperation between countries is needed to collect necessary data, which is quite expensive.

En jernbane for framtiden – Perspektiver mot 2040

Geography: Norway

Purpose: Study the future role for the railway, in 2040 perspective. The study has mapped current situation in the railway system and investigated demands of increased quality as well as demands for increased international transport, and increased efficiency.

Conclusions: Capacity investments are necessary to overcome capacity problems visible alredy today. Strategic work on railway development need to take into account both long distance passenger transport as well as freight transport. It is pointed out that investments in terminals, particularly intermodal, are necessary to promote fraight transport on railway.

Facts about Fehmarn-the fixed link and its region

Geography: Öresund region

Purpose: Overall information about the Fehmarn Belt fixed link concerning its importance for rthe region and information about financing and construction. Pointing out new possibilities like improvement of infrastructure.

Femarn Belt Direct no 9

Geography: Köge municipality

Purpose: Article discussing possibilities developing Köge transport centre in relation to Fehmarn belt fixed link.

Femern Bælt forbindelsen komplet med ny station på Lolland

Geography: Lollands municipality

Purpose: Argumentation for a new railway station, with regard to business, tourism, labour market and transportation.

Conclusions: Increasing possibilities for commuting and economic growth in the area

Godskunders värderingar av faktorer som har betydelse på transportmarknaden

Geography: Sweden

Purpose: Identify and quantify freight costumers values of importance for transport choice at long distance freight transport. Results are intended to improve forecast models.

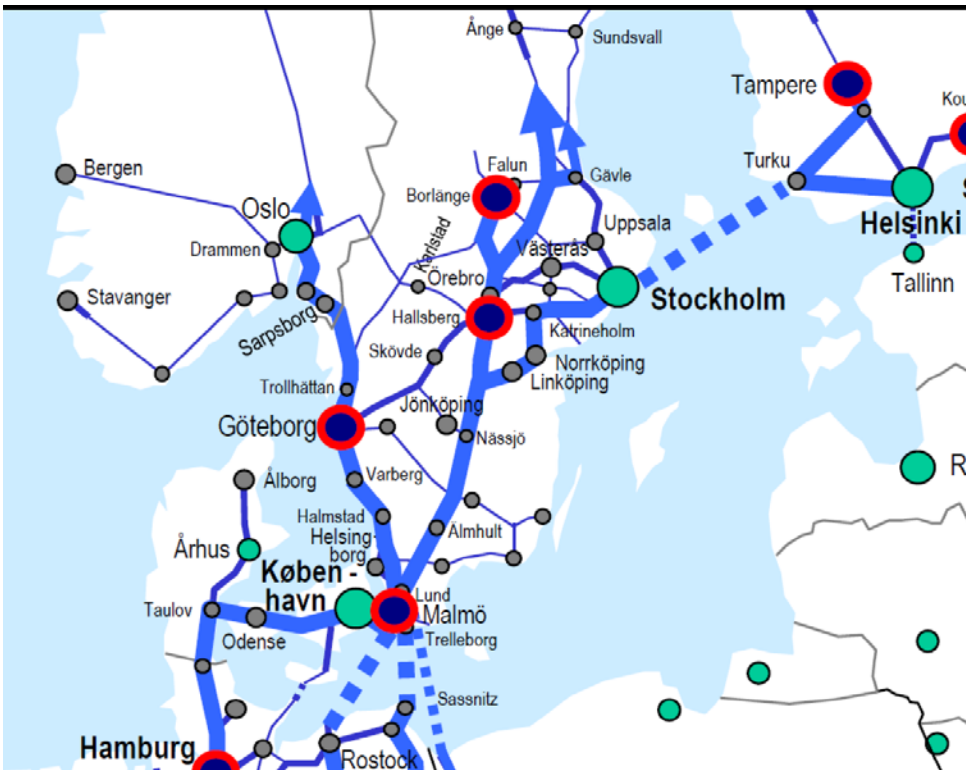
Conclusions: Transport cost is decisive for choice of forwarder. Halving environmental effects are valued to 2% of transport cost, provided that transport quality can be maintained. Shorter transport time and increased frequency is low valued. An expcion is for high value goods where shorter transport time is valued higher than for low value goods.

Godstrafikens utvecklingsmöjligheter

Geography: Sweden

Purpose: Development possibilities to meet forecasted future demand for railway transport. Focus on the Swedish railway system and its international connections. Analysis of railway competitiveness compared to road and sea transport.

Conclusions: Deragulation of railway transport and the Fehmarn Belt fixed link are crucial for railway competitiveness. The fixed link will reduce transport time between Sweden and Maschen (Hamburg) with approxamitely two hours. Building of high speed railway Stockholm-Gothenburg and Jönköping-Malmö will release capacity for freight trains within Sweden and guarantee required capacity for a long time and thereby benefit Swedish trade and industry as well as contribute to reach climate goals.



Cross-border railway routes of southern Scandinavia and northern Germany in 2010

Source: Sonora paper - Developments in railway freight transportation between Scandinavia and Germany - Boysen 2010-10-15 - with footer

Gränsöverskridande godstransporter genom Skåne år 2030

Geography: *Öresund region*

Purpose: Analysis of cross-border freight flow growth to/from Skåne from year 2003 to 2020 and 2030. Analyses have been made withand without a second fixed link crossing Öresund.

Conclusions: Cross-border freght transport, measured in tonnes, is expected to triple during the 30-year period. Infrastructure improvements (Fehmarn Belt fixed link, Route 5 and a second fixed link crossing Öresund) would substantially improve railway competitiveness. On conclusion concerning methodology is the difficulty to simultaneously calculate freight and passanger transport on road and thereby making it difficult to assess impact on road capacity use.

Hallands hamnar och Kombitrafik

Geography: Region Halland

Purpose: Description of preconditions for developing the three ports in the region into multimodal nodes, thus contribute to sustainable transport.

Conclusions: The three ports (Halmstad – container and general cargo, Falkenberg - bulk and Varberg - timber) are quite different concerning organization and line of businesses, thereby the ports complement each other.

Current sea container volumes are small and irregular. To develop multimodal transport truck transport must be transferred to rail, and the marketshare for unitized goods needs to increase. The port (in this case Halmstad) and its owner need to keep investment costs down and work for establishment of companies using unitized goods transport in the port or nearby. The owners of the three ports should consider increased cooperation to better use available resources, improve competitiveness and contribute to regional development.

Handelsstrømmer og transportmetoder mellom Tyskland og Skandinavia

Geography: Germany and Scandinavia

Purpose: mapping trade flows and mode of transort between Germany and the Scandinavian countries.

Conclusions: Shipping is the most important mode of transport for trade between Germany and Scandinavia. Railway is used for 5-6% of transported tonnes between Germany and Scandinavia.

Impacts of Infrastructure investments on Logistics and Transport

Geography: Denmark – particularly Öresund fixed link and Store Belt.

Purpose: investigate how companies logistic decisions have been affected by the completion of the fixed links crossing Öresund and Store Belt. Interviews with manufacturing companies and forwarders concerning decisions about localisation, transport flows, trade relations and transport resources.

Conclusions: goods owners could not specify the impacts of the fixed link concerning localisation issues. The author of the study concludes that the fixed links has contributed to increase in freight transport on the links. Ther has been a general tendency to reduce warousing capacity, which leads to increase in transport intensity to and from logistic facilities.

Järnvägens konkurrenskraft och utveckling i Skåne

Geography: Skåne and surroundings

Purpose: The study aim at showing possibilities to increase railway competitiveness in the region. A central question is forwarders opinion on infrastructure obstacles and market conditions for railway transport.

Conclusions: The study concludes that improvement in terminals and marshalling yards would substantially improve railway competitiveness. Capacity, space and equipment for freight handling as well as opening hours are major obstacles to overcome.

Konkurranseflater i godstransport

Geography: Norway

Purpose: Study of how to improve intermodal transport to meet market demand. Main transport corridors hav been mapped, except for air transport. The analasys has also included commodity groups and potential for transferring goods from road to intermodal transport solutions.

Conclusions: Intermodal transport has 50% market share for domestic transport. The largest potential to increase intermodal transport is in international relations here the market share is low.

Transferring goods from road to intermodal train transport is promoted by: increased fuel taxes, longer trains and reduced terminal costs. Transferring goods from road to sea tranbsport is promoted by: abolish taxes on goods at ports, reduced termnal costs in ports, abolishing port fees and enable larger vessels by increased draught.

Korridoren Femern-Öresund

Geography: Öresund region

Purpose: Define a strategy for railway development in the corridor Öresund to Fehmern. Analyses of road and rail development in Route 5 and a second fixed link crossing Öresund, in view of completion of the Fehmarn Belt fixed link.

Conclusions: Strategic discussions are built on background facts and investigations from other studies, where forecasts is an important point of reference. Suggests how to implement for example, the second fixed link crossing Öresund.

Midt i en dynamisk vækstregion

Geography: Lollands municipality

Purpose: To emphasize development possibilities for the municipality of Lolland.

Conclusions: Possibilities to create new markets and attract labour force to the area. There are expectations of developing Rødy Havn as logistic node. However, there is an expected loss of 600 jobs when the ferry traffic end. A new railway station is important for the municipality to get access to the railway syustem for passanger transport. The municipality also wants to promote local business as subcontracors to the construction of Fehmarn Belt fixed link.

Mulighetsstudie-utbyggningskonsepter for intercitystrekningen – Östfoldbanan

Geography: Norge

Purpose: Emphasize development possibilities for passanger transport between Oslo and Halden/Gothenburg by investing in double track rail.

Conclusions: Capacity and travel times have been calculated. The study finds two solutions for double track building. These are discussed concerning both investment cost and froman implementation perspective.

Opportunities for business cooperation in the Fehmarn Belt region,

Geography: southwestern Baltic Sea Region - Sjælland, Skåne, Schleswig-Holstein, Hamburg, Mecklenburg- Vorpommern and Berlin-Brandenburg.

Purpose: Mapping business branches in the area to evaluate possible development of business and value chains. The study focuses on biogas production, transport of animals and Life Science industry.

Conclusions: The study concludes that there is no defined Life Science cluster even though the line of business is important in the defined region. The Fehmarn Belt fixed link will have impact on transport of animals, because of shorter transport times. There are potential for developing a biogas corridor, since biogas is an important fuel in the entire region. Cross border coordination is necessary to set common standards.

Oslo og Köbenhavn

Geography: Norway, Sweden and Denmark

Purpose: Analyze passanger flows Oslo-Køpenhavn and triangle Stockholm-Göteborg-Køpenhavn. Market potential for new train concepts is compared with car and air transport. Transport time, frequence, price and quality are important parameters. The purpose is also to analyze the potential for high speed trains towards Hamburg and further into continental Europe.

Conclusions: General conclusions about market for high speed trains where leisure time travel between major European cities has good possibilities. Air transport is chosen because of short lead times and high time precision. High-speed trains can be competitive in this regard.

Redegørelse om erhvervsmæssige potentialer ved en fast HH-forbindelse.

Geography: Öresund region – HH-connection

Purpose: to study the potential of a fixed link Helsingborg – Helsingør with regard to tourism, business development and regional labour market. The study also includes analyses of optimal use of existing resources to meet expected capacity problems.

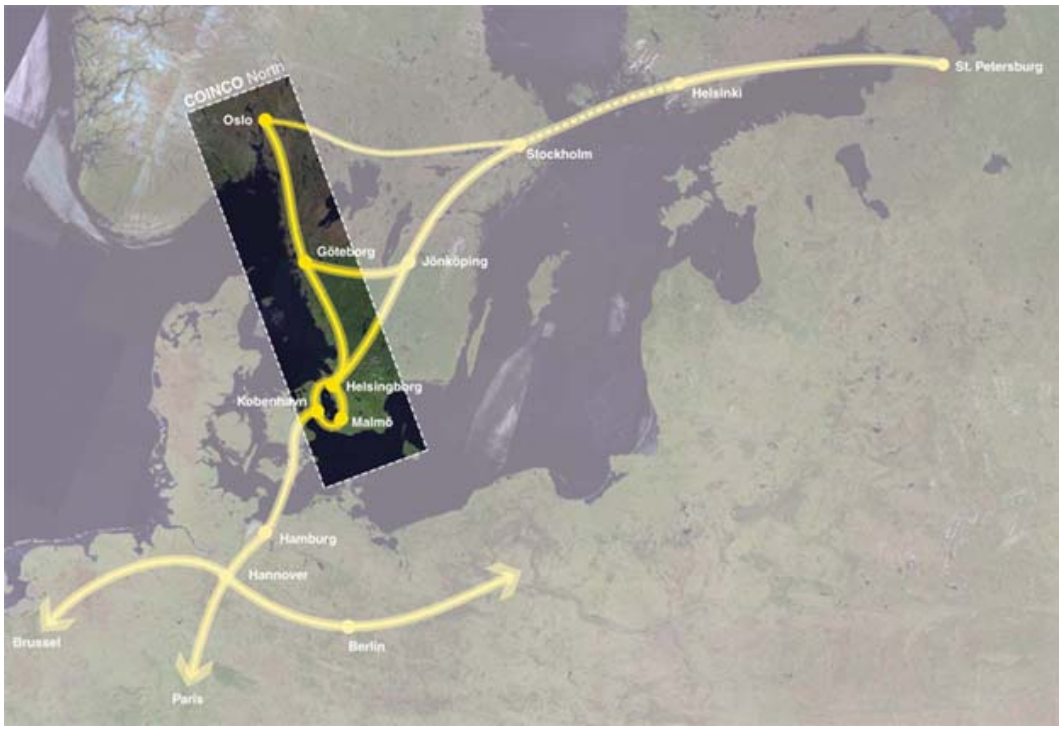
Conclusions: The study results in overall conclusions with regards to dynamic effects of a second fixed link. These dynamics concerns market enlargements, accessibility to a larger labour force, cooperation between business and organizations and intensified cooperation between business and research.

Samfunnsøkonomisk analyse: Utviklingen av "Green Freight Corridor" Oslo-Göteborg-Öresund-Duisburg

Geography: Transport corridor Oslo-Duisburg

Purpose: Investigate the meaning of a Green corridor establishment Oslo-Duisburg. Environmental issues (CO2) and economic perspectives (transport cost with intermodal solutions) are in focus.

Conclusions: An establishment of a green corridor is regarded to be socially profitable with a surplus of about one billion NOK. Almost half of the gains can be derived from less cost for external effects. The calculation assumes that the Fehmarn belt fixed link and connected investments in infrastructure upgrading are done. It also assumes less cost difference between road and rail transport. A third assumption is implementation of emission trade.



Source: *Samfunnsøkonomisk analyse: Utviklingen av "Green Freight Corridor" Oslo-Göteborg-Öresund-Duisburg Coinco North (2010-2011)*

Scandria WP 3.1 Intermodal Nodes - Report on the Potentials for Intermodal Transport at the Ports of Koege and Gedser in Region Zealand

Geography: Denmark

Purpose: Investigation of possibiities for intermodal transport between Germany and Denmark with focus on relation Gedser-Rostock and the Fehmarn Belt. Discusses Köge and Höje-Taastrup as possible intermodal nodes. Investigation of freight handling activities and the possibilities to develop multimodal solutions. Investigate how green corridor concept can be applied andpromoted by future investments.

Conclusions: The investigation suggests a number of infrastructure measures beyond planned investments. A second fixed link Helsingborg – Helsingør fixed and Route 5 Helsingør – Køge, development of the Port of Køge with a new combi terminal and development of the Port of Orehoved at Falster Island.

Scandria Output 3.11-1 "Optimised connection of intermodal terminals in Berlin-Brandenburg to north-south-transport"

Geography: Berlin - Brandenburg

Purpose: Analyze preconditions and formulation of a strategy to improve linkeages between the intermodal terminals in Berlin-Brandenburg, in particular to improve transport options in north-south direction.

Conclusions: Strategies for developing two railway links to improve multimodalt transport. Investments strategies to develop terminals in pace with growing volumes. Potential multimodal hubs are Frankfurt – Oder and Berlin – Großbeeren or Wustermark. More emphasis should be put on marketing multimodal solutions, and be given higher priority in Germany.

Scanadinavian trade with Germany

Geography: Scandinavia/Germany

Purpose: Mapping of trade flows betweens Scandinavian countries and Germany to assess possible implications for Fehmarn Belt fixed link.

Conclusions: Germany is an important trade partner for Scandinavia and the largest importer of Swedish and Danish goods, as well as second largest importer of Norwegian goods. The report also discusses the most important commodities.

Social Perspectives on Mobility

Purpose: Debate article about mobility

Conclusions: Mobiliteten är viktig, de ser på mobiliteten ur tre olika teman, individers möjlighet till rörlighet i vardagen, ur ett politiskt tema och ett tema om den rumsliga rörligheten av mobilitet.

Stora infrastrukturprojekter og deres strategiske virkninger med saerlig fokus på effekter for virksomheder.

Geography: Denmark

Purpose: Qualitative study investigating how large infrastructure investments affects logistic solutions and freight transport. The study analyses in three cases effects on market expansion, accessibility changes, transort frequency and ocalization of warehouses and production. The study also includes analyses of logistic solutions for IKEA.

Conclusions: Main conclusion is that it is not possible to quantify effects on logistic solutions since all companies are unique. However, it is important to model strategic effects. The study gives suggestions on how to model strategic effects calculating time value, time precision and, based on these variables calculate a localisationfactor.

The perception of the Fehmarnbelt connection among German stakeholders

Geography: Germany

Purpose: Mapping the need for infrastructure development in Germany connected to the Fehmarn Belt fixed link and to explore German actors the point of view.

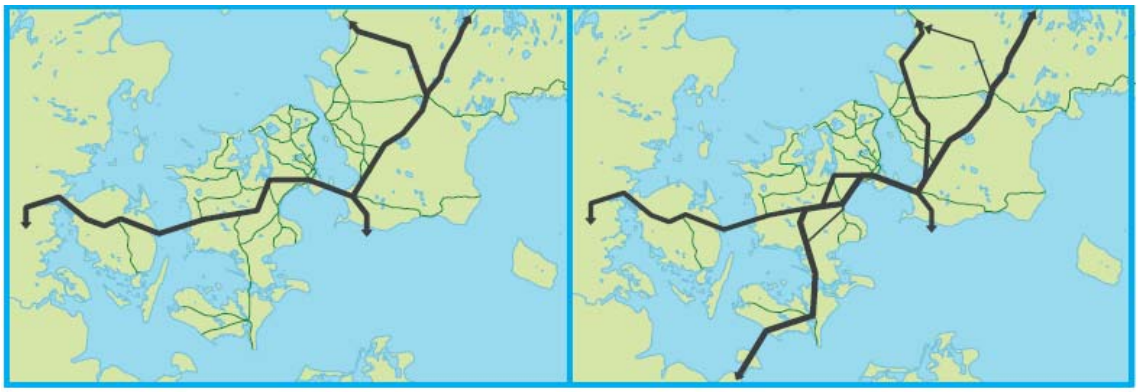
Conclusions: The planning process is impaired by less support from German government, which creates negative signals to the region. Upgrading of the railway system is needed to use the ful capacity of the fixed link. There is also need for investments in roads A20 and A21.

Trafikanalyser I Öresundsregionen

Geography: Öresund region

Purpose: Create a knowledge base for investments and infrastructure planning. Forecasts of transport flows, both freight and passanger, for years 2020 and 2030.

Conclusions: Freight volumes on railway can double within 10-15 years and Öresund-Fehmarn will become an important railway route. The studie identifies some bottlenecks in the railway system that needs to be fixed. The Öresund fixed link will not be able to meet the demand for increased transport flows in the long run, and need to be complemented by a second fixed link.



Figur 18. Godsruter gennem Øresundsregionen før og efter Femern Bælt.

Wirtschaftsraum A 1 – Regionale Wachstumsachse Hamburg-Fehmarnbelt

Geography: Germany

Purpose: Elaborate recommendations for creating transnational cooperation to develop the A1 region (the area between Hamburg and Fehmarn). The study have focused on port and logistics, food industry, life science, engineering/technology and tourism.

Conclusions: The study recommends industrial cooperation in a regional context, secure the supply of labour, transport infrastructure investments and improved research and development by cooperation with universities.

Öresundsregionens byutveckling och infrastruktur

Geography: Öresund region

Purpose: Developing the Öresund region as an attractive and competitive region by enhancing integration and accessibility. Focus on passanger tansport.

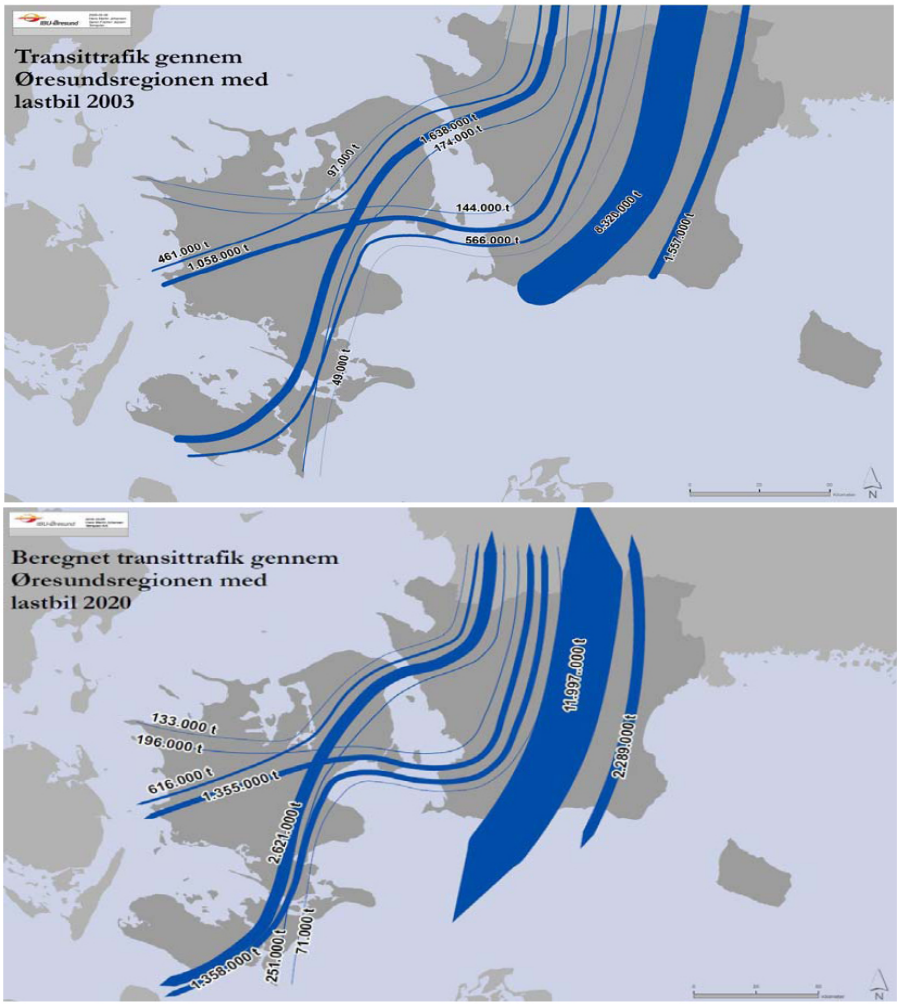
Conclusions: The region has good accessibility in a European perspective. There is still need for railway investments to improve the international accessibility, a second Öresunfdfixed link, and to improve the development of the region as one labour market.

Øresundsregionen som internationalt transportknudepunkt

Geography: Öresund region.

Purpose: The report is part of a larger study mapping international accessibility, transport flows and infrastructure in the Öresund region, both freight and passanger transport. The report discusses the transport business view on freight transport through the region, route and modal choice as well as impacts of the Fehmarn Belt fixed link. The report discusses obstacles and possibilities to develop green transport solutions.

Conclusions: Cooperation between municipalities and regions, as well as with companies is needed for planning of, for example, terminal development and for land use planning. Identification of logistic clusters in the region, which are: southern Copenhagen, Kastup arport area, southwesterm and northwester Skåne. The study suggests development of high-speed trains, development of Kastrup airport and of intermodal terminals.



Truck transport through Öresund region 2003 and 2020. Source: IBU.

Öresundsregionen som internationelt transportknudepunkt - vision 2030

Geography: Öresundsregionen

Purpose: Formulation of a vision for the development of the Öresund region, divided into milestones.

Conclusions: The report suggests measures to reach goals for increased efficiency and capacity for greening transport.

Öresund-Femern – En grön logistikkorridor?

Geography: Öresund region

Purpose: Development of green transport and logistic solutions in the Öresund region, which function as one transport node. The study analyzes the connection between infrastructure and transport demand, and analyses four logistic clusters in the region.

Conclusions: Increased awareness of environmental issues among companies, consumers and authorities promotes intermodal transport solutions. But intermodal solutions must be competitive with road with regards to quality and cost. Intermodal transport is often regarded as a railway service, not as a combination of modes that offers transport possibilities. The most important obstacle for developing intermodal terminals is related to governance issues as many actors are working with different strategies to promote intermodality. There often lack of discussions and contact between relevant actors. Establishment of for a for discussion might be part of the solution.