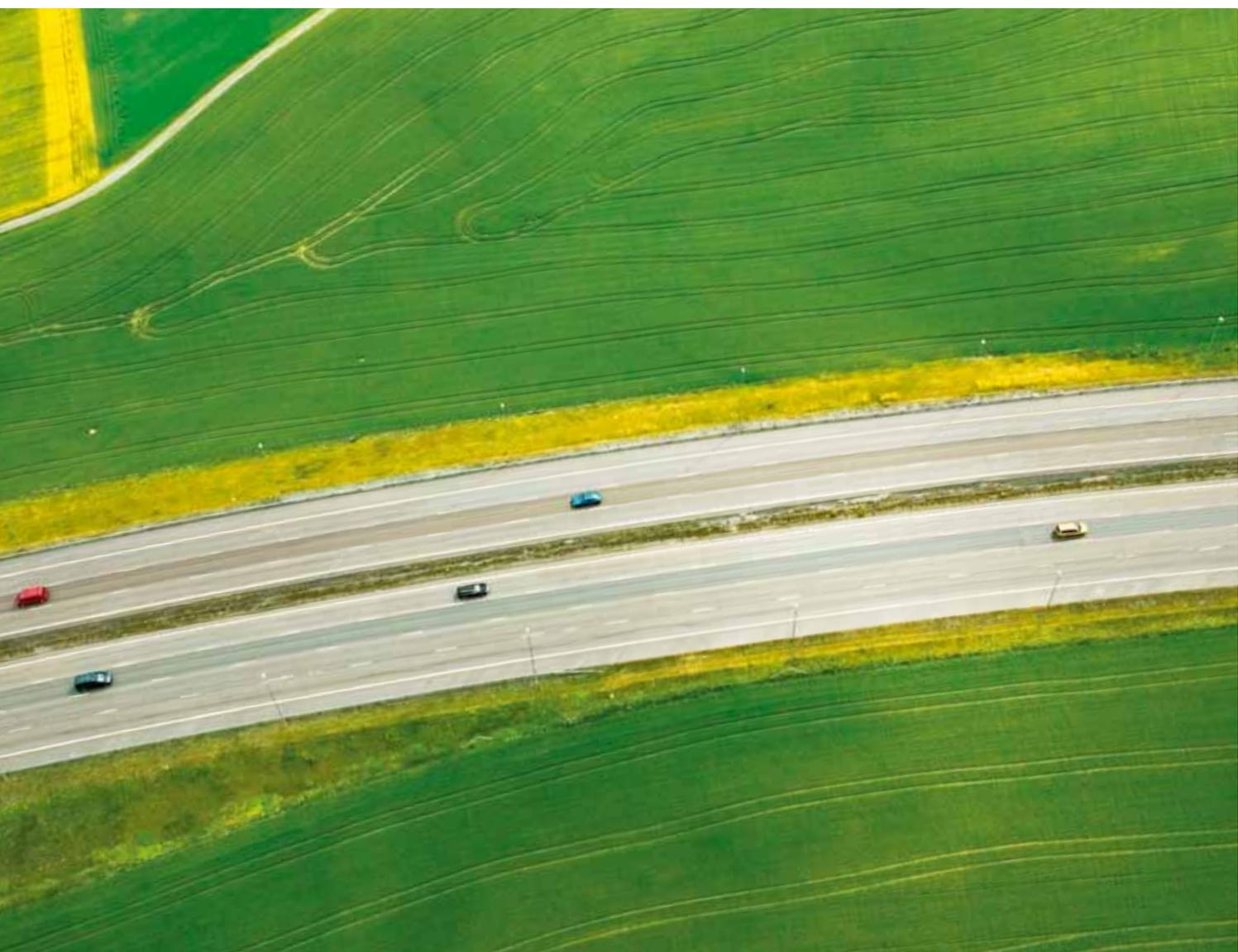


GREEN **STRING** CORRIDOR

The Green **STRING Corridor**

From speed and transit to accessibility and regional development



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PREFACE

Ambitions for growth and employment in the STRING Corridor

Region Zealand, The Capital Region of Denmark and Region Skåne want to ensure growth and employment in the corridor connecting Øresund and Hamburg. The opening of the Fehmarnbelt tunnel in 2021 will create new opportunities to support the development in the corridor – the STRING Corridor.

A positive development will reinforce the international competitiveness of the STRING region and its role as the engine for Sweden, Denmark and Germany alike. The region has 8.4 million residents and the greatest concentration of well-educated labour in Northern Europe. The Green STRING Corridor project, undertaken by Region Zealand, Region Skåne and The Capital Region of Denmark working together with other partners in the Øresund Region, represents a unique investigation of the potentials and challenges found in the STRING region. The project has also involved participants from Schleswig-Holstein and Hamburg.

The project has focused on the development of business, accessibility and more sustainable transport solutions along the transport corridor connecting Øresund and Hamburg. The project has highlighted three main issues: development of a green transport corridor, transport and logistics and accessibility and business travel. This report summarizes the results reached over the course of 2½ years of work. A number of analyses point out the challenges facing the STRING region and present concrete solutions. The analyses provide us with

tangible proposals for strengthening the development in the STRING region and which solutions contribute to the greatest growth – for the benefit of employment, commercial development and the environment in Sweden, Denmark and Germany.

A significant conclusion is that the three national transport authorities each focus on their own national traffic and have far less attention on cross border corridor traffic. This challenges the utilization of the corridor's potentials. Another conclusion is that the Fehmarnbelt fixed link will significantly improve the possibilities for transport which again will create more traffic. Here, the challenge is to ensure that this increase in traffic takes place in the most environmentally sustainable way possible. The project has taken initiative to establish a joint cross border network between existing logistics initiatives in the STRING corridor.

The parties involved in the Green STRING Corridor agree that it is necessary with greater insight into how they can work together to develop the STRING region. Our hope is that the results from the project will contribute to dialogue and debate amongst decision makers on the local, regional and national levels in all three countries. We hope that the material can serve as useful knowledge for the actors involved in the future strategic planning and decision-making process.

Thanks to all those who have made contributions to the work with the Green STRING Corridor project.



Jens Stenbæk
Chairman of the Regional Council
Region Zealand



Pia Kinhult
First Governor of Region Skåne
Region Skåne



Sophie Hæstorp Andersen
Chairman of the Regional Council
The Capital Region of Denmark

EXECUTIVE SUMMARY

In seven years Northern Europe will become smaller when the fixed Fehmarn Belt link and the new road- and rail infrastructure between the Øresund region and Hamburg will be inaugurated.

The new infrastructure will bring Scandinavia and Europe closer together and for both the population and the businesses in the STRING region it will become easier and faster to travel and to transport goods.

This opens up new perspectives for the future growth and employment in the STRING region and for the development of new and more sustainable modes of transport that can support the fulfillment of the climate goals of both the EU and the individual countries.

However, in order to reach this far it is necessary to fulfill three basic preconditions:

- strengthening of the competitiveness of the train in comparison to other modes of transport so that future growth in traffic primarily is by railway.
- an ambitious technical solution to the running of the train service with speed up to at least 200 km/h and with double tracks in the entire STRING corridor by 2021.
- a joint railway strategy ensuring service and seamless connectivity in the region's international and interregional train services.

The green corridor

With the fixed Fehmarn Belt connection and the upgrade of the adjoining railway the foundation for the fulfillment of the vision of a green transport corridor from the Øresund region to Hamburg has been established.

The new upgraded railway will mean more and faster trains between the cities in the region. The train will become more competitive in relation to cars and planes which will mean that more passengers and more goods will move to

trains relative to today. However, in order to utilize the full potential of the new physical infrastructure and in order to reach environmental and climate targets it is necessary with additional political decisions. "Business as usual" will no suffice.

The first condition for giving the train a strong competitive position is to make the railway from the Øresund Region to Hamburg a double track railway with a standardized speed of minimum 200 km/h. Thus the travel time from Øresund to Hamburg will be brought down to 2,5 hours – the same as travel by plane – and it will be possible to combine the German Intercity Express trains (ICE) with interregional trains connecting all towns and cities in the STRING region. This will create one big, integrated train system in the STRING region and it will reduce the environmental impact in the corridor.

In order to reach this far it is necessary that the three transport ministers in the STRING region initiate coordination of the train services and make decisions about a unified standard regarding capacity and speed in the entire railway corridor before the opening of the Femern Belt connection in 2021. Such coordination should also include a decision to the establishment of a new double track for faster trains for passenger and goods between Fehmarn–Lübeck–Hamburg.

Even with the strengthening of the train services road transportation will also be the primary mode of transport for goods and passengers in the future. It is therefore necessary to develop and establish an infrastructure along the STRING corridor enabling the supply of fossil free fuels such as gas, biofuels, and electricity to cars and trucks. With a high concentration of traffic in a defined corridor crossing several borders it is obvious to carry out a pilot project of such kind as an important result of the Green STRING Corridor.

The engine of growth

The transport and logistics industry is one of the engines that is going to foster the future economic growth in the STRING region.

The region contains a number of big transport hubs that are gateways to the global world and that are important to the European transport. The Port of Hamburg is the second largest in Europe and is a significant link of trade between Scandinavia and the overseas markets of North America and Asia. Copenhagen Airport is a similar hub for international passenger connections to and from the STRING region. With new railway lines and upgrade of the motorways in Sweden, Denmark, and Germany the businesses will have increased accessibility to the transport hubs and this creates new opportunities for cooperation, development and growth.

The transport and logistics industry plays a determining role in this connection. The industry employs approximately 180.000 in the STRING region and it is one of the conditions for new and improved mobility in the region. The composition of the industry and structure varies in the STRING region. Where Southern Sweden is dominated by ferry, rail, and distribution activities Zealand is dominated by maritime transport and retail distribution by road while Northern Germany has a high specialization in harbour logistics, maritime transport, and courier transport. Despite these differences the industry, from an overall perspective, has started a restructuring where transport and logistics companies develop more intelligent logistics solutions that to a larger degree encompass the whole transport and logistics chain of their customers.

The small and medium sized transport companies make out a substantial part of the industry in the STRING region and individually they are having a hard time developing

innovative solutions at the same speed as the global companies in the industry. Thus a number of companies have established themselves in clusters in order to get better opportunities for cooperation with suppliers, customers, and competitors and to ensure the necessary business development. In order to explore the full potential of the development for the whole of the transport and logistics industry there is a need to coordinate the activities of the clusters. Thus Green STRING Corridor has initiated a Declaration of Cooperation between the five existing cluster initiatives in the region.

Today by far the biggest part of transport of goods takes place by truck and this will also be the case in the future. To develop more sustainable transport solutions it will be – as on the passenger side – a goal to move a larger share of the transport to the railway.

In order to ensure both greener transport and a larger value in the business environment it is therefore important to increase focus on the development of the logistics industry in the STRING region. The industry's opportunities to promote mobility and accessibility for the other businesses should be part of the STRING region's regional development strategies. At the same time the regional business and infrastructure planning should to a higher degree have a strategic focus on the significance of good transport connections between the Øresund region and Hamburg Harbour in order to develop the accessibility for the business environment to global suppliers and markets in the STRING region.

Without political attention it can be expected that goods traffic between the Øresund region and the German ports primarily will take place by truck and that freight transport by railway in the corridor exclusively will serve goods in transit.

New time schedules increase integration

The future traffic layout will give completely new opportunities to the population, business, and higher educational institutions in the region. Students and employees will have shorter travel time to their educational institutions and their work places. Also the business environment will have access to an enlarged catchment area for recruitment of employees due to the faster and better accessibility in the STRING region.

Especially the railway will be able to make a huge difference if the politicians decide to make an ambitious plan for the transport system. Speed up to 200 km/h on rail will make the train as fast as plane between Hamburg and Copenhagen and as fast as by car between the cities in the STRING corridor.

This will mean that more business travellers in the region can make day trips by train almost regardless of where in the region they are going, but also that travel times between the cities in the region will be significantly reduced. This could be the development of a cross-border labour market, not at least for specialists, who are willing to commute 1-2 hours by train and be able to work during their travel time.

The fast train connections will at the same time create a better economy for train services as the shorter travel times will attract more passengers for both the international and interregional train services. The improved train service will furthermore increase the job possibilities for the population in the intermediate towns as they will have shorter travel time to the big work places in the region. Also the knowledge intensive sectors around the big cities will be strengthened because they will be able to recruit specialists from a larger catchment area.

Overall it can be expected that faster trains will trigger the cross-border commuting and expand the specialized labour market.

The condition for this is that the train service between the countries is connected and integrated across national borders. Thus the transport ministers of the three countries should make a joint "strategy" for the commercial and publicly subsidized train services in the STRING corridor. The plan should include the investment in electrical trains ready for use in 2021, but also establishment of common train connections from 2021 should be carried out by engaging the traffic operators and the national and regional public transport authorities.

Without a well-functioning coordinated train service the train will lose its ability to attract customers and the cross-border commuting will only happen by car which will in turn limit the development possibilities for private and public companies in the region.



OBJECTIVE

The project and this report are intended to cast light on the opportunities for establishing a green transport corridor through the Øresund Region to Hamburg for international freight transport; the so-called STRING region. The goal of the corridor is intended to both reduce the energy consumption and CO₂ emissions per traveler and per tonne of freight whilst at the same time ensuring optimal accessibility and mobility.

The project has been particularly interested in analysing three main themes:

- 1. Development of a green transport corridor**
- 2. Development of transport and logistics in the STRING region**
- 3. Improved accessibility and mobility**

On the basis of the results from this analysis, the project has identified the requirements and conditions involved in establishing such a transport corridor from the perspective of the authorities and commercial interests operating in the Øresund Region. The project has also mapped out the potentials for increased cooperation within the region and with partners in Germany. In this manner, the project can fulfill the objective with respect to preparing the business world and decision makers as regards the particular conditions and possibilities that are tied to the development of innovative and more environment-friendly transport and logistics solutions in a continuous transport corridor between Øresund and Hamburg via the Fehmarnbelt.

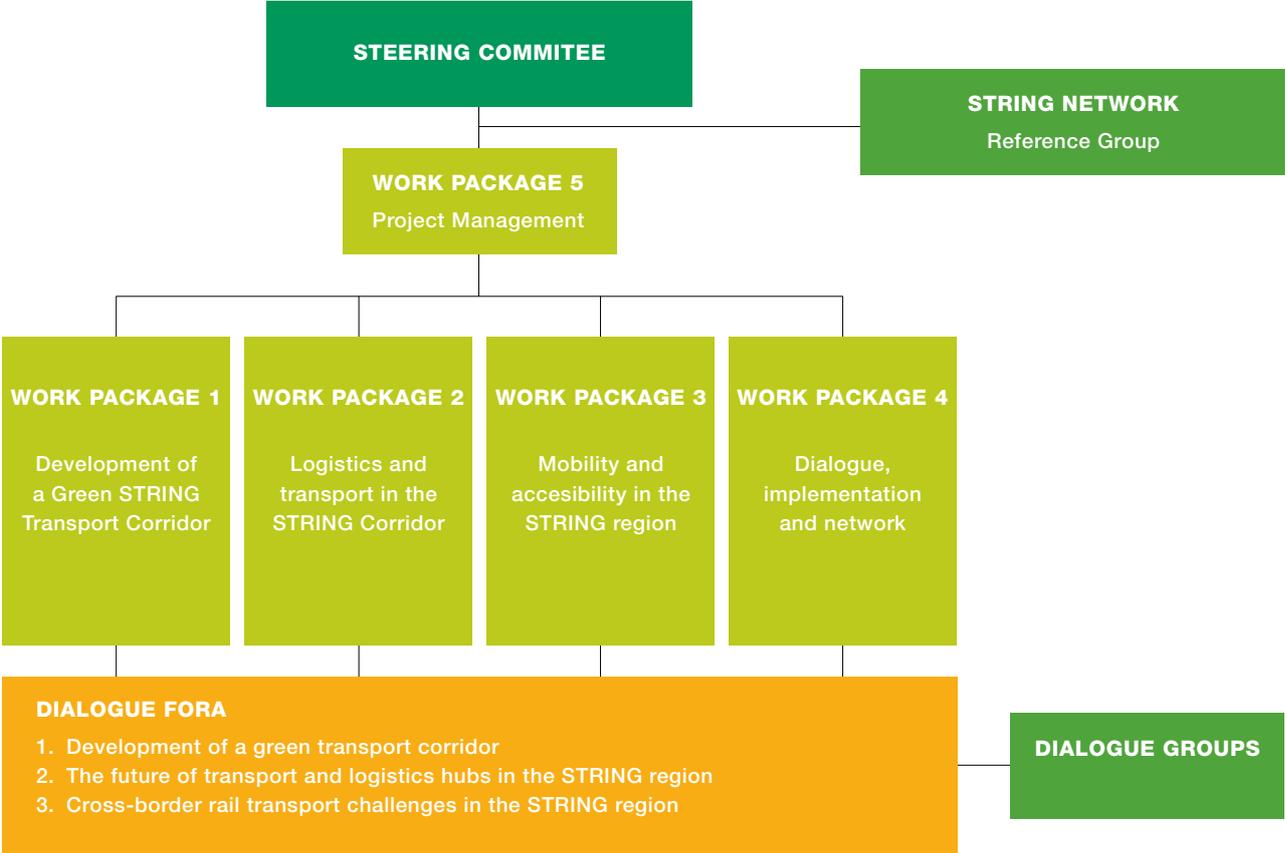
THE PROCESS

The project began in November 2011 as a collaborative cooperation between twelve Danish and Swedish partners. The project is financed with EU funding via the Interreg IVA Øresund programme and partners representing regional, municipal and state authorities together with universities on both sides of Øresund.

The three main themes of the project: developing a green transport corridor, transport and logistics in the STRING region and improved accessibility and mobility – have been the basis for three parallel working groups. In these groups, the project partners have worked with the on-going analyses and evaluated the results. The analyses

have been carried out by researchers from Roskilde University and Lund University together with consultants. The working group activities have been coordinated by project managers from Region Zealand, Region Skåne and The Capital Region of Denmark together with a steering committee for the entire project consisting of representative from the project partners (please see page 52 for a list of the project participants).

One of the important objectives in the project has been to ensure a close anchoring of the results and activities amongst the relevant actors and decision-makers in the STRING region. The project has therefore established



SOURCE: GREEN STRING CORRIDOR

a network of dialogue groups tied to the three project themes. These dialogue groups have made it possible to involve interested German stakeholders as well as stakeholders from Sweden and Denmark. Together with the dialogue groups, the project has presented selected results from the analyses at an early point in the project to relevant decision-makers from administrative bodies, corporations, research institutions and interest organizations. In this manner, the project has attempted to obtain on-going validation and qualification of the results obtained. The dialogue groups have also made it possible to identify new or under-exposed challenges within the respective themes.

The experience with the dialogue groups has been so fruitful that the project recommends that a selected number continue with this work after the conclusion of the project within the STRING framework.

From the outset of the project, Roskilde University and Lund University – both partners in the project – have worked together with a so-called STRING logistics platform. This activity has been conceived as an enabler or catalyst for concrete initiatives that have emerged from the meetings with the dialogue groups. Among the initiatives emerging from the STRING logistics platform are:

- the Marco Polo application from railway operator DB Schenker for economic support to a business case addressing a freight train concept between Høje Taastrup and the Port of Hamburg.
- seminars addressing the potentials for the use of liquefied gas for road and sea transport along the STRING corridor and air-rail cooperation, potentials for the so-called dry ports in the STRING region. The STRING logistics platform has also arranged seminars on the establishment of cluster initiatives together with dialogue group 2.

Finally, the Green STRING Corridor project has been engaged in on-going, close dialogue with the political actors in the STRING Network, meaning that the results from analyses and dialogue group meetings have been able to contribute as background material to the formation of political visions and objectives for transport and infrastructure in the STRING region.

This final report has been prepared by the working group in close dialogue with the dialogue groups and in line with the steering committee's recommendations.



Group discussion. Dialogue Forum workshop, Hamburg, May 2014.

STRING



SOURCE: STRING

STRING represents a political cooperation between Hamburg and Schleswig-Holstein in Germany, Region Zealand, the Capital Region of Denmark and the City of Copenhagen in Denmark and Region Skåne in Sweden. Geographically, STRING stretches in a diagonal line from Scania in the north to Hamburg in the south.

The STRING region has 8.4 million residents and represents a high concentration of labour, economic activity and transport centres in each end of the corridor, Hamburg and Copenhagen–Malmö, respectively.

The partners have established a joint secretariat, which works together with key stakeholders in the business community, labour market organizations, cultural institutions and associations in order to promote collaboration,

networks and projects. Through this collaboration, the secretariat has attempted to develop common policy agendas supported by analyses, debate and dialogue with relevant stakeholders.

One of the major themes for the collaboration has been to launch initiatives capable of producing new knowledge and implementing initiatives that can ensure closer integration and trade between the cities and regions in the STRING region. With the establishment of the fixed link across the Fehmarnbelt, the STRING region will become tied together by a continuous transport corridor consisting of road and rail between Øresund and Hamburg. The corridor is also an important connection between Scandinavia and central Europe – and it is an important part of the European TEN-T transport corridor, running from Helsinki to Malta.

THE VISION

The stakeholders working in the STRING Network have formulated a vision for the development of the region.

“Our vision is that the STRING region will be the driver behind a North European green growth corridor consisting of the STRING region in a functional partnership with our neighbouring regions. The corridor will be a green European powerhouse; a strong strategic axis contributing to knowledge, growth, welfare, and sustainability in Northern Europe, including the Baltic Sea Region.”

The massive investments in the Fehmarnbelt fixed link and the related expansion of the fixed land works on land on both sides of the Fehmarnbelt represent the most comprehensive upgrade of the connections between Scandinavia and Central Europe. They will create a new dynamic to Northern Europe, they will provide new opportunities for more sustainable transport, and they will draw the populations, corporations, economies and cultures of Northern Europe closer together.

In order to ensure the full exploitation of the potential in these massive investments, it is also necessary – at the earliest time possible – to see which initiatives must complement the fixed land works in order to create the greatest possible integration in the region and strengthen the competitiveness of the sustainable modes of transport.

This report and the analyses behind it are a contribution to promoting this work.

DEVELOPMENT OF A GREEN TRANSPORT CORRIDOR

The completion of the Fehmarnbelt fixed link in 2021 will represent the realization of a significant part of the TEN-T corridor from Finland to Malta, also referred to as the Scandinavia–Mediterranean corridor.

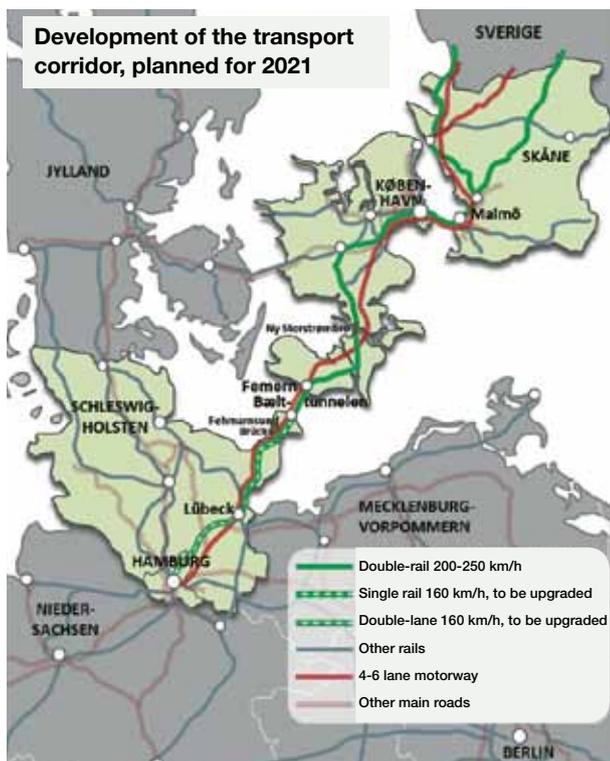
The Green STRING Corridor has analysed the major investments in the tunnel and rail facilities in order to assess how far it is possible to develop the green corridor and ensure more environmentally efficient freight and logistics solutions.

From transport corridor to development corridor

When the fixed Fehmarnbelt link opens in 2021, there will be a direct connection by land for road and rail between Øresund and Hamburg. The tunnel and the upgraded hinterland infrastructure works will serve as a new main corridor for the transport of freight and persons between Scandinavia and Germany.

A new, direct traffic infrastructure supplements the existing land- and sea-based connections via the Danish-German border in Jutland and the ports of the Baltic Sea in Sweden and Germany. The new transport corridor could possibly become an important link in a closer integration between the Swedish, Danish and German cities and regions in the STRING area.

The transport policy vision in the interregional STRING Network extends over three countries. The aim is to develop closer relations between Øresund and Hamburg on the basis of an international transport system connecting the cities and regions along the corridor and which contribute to creating healthy and sustainable growth opportunities in the future. With an integrated, more environmentally correct and coherent transport system, the objective is to increase accessibility, reduce transport and travel times as well as reduce costs for travelers and freight.



SOURCE: SYLVANS TRANSPORT DATA LAB

Better accessibility will also mean increased interaction between the cities and regions in the STRING area. Not least, it is expected that a new fixed link over the Fehmarnbelt will contribute to increased traffic in the form of more travel and lorry transport as well as trains the entire length of the transport corridor. Increased traffic brings a corresponding risk for increased strain on the local environment and the global climate [4].

This risk can be countered through strategic initiatives and planning across regional and national borders. Environmental challenges know no borders, and shared knowledge and international cooperation can therefore ensure a advantageous basis for developing sustainable transport between countries. The work in the Green STRING Corridor therefore focuses on maximizing the benefits of more sustainable transport and reducing negative effects of the increased traffic.

From national traffic routes to European transport corridors

Since the European Commission crafted the Maastricht Treaty in 1992, it has been a European objective to support the establishment of selected elements of trans-national infrastructure in order to remove critical “missing links” in a coherent European infrastructure network. This strategy has been based on the co-financing of concrete infrastructure projects and the coordination of the interfaces between the national transport systems, which can improve cross-border traffic by road, rail, sea and air.

In 2011, the European Commission adopted a new strategy. The European transport policy is now focused on establishing nine major European corridors in the overall TEN-T network instead of supporting individual projects.

In addition to eliminating the aforementioned missing links, the transport corridors are intended to be multi-modal so as to ensure the compatibility between the various forms of transport – road, rail, sea and air – as well as common standards and rules aimed at ensuring free mobility for travellers and goods across Europe.

According to the new strategy, the member states have assumed responsibility to help ensure the development of and connections in their respective parts of the nine corridors. Here, the European Commission and member states are using the transport corridors as a key strategic instrument to guide the future planning, development and operation of transport systems in Europe. The objective is for these corridors to have been completed no later than 2030 [5].



Trans European Transport Network TENT-T Scandinavian-Mediterranean Corridor

SOURCE: COWI

The Øresund–Hamburg STRING corridor is a strategically important link in the TEN-T Scandinavia–Mediterranean corridor, stretching from Helsinki in the north to Valetta in the south. This is one of the longest corridors and passes some of the most densely populated and economically strongest regions in Europe. It connects seven countries and, in the STRING area alone, it crosses the Swedish, Danish and German borders. This necessitates the creation of more comprehensive, transnational coordination than was previously the case, the focus before being on bilateral infrastructure projects between just two countries.

This initiative supplements the current corridor initiatives, which are more narrowly focussed on increasing the competitiveness of the railways across national borders, such as the rail freight corridors. As such, the national traffic authorities from the seven countries along the Scandinavia–Mediterranean corridor have been working on creating a coherent and open market for freight since 2010. They have also worked for an overall implementation of a single, joint European standard for train signal and command systems (ERTMS), which can optimize capacity and increase safety. The goal is to provide the freight operators with a single administrative point of entry to the planning and booking of rail channels throughout the corridor instead of seven national authorities. The administration of the Scandinavia–Mediterranean corridor for rail freight is to be established in November 2015, work which is being led by Trafikstyrelsen (the Danish Transport Authority) and Trafikverket (the Swedish Transport Administration).

The TEN-T strategy focuses not only on the technical infrastructure but also the environmental and regional development surrounding the corridors [5].

New TEN-T strategy

- Came into effect 21 December 2013.
- Work plan for implementation: December 2013.
- Covers nine cross-border, multi-modal transport corridors for completion by 2030.
- Together with the member states, the EU has appointed coordinators for each of the nine transport corridors. Former President of the EU Parliament Pat Cox is the EU coordinator for the Scandinavia–Mediterranean corridor, which includes the STRING corridor.
- Objective: integration within and between the corridors, interoperability and modal shift between modes of transport and national borders.

(Regulation No 1315/2013. new TEN-T strategy)

Green transport corridors

In addition to improved accessibility and mobility for passengers and freight in Europe, the TEN-T strategy is also aimed at ensuring a societally sustainable use of the transport system along the corridors by promoting energy-efficient and fossil-free solutions. Important initiatives aimed at supporting these objectives include the electrification of rail lines, implementation of common standards for international rail freight, taxes on particulate pollution, accessibility to cleaner fuels for road, air and sea traffic and so forth. The railways are to play a greater role in the future and are hold great potential for ensuring gains with respect to mobility and energy efficiency in relation to road and air transport.

A key element in the TEN-T strategy is therefore the opportunity to switch between different modes of transport in selected traffic hubs for passengers and freight. Such a switch will help achieve the European environmental objectives for transport of a 60 per cent reduction of CO₂ emissions by 2050. This is to be achieved by, among other things, moving 30 per cent of road freight to rail and sea transport by 2030 and 50 per cent by 2050 [2].

This means that the nine new TEN-T corridors must be able to ensure more efficient and environmentally sustainable transport. They are to develop into “green transport corridors”. The EU and member state initiatives have thus far focussed on freight transport and logistics, which account for most of the international, long-distance traffic on the European roads. But it is also important that other modes of transport along the green transport corridors are coupled together with long-distance traffic.

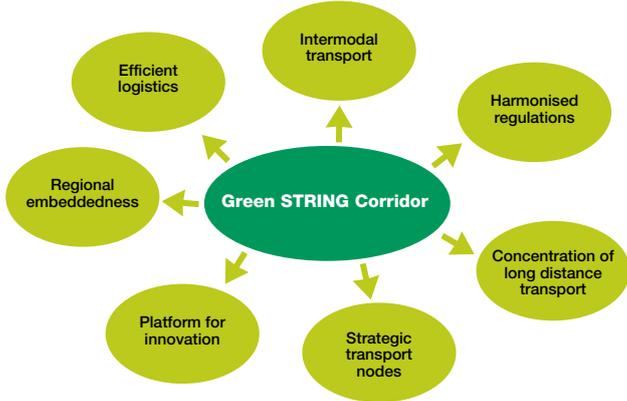
There is a political awareness in the STRING Network concerning the possibilities related to the massive investments in the coming years, particularly in the new railway infrastructure between Øresund and Hamburg via the Fehmarnbelt fixed link. The traffic policy vision for the STRING Network therefore aims at:

- freight transport over long distances must to a greater degree be able to be moved via the railways and be part of a coherent transport system with road and sea transport.
- passenger transport over greater distances can take place in highspeed trains capable of competing with automobile and air transport.
- urban areas between the metropolitan regions Øresund and Hamburg are connected to the corridor via regional commuter trains.

In order to support this vision, the Green STRING Corridor has identified seven key areas as requirements for developing a green transport corridor with a focus on accessibility, mobility and eco-efficient transport solutions. The initiatives are aimed at improving the business base for the operators in the sector by making improvements to capacity utilization and beneficial opportunities to switch between the modes of transport available in the region. This makes it possible to achieve the most efficient solutions for long-distance transport by train, ship or LHV lorries and for distribution in urban areas [2] [3].

When streams of trade and travel are concentrated in a general corridor, the large volume creates a better basis for developing alternative and innovative solutions, when then become commercially attractive for private investors. A well co-ordinated corridor is therefore also a suitable test environment for pilot projects aimed at developing sustainable transport and logistics solutions.

Seven initiatives that support the development of an efficient and sustainable transport corridor



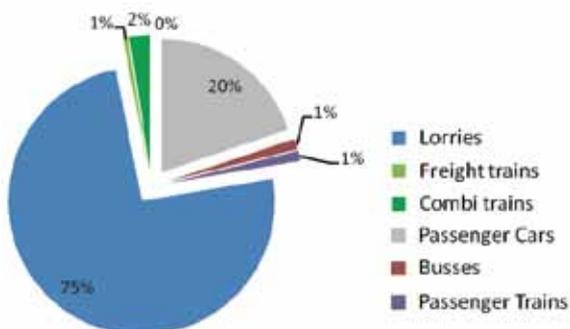
SOURCE: OXFORD RESEARCH, 2013

From transport sector to the Green STRING corridor Øresund–Hamburg

Emissions from freight traffic by lorry currently account for most of the total CO₂ emissions for long-distance transport through the STRING corridor.

It is expected that the massive investments in the new rail infrastructure in the years to come between Øresund and Hamburg will provide a major boost to the freight transport on the railways. In its report “Trafikplan for 2027” (Traffic Plan for 2027), The Danish Transport Authority has assessed that the number of freight trains is expected to be tripled to 84 per day across the Øresund by 2027, and 78 freight trains per day across Fehmarnbelt. Together with

Distribution of CO₂ emissions from long-distance traffic for various modes of transport in 2012 in the STRING corridor



SOURCE: COWI, 2014

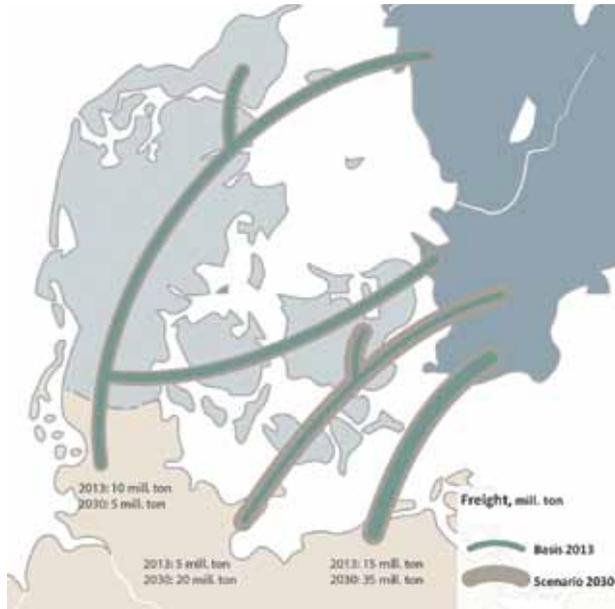
the existing international rail connections via Jutland and the ferries sailing on the Baltic, the total capacity for rail freight between Scandinavia and the European continent is expected to increase considerably [4].

This means that there is the basis for moving freight from roads to rail if all of the bottlenecks in the rail network are eliminated. Whether the increased capacity will actually result in the transfer of said freight transport will depend on whether the trains are able to improve the quality of train services correspondingly in terms of keeping their timetables and competitive prices; a transfer will only occur if rail transport is attractive for the transport market.

The use of railways for freight transport is not determined by the new infrastructures alone – but rather by decisions made by those who are buying and selling transport. At the same time, this usage demands good connections to terminals and hubs along the way, including a good connection between the Port of Hamburg and the lines north to Scandinavia.

Further initiatives must therefore be arranged if the expectations of the railways being able to bear most of the expected growth in the freight traffic in the STRING corridor are to be fulfilled by 2030.

Calculated long-distance freight transport in 2013 and 2030 (million tonnes annually)



SOURCE: COWI, 2014

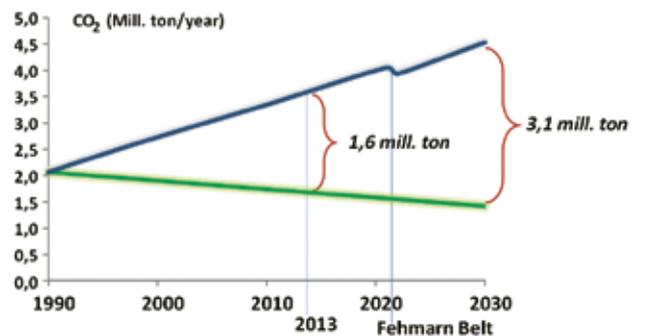
In 2014, Green STRING Corridor initiated an assessment of the possible climate effects resulting from a traditional projection of the current traffic development in the STRING corridor [4]. This assessment is set against a target-based development based on a 30 per cent CO₂ emissions reduction for the traffic in the corridor by 2030.

The assessments show that unless further initiatives are taken in order to promote the increased transfer of transport from roads to rails, the national and European objectives of a 30 per cent share of the freight traffic on the railways in the TEN-T corridors will be difficult to reach.

Without new initiatives, the lorry and automobile traffic can in the worst case come to account for almost 90 per cent of the total CO₂ emissions in the Øresund–Hamburg transport corridor. This is calculated in a so-called “business as usual” scenario for the years up to 2030.

The total CO₂ emissions from the traffic in the corridor are estimated to reach 4.5 million tonnes in 2030 if the development continues (cf. the figure below). In contrast is the “best case” scenario, which the Green STRING Corridor is working to realize. This scenario sets a target of 1.45 million tonnes of CO₂ annually in 2030 through a gradual reduction. The difference between the two scenarios is the rather significant “CO₂ gap”.

Illustration of the so-called gap between the two scenarios in terms of CO₂ emissions



SOURCE: COWI, 2014

In 2030, the CO₂ gap will consist of approximately 3.1 million tonnes of CO₂ annually. From 1990 to 2013, the gap reached 1.6 million tonnes of annual CO₂ emissions.

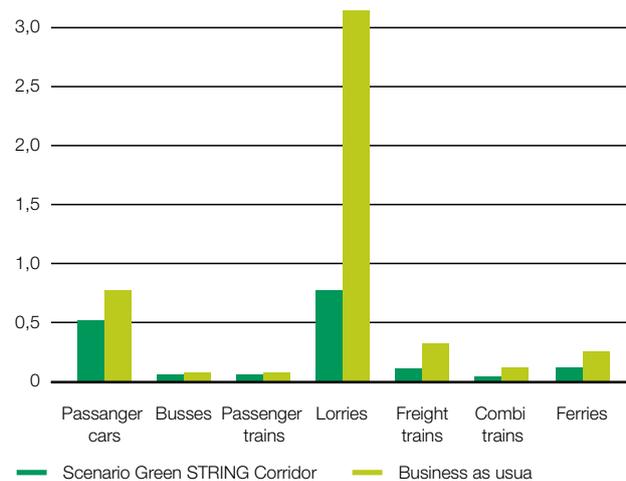
This development is primarily due to the major increase in the road traffic in the corridor. The increased traffic is largely driven by the corresponding economic growth in the form of increased business and trade activity.



PHOTO: SANDRINA LOHSE

The challenge and the need for initiatives is therefore quite significant. Particularly in light of the fact that the “business as usual” scenario already includes gradually increased motor efficiency and fuel technology; a development that has already made cars much more energy-efficient and less polluting over the last ten years. These factors have, other things being equal, led to a certain measure of improvement in relation to how things could have been.

Calculated CO₂ emissions for road and rail traffic in 2030 in two scenarios



SOURCE: COWI, 2014

As indicated by the calculations, road haulage in particular must contribute in one way or another towards reducing the gap.

Obviously, the development of modes of transport can be influenced. The analyses therefore cast light on whether it is at all possible to triple the railway traffic. If it is indeed possible, the 2030 objective for rail freight and shipping to transport 30 per cent of all freight on the longer trips will be fulfilled.

However, further initiatives with respect to roads are also necessary in order to achieve a greener scenario if the traffic corridor's CO₂ levels are to fulfil the European environmental objectives in 2050.

Road haulage will still be the primary mode of transport for freight and passengers in 2030 and 2050. It is therefore necessary to develop and establish an infrastructure along the STRING corridor in order to supply vehicles with fossil-free fuels, such as gas/propane, biofuels and electricity.

Due to a high concentration of traffic along a defined corridor crossing several national borders, the STRING region is a natural choice for a pilot project on alternative solutions to fossil fuels. Such a pilot project would be an important result of the Green STRING Corridor project.

Background and analysis

[1] *Traffic Analysis Malmö – Hamburg*, Vectura, 2012

[2] *Green STRING Corridor – 7 elements for a greener transport corridor Øresund – Hamburg*, Oxford Research, 2012

[3] *Environmental Effects of a Green STRING Corridor*, Oxford Research, 2013

[4] *Climate and business-related effects of a Green STRING Transport Corridor Øresund – Hamburg*, COWI, 2014

[5] *The TEN-T Core Network and the Fehmarnbelt region*, Roskilde University, 2014



Conclusions

On the background of the analyses of the environmental challenges in the STRING region and the mentioned possibilities for developing a green transport corridor, it is possible to conclude the following:

With the expansion of the railways in the STRING corridor, there will be capacity on the Danish side to ensure a major shift of freight over long distances from the roads to the rails, which is an essential element in the development of a green transport corridor. On the German side, a number of decisions have yet to be made that can ensure the same effect.

A competitive railway transport system along the STRING corridor requires:

- that a double-tracked railway and uniform speed standards of at least 200 km/h be established, as this will make it possible to combine the German Intercity Express train (ICE) on the Øresund–Hamburg line with interregional trains connecting all of the cities along the STRING corridor.
- that it will be possible to create room for the expected freight transport on the railway.
- that the fastest travel time Øresund–Hamburg can be brought down to 2½ hours – the same travel time as by air.
- that interregional travels by train can have the same speed as travel by car.
- and that the greater the number using the railways, the lesser the environmental impact in the corridor.

The Fehmarnbelt fixed link alone will reduce the environmental impact of the traffic across the Fehmarnbelt. When the connection opens, a leap in total traffic is expected in the corridor. With a projection of the current distribution between the various modes of transport, it is therefore reasonable to expect:

- that the railway will account for a minor part of the total traffic increase.
- that most of the increase is expected to result from passenger cars and lorries.
- that the traffic development is a challenge for the contribution made by the corridor towards reaching the European and national climate goals towards 2030.

With the Fehmarnbelt fixed link and the massive investments in new infrastructure between Hamburg and Øresund, the political decisions regarding the physical structures for the Scandinavia–Mediterranean corridor are coming into place on the Danish side, while debate continues on the German side. An EU coordinator has been appointed for the transport corridor, and the national traffic authorities are working together. The conditions for establishing frictionless, cross-border rail services along the STRING corridor should therefore be in place on the administrative level.

Recommendations

If the corridor is to contribute to the reduced environmental impact from passenger and freight transport, it must be attractive to the users and fossil-free fuel has to be available. This requires:

- a uniform standard for capacity and speed for the entire railway corridor prior to its opening in 2021.
- a special effort in Northern Germany to ensure the full impact of the green corridor. Among other things, this requires a decision to establish a new double track for passenger and freight trains between Fehmarn–Lübeck–Hamburg.
- that the respective ministers of transport take the initiative to coordinate efforts.
- establishing a fossil-free infrastructure for fuels in the form of electricity, gas, propane or hydrogen along the entire corridor.

A comprehensive strategy is necessary. A strategy capable of ensuring the continued development of the green corridor and maximizing the benefit for the business community, labour market and the environment.

This requires active cooperation between:

- the EU coordinator for the TEN-T Scandinavia–Mediterranean corridor.
- national authorities in Germany, Denmark and Sweden.
- STRING Network.

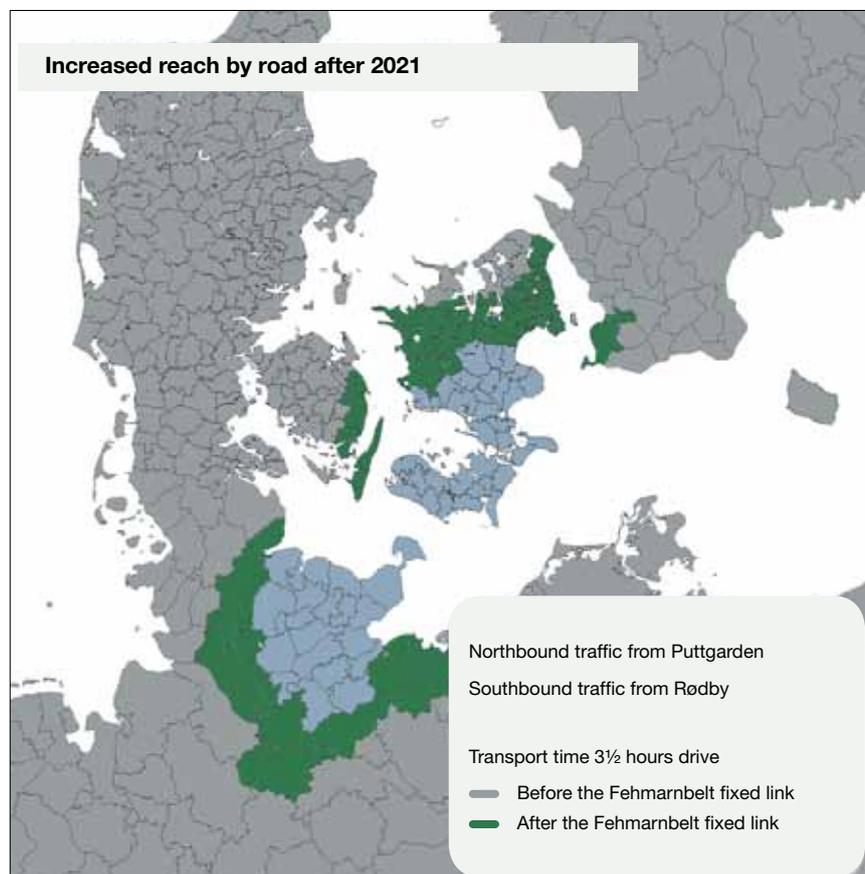
DEVELOPMENT OF THE TRANSPORT AND LOGISTICS INDUSTRY

Foreign trade accounts for almost 50 per cent of the gross national product of the Nordic countries. Access to the transport systems connecting to global markets is therefore a key to the growth and prosperity in these countries. There are a number of transport hubs in Northern Europe that ensure this access. Maritime transport primarily goes through the major ports of Rotterdam and Antwerp and, when it comes to the STRING region, especially the Port of Hamburg, which is a global port – the second largest in Europe – with connections to Asia and North America. The German ports on the Baltic Sea are also important hubs for trade to and from Eastern Europe. Air cargo generally moves through Frankfurt in Germany, Schiphol in the Netherlands and in the STRING region via Copenhagen Airport. These traffic hubs are of interest to the STRING region and the Øresund–Hamburg transport corridor, which serves as

a link between Scandinavia and central Europe. In addition Hamburg is one of the strongest and most innovative logistics clusters in all of Europe. Thus, the region has the potential to be a pioneer in terms of developing both efficient and environmentally sustainable logistics solutions.

The massive investments to be made in the infrastructure along the STRING corridor in the years to come will tie the European markets closer together. The Fehmarnbelt fixed link, new rail lines and upgraded motorways in Sweden, Denmark and Germany will improve the access to the Port of Hamburg and provide the business community with new opportunities for cooperation and development. The investments will increase logistics activities and stimulate the economic growth and a broader regional development.

The Fehmarnbelt fixed link “makes Northern Europe smaller” and makes new transport and logistics solutions possible along the entire STRING region. It will be possible to drive a lorry between Copenhagen and Hamburg within the driver’s daily drive/rest times. It is reasonable to expect that these changes to transport times will also make a difference in terms of where companies position their future distribution and warehouse facilities in Northern Germany and Scandinavia.



SOURCE: COWI



PHOTO: SANDRINA LOHSE

It is crucial for the transport and logistics industry to have well-functioning access to the Port of Hamburg and all of the other Baltic ports, regardless of whether this access is via road, rail or sea.

More large freight-forwarders and increasing competition

Analyses of the Green STRING corridor show that the transport and logistics industry in the STRING region employs approximately 180,000 employees across a number of sub-sectors in the various areas in the STRING region [3].

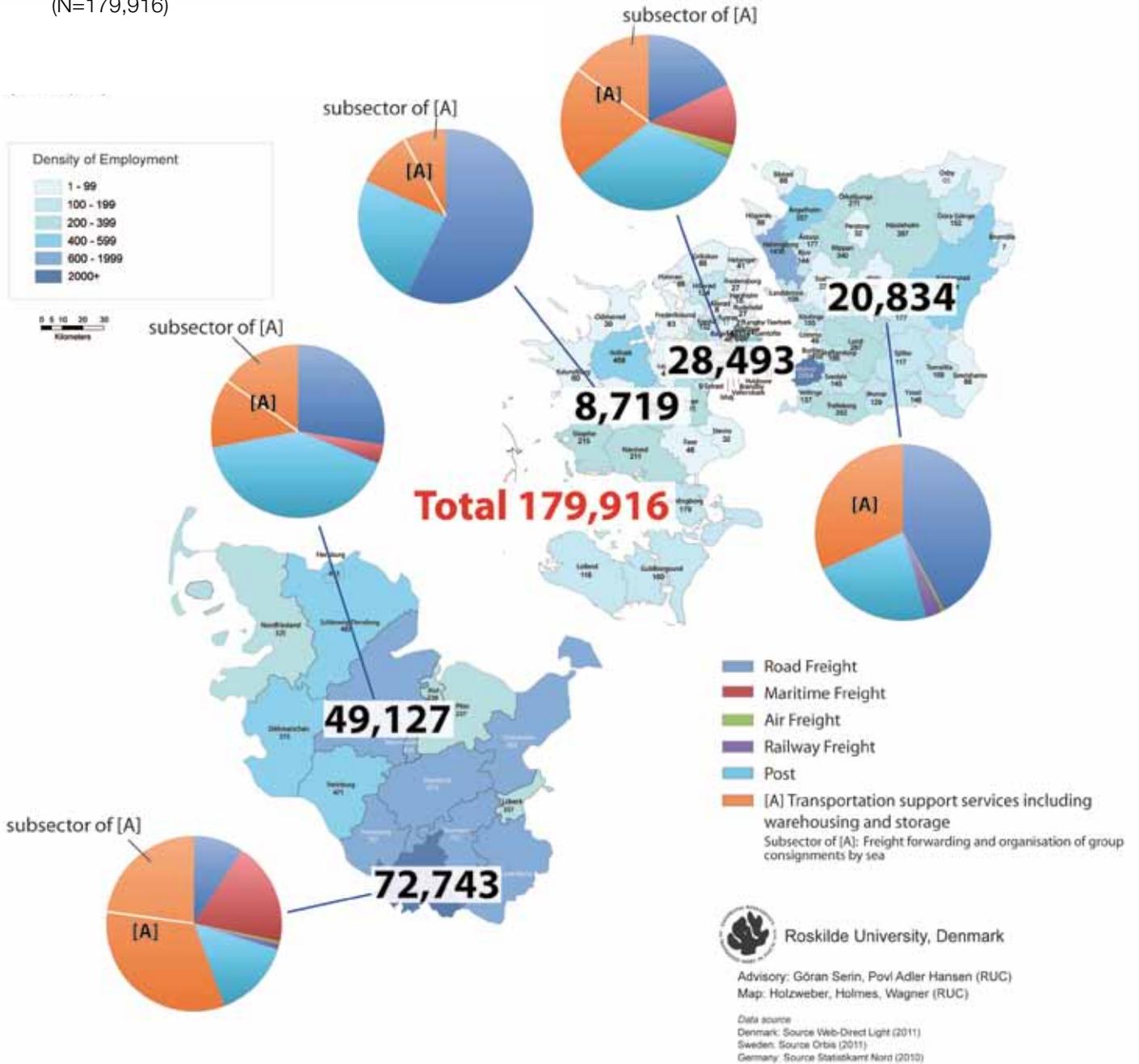
The total employment in the transport and logistics industry has been declining in recent years. But there are considerable differences between the five regions along the STRING corridor and between the sub-sectors. Hardly surprisingly, Hamburg has the leading position in transport and logistics activities, representing 40 per cent of the total workforce in the sector.

In the regions of Scania and Schleswig-Holstein, employment and the number of companies has been relatively stable since 2004, even though there are distinct differences in the composition of the sub-sectors. Schleswig-Holstein has a prominent and specialized position in postal services and freight, which represents more than a quarter of the state's total share of the 49,000 employees in the regional transport and logistics sector.

In Region Zealand, the road haulage sector dominates the total number of companies and employees in the sector. At the same time, this sector is one of the sub-sectors that has had the greatest decline in employment since the end of the 1990's. The sector is dominated by a few, very large – often global – companies with a share of 34 per cent of the employment and with an undergrowth of many small companies. Even though the overall picture of the transport and logistics industry reveals a declining number of employees, the revenue in many of the sub-sectors is increasing; and for some of the sub-sectors, the number of employees has actually increased – for example in the storage industry, third-party logistics and postal and freight providers.

Without comparison, the greatest revenue is in the maritime sector. In the Capital Region of Denmark, the maritime sector thus had a revenue amounting to almost 18 billion euro in 2010, while the corresponding sector in Hamburg turned over 15 billion euro. The maritime sector in Hamburg had 14,000 employees, whereas the number of employees in Copenhagen was merely 3,000. This clearly illustrates how the maritime activities in the Capital Region of Denmark – with the exception of the administration – take place on a global market. [3]

Employment in the freight transport and logistics sector, divided into subsectors (five STRING regions) in 2010
(N=179,916)





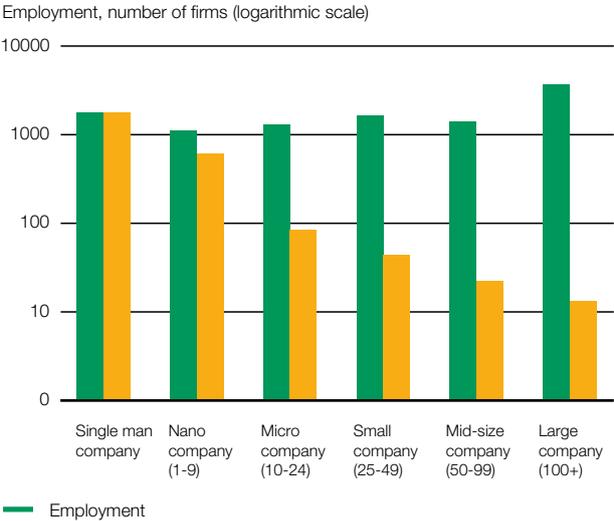
Vi testar
framtidens bränsle
för miljöns skull

postennorden.se/miljo

The transport customers themselves can take the first step with respect to innovation in the area, but it is ultimately the freight-forwarding companies that are running an investment risk. The small and medium-sized companies in particular require economic support in order to adjust to new solutions and shift to alternative fuels.

In order to take advantage of the improved accessibility, shorter transit times and more efficient transport developing as a result of the new infrastructure, however, the STRING region also depends on a flexible and innovative logistics sector.

Zealand, employment at Freight Transport-by-road Firms (N=2519 firms; 10,869 employees)



SOURCE: ROSKILDE UNIVERSITET, 2013

The small and medium-sized transport companies make up a substantial part of the transport and logistics industry in the STRING region, and they play a major role for the employment in the sector. For example, two-thirds of all of the employees in the road haulage sector on Zealand are employed in small and medium-sized transport companies (SMEs). A similar picture emerges in Scania and Schleswig-Holstein – here, however, the share of the employees in the smaller companies is slightly smaller.

This type of small and medium-sized road haulage company has been challenged in recent years by the increasing internationalization of goods transport and liberalization of the rules for cabotage operations across national borders. This has resulted in increasing competition on wages and the prices for simple transport services, where driver wages represent the most significant cost. In some cases, however, the new competition has also meant that services and products have been developed and processed in such a manner that customers have received greater value instead of lower prices.

Conversely, it has been possible to register a positive development among the transport and logistics companies that are focusing on the coordination of large customers' logistics, storage, packaging and assembly – also referred to as third-party logistics. For an increasing number of manufacturing and trade companies, logistics represents a strategic competitive parameter with respect to minimizing the costs in production and distribution systems.

Third-party logistics is an activity and competence, which can be expected to make a greater contribution to the companies' added value than transport services in the strict sense. There would also appear to be a widespread tendency amongst the large wholesaler and manufacturing companies only to use larger freight-forwarding companies for their distribution needs.

The major international transport and logistics companies operate across national borders and they have customers in various sub-industries in multiple countries. In this manner, they can collect, integrate and transfer innovative solutions and technologies between these industries. But part of this knowledge is also transferred to the smaller actors in the STRING region when the large companies outsource parts of their work. This establishes the potential for development and innovation in the entire transport and logistics industry in the region.

“Efficiency is green.
Efficiency is good.”

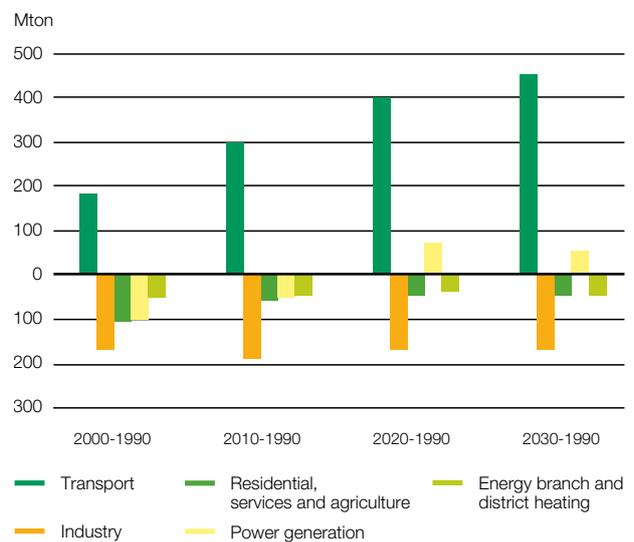
Rüdiger Schacht, Chambers of Commerce and Industry in Schleswig-Holstein

The green corridor requires new knowledge and innovation

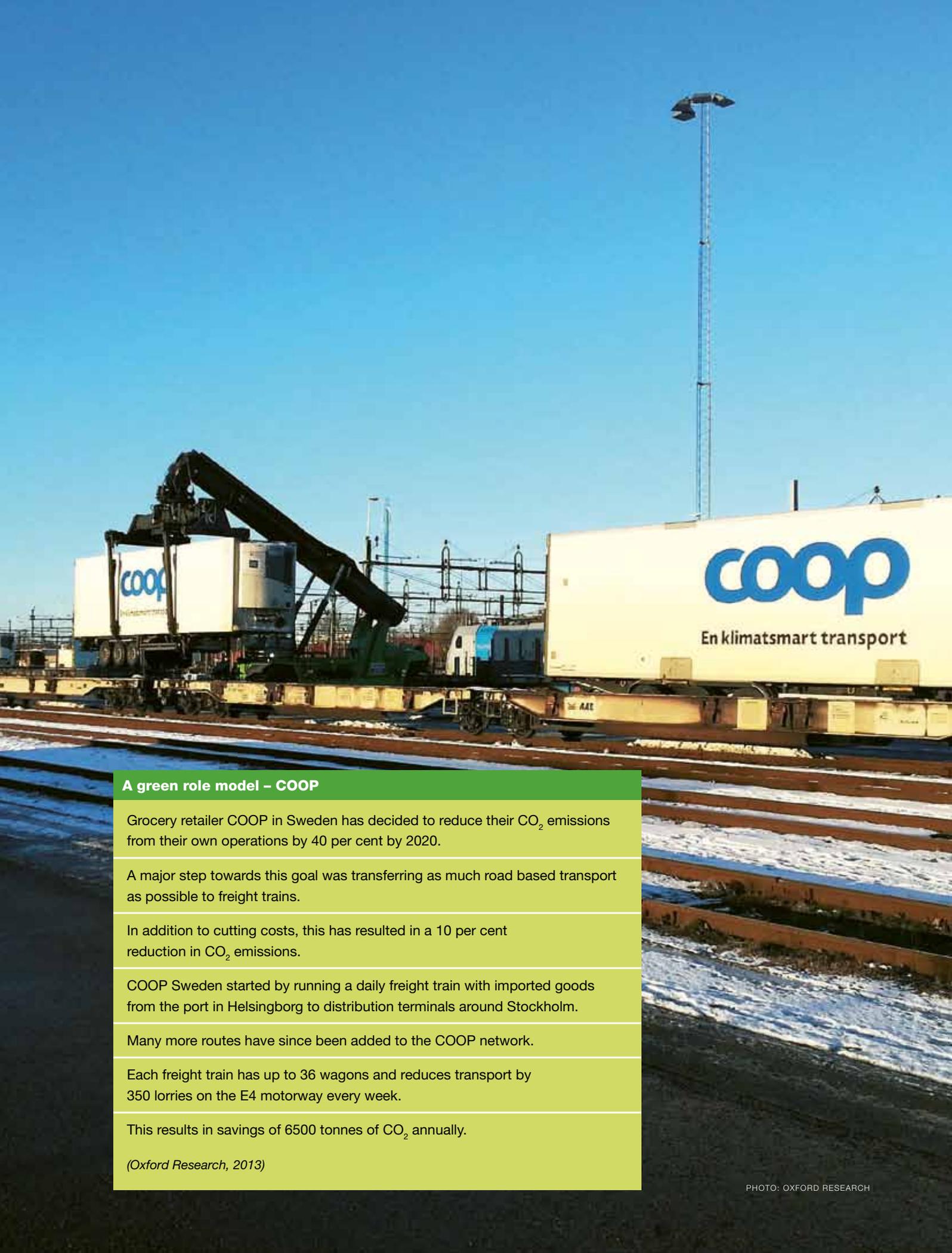
The STRING region benefits from a long number of well-established suppliers of transport and logistics, which have developed effective transport solutions combining economic gains for the companies with reduced environmental impact such as less emissions and energy consumption. Earnings are smaller in the small and medium-sized companies and despite some measure of cooperation with the large freight-forwarding companies the innovation is not at the same level as with the major actors in the sector. In order to realize the green corridor, it is therefore important that the current re-structuring of the transport sector leads to a more knowledge-based sector and that the transport buyers are made aware of the potential in sustainable transport solutions – both with respect to business and the environment [3].

There are numerous examples of companies wanting to operate in a more environmentally friendly manner and being able to place a green label on their products. The analyses in the Green STRING Corridor indicate that rail transport can provide financial gains for corporations and positive effects with respect to CO₂ emissions, energy consumption, and congestion on the roads, as road haulage is minimized [8].

Change of CO₂ emissions since 1990



SOURCE: EC DG ENERGY AND TRANSPORT, 2008



A green role model – COOP

Grocery retailer COOP in Sweden has decided to reduce their CO₂ emissions from their own operations by 40 per cent by 2020.

A major step towards this goal was transferring as much road based transport as possible to freight trains.

In addition to cutting costs, this has resulted in a 10 per cent reduction in CO₂ emissions.

COOP Sweden started by running a daily freight train with imported goods from the port in Helsingborg to distribution terminals around Stockholm.

Many more routes have since been added to the COOP network.

Each freight train has up to 36 wagons and reduces transport by 350 lorries on the E4 motorway every week.

This results in savings of 6500 tonnes of CO₂ annually.

(Oxford Research, 2013)

Logistics service providers would like to develop green solutions, but they have a limited planning horizon of a few years, and the competition between companies is great. While geographical concentrations of transport and logistics companies have been identified around the larger cities together with transport hubs in the STRING region, there are relatively few examples of more formalized clusters of networks capable of supporting a more coordinated development of the sector between the individual companies.

The massive investments in new traffic infrastructure in the years to come in the STRING region will create a need for a greater strategic focus on the transport and logistics industry among actors such as the regional and local authorities. This sector plays a decisive role as the intermediary link between the new opportunities for capacity, which the infrastructure provides, and the need for accessibility, which the regional business community demands. In other words, the transport and logistics industry is contributing to the realization of the mobility of the road haulage for the regional business community from the suppliers to the customers.

This means that it is necessary to continue the work with regional authorities, with national initiatives and with support from business organizations. Basically, there are no significant barriers that hamper cooperation on concrete initiatives. The challenge is to find effective solutions that go beyond the two national borders in the corridor between Northern Germany, eastern Denmark and Southern Sweden.

Strengthening the railways

The massive investments in the STRING corridor infrastructure currently being undertaken will make it possible to use the railway for more freight and logistics transport. But this will require focusing on a number of factors, some of which require public initiatives, while others require initiatives from transport customers and transport companies [8]:

- Companies purchasing transport services with goods suitable for rail demand more and more frequent train connections between international freight terminals and the Øresund Region, as well as greater flexibility and faster response times when transport needs arise. Conversely, several of the train operators call for more active participation from the major freight customers in order to ensure a critical mass when new freight train connections are established.
- Greater flexibility among those administrating the infrastructure will provide better opportunities for one-stop-shopping and opportunity to order capacity on the rail network more quickly – so-called train paths.
- Implementation of a common technical railway standard along the STRING corridor – and in the longer term along the entire Scandinavian–Mediterranean corridor, capable of handling heavier trains and wider freight car profiles (25 tonnes axle loads for freight cars, increasing the train length to 1,000 meters and using a profile standard PC/450-G2 for new railway constructions). This will provide better economy of scale for operators and render the railways more competitive compared to road haulage over longer distances.
- The bodies administrating the railways in the respective countries have not been able to agree on a general standard, and negotiations are left to the administrative levels. Help to support a flexible process must be considered.

The potential role of the logistics clusters in developing the corridor

Company clusters are powerful machines in the economic development in a society. Clusters can provide productive business development for companies, not least the small and medium-sized companies, as they provide better opportunities for working together with suppliers, customers and competitors in the same geographical area.

Examples of cluster cooperation on transport and logistics in the Green STRING Corridor project show that there are different traditions for how companies can be brought together in public–private relations. In Germany, there are a number of regional cluster and network initiatives with a well-developed organization that initiate cooperation with the local transport and logistics companies. In Hamburg, the state contributes financial support to the regional cluster initiative, Logistics Initiative Hamburg.

Logistics areas in the STRING corridor. Cluster development and academic collaboration can provide competitive advantages, as the future STRING region will not be able to compete on wage costs.

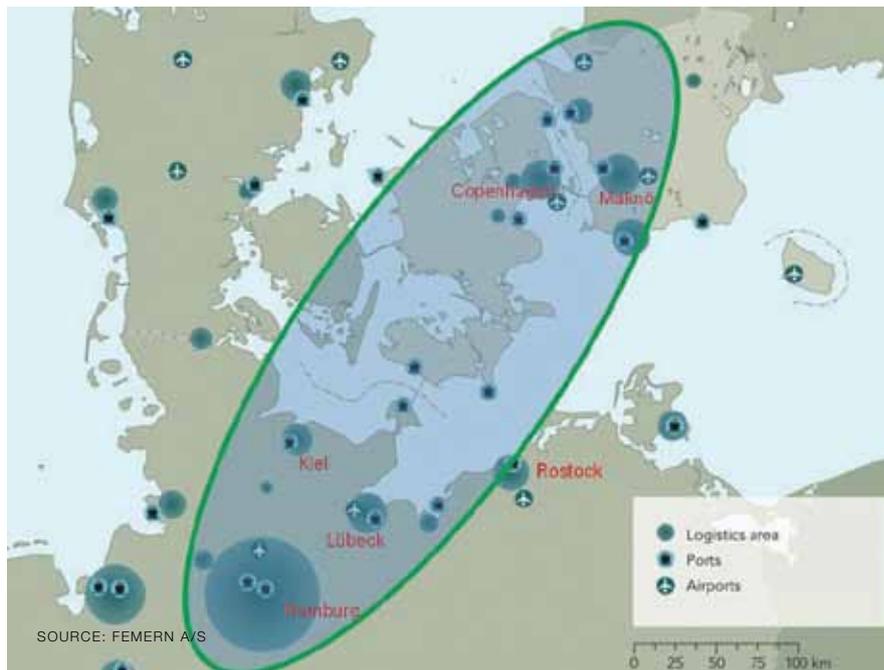




PHOTO: SANDRINA LOHSE

All cluster initiatives require actors, who are “passionate or enthusiastic” enough to drive the clusters actively in the introductory.

“Don’t think outside the box!
Think as though there isn’t
any box.”

Bo Wallteg, Packbridge

The cluster became the first logistics cluster in Europe in 2014 to be certified for fulfilling a number of organizational and operational standards around the servicing of the regional companies – a so-called gold certification. The cluster initiative is now the role model for a number of similar logistics initiatives in Germany. The experiences accumulated in the cluster regarding certification and networking are also of interest among the other logistics initiatives in the STRING region.

One of the other Northern German logistics initiatives is the “Logistic Initiative” in Schleswig-Holstein, which was established in 2008. The logistics industry in the state is not as prominent as in Hamburg, and this initiative has therefore been established in order to attract new transport and logistics companies that are capable of contributing to the growth in both industry and trade in Schleswig-Holstein.

Both of the Northern German initiatives are also working together with other clusters on the introduction of new IT logistics solutions that have emerged out of cooperation with IT clusters.

In Denmark and Sweden, there is a tendency to view clusters from a network perspective, which makes a narrow geographical delimitation of a cluster less relevant. This opens up for new types of cluster collaboration within and between sectors, and it can affect the regional business community with regard to more and better cooperation on new, more effective business models, more innovative logistics solutions and better use of resources.

There are two on-going initiatives on Zealand. The Municipality of Køge is behind one of these, which is aimed at identifying the opportunities for establishing a logistics cluster in the Køge area on the basis of regional transport companies. The other initiative is Copenhagen Capacity, which is a Danish marketing organization that aims to promote investments in the Capital Region of Denmark and Region Zealand. Their focus is on increasing awareness among regional companies regarding the significance of control of the supply chain as a competitive parameter for the individual company and for Eastern Denmark as a site for attracting larger foreign companies.

In Scania, the “Logistics for Tomorrow” initiative is in the introductory phase and is financed by Business Region Skåne. Later, the members themselves will be responsible for the financing. “Logistics for Tomorrow” has grown out of an initiative to promote clusters and innovation for which the EU and Region Skåne are responsible. In the cluster, logistics providers meet with logistics customers and the local authorities. The cluster also aims to attract new logistics companies to the Scandinavian market, and it is working hard at cooperating together with other clusters in order to achieve greater reach and value.

Logistics initiatives along the STRING corridor

Region Skåne – Sweden

- Business Region Skåne (Näringsliv, Skåne)
<http://utveckling.skane.se/utvecklingsomraden/naringslivsutveckling/innovationssystem/>

Region Zealand/The Capital Region of Denmark – Denmark

- Copenhagen Capacity (establishment of networks) www.copcap.com
- Køge Municipality (EU project aimed at establishing a certified cluster)
www.koege.dk/kommunen/international

The State of Hamburg and Land Schleswig Holstein – Germany

- Logistics Initiative Schleswig-Holstein e.V (establishment of networks) www.logistics-sh.de
- Logistics initiative Hamburg (establishment of a gold-certified cluster) www.hamburg-logistics.net



With the on-going and impending investments in new traffic infrastructure in the transport corridor, there is a potential for the five local logistics initiatives to establish cooperation on how the corridor can strengthen the transport and logistics industry in the STRING region.

Since 2012, the Green STRING Corridor has taken the initiative to hosting a number of network meetings involving the five logistics initiatives together with regional stakeholders from the business community, knowledge institutions and interest organizations. These network meetings have resulted in a joint “Declaration of Cooperation” (see Appendix), which initially is a declaration of intent regarding closer cooperation, which in the longer term can support the opportunities for creating synergy between the companies and the clusters in the STRING region. This new venture is focused on three areas:

1. STRING logistics network: How can the cooperation develop a network, which creates international awareness together with matchmaking and events for its members?
2. Support for innovation: How can the cooperation foster innovation among the members of the clusters through joint projects and facilitation?
3. Platform for the exchange of knowledge: How can the cooperation share relevant knowledge between the clusters and act as a knowledge and information centre?

This venture represents a further development of the logistics initiatives and a more extensive and deeper cooperation between these initiatives, which together can contribute to growth, employment and innovation in the transport and logistics industry in the STRING-region.

Background and analysis

- [1] *The Green STRING Corridor and transport development*, Roskilde University, 2012
- [2] *Green STRING Corridor SWOT analysis*, Roskilde University, 2012
- [3] *Employment and turnover in the transport and logistics industry in the STRING region*, Roskilde University, 2013
- [4] *Environmental effects of a Green STRING Corridor*, Oxford Research, 2013
- [5] *Case studies in Understanding Transport Sensitive Industries (TSI) – Being ‘Green’ or ‘Managing Transport and Logistics?’*, Roskilde University, 2014
- [6] *Strategic cooperation between logistics clusters along the STRING corridor* (begins in September 2014, COWI 2014)
- [7] *Fehmarn business survey* (2013, 2014)
- [8] *Climate and business-related effects of a Green STRING transport corridor Øresund–Hamburg*, COWI, 2014

Conclusions

The analyses of the transport and logistics industry and the expected development in the STRING region lead to the following conclusions.

The transport- and logistics industry is an important prerogative for the creation of economic growth and development in the STRING corridor, because:

- the sector employs 180,000 and is an important actor because the transport and logistics companies are crucial for improving accessibility, which is realized through comprehensive investments in infrastructure resulting in better mobility for the other sectors in the STRING region.
- the sector is facing re-structuring where companies develop more intelligent logistics solutions tailored towards the entire transport and logistics chain for their customers. This is reflected in the decline in employment in companies with a narrow focus on traditional “A to B deliveries” and corresponding growth in logistics-oriented companies that are focusing on third-party logistics, freight-forwarding, storage and terminal activities.
- there has been some measure of specialization within the transport and logistics sub-sectors. Southern Sweden is dominated by ferries, rail and distribution activities. On Zealand, the specialization is tied to maritime transport and road-based retail distribution, while Northern Germany has a high degree of specialization in port logistics, shipping and courier transport.

Road transport and the German Baltic ports play a significant role for the Scandinavian goods transport in the STRING region:

- the Port of Hamburg is a global port with the biggest amount of loading and unloading of intercontinental cargo to and from Scandinavian companies. The Baltic ports are important for European trade. Developing the STRING corridor will therefore represent a significant improvement with respect to the accessibility between the major transport hubs in Northern Germany, Swedish industry and the consumer market surrounding the Øresund Region.
- the Fehmarnbelt fixed link “makes Northern Europe smaller” and makes new transport and logistics solutions possible in the entire STRING region. There is reason to expect that the shorter transport times will also have an impact on how companies position their distribution and storage facilities in Northern Germany and Scandinavia.

The STRING region has relatively many transport- and logistics companies concentrated around the larger traffic hubs and major infrastructure lines, as geographically demarcated clusters. More formalized cluster initiatives aimed at coordinating cooperation and the exchange of knowledge between the local transport and logistics companies have only been established in Northern Germany. There are no formalized cluster initiatives in Scania or on Zealand. This can limit the sector, because:

- the Fehmarnbelt fixed link will potentially create a new logistics landscape, but a coordinated strategy for exploiting the possibilities for the transport and logistics industry in the entire STRING region across national borders has yet to be developed. This could result in an international rivalry between the existing geographical clusters of companies with respect to attracting Northern European and Scandinavian distribution activities.

Recommendations

In order to ensure the greatest possible accessibility and value growth in trade, it is necessary to sharpen the focus on the logistics industry and infrastructure planning.

We therefore recommend that:

- the opportunities for the transport and logistics industry to promote mobility and accessibility ought to be included in the regional STRING development strategies.
- the regional business and infrastructure planning should focus more on the significance of good traffic connections between the Øresund Region and the Port of Hamburg in order to improve accessibility to commercial activities for global suppliers and markets in the STRING region.

There is a lack of concrete initiatives that can help establish competitive transport solutions on the railways between the terminals in the Øresund Region and the ports in Northern Germany, such as:

- the development of a corridor principle where major freight customers, shipping agencies, freight forwarders, ports and railway operators work together towards establishing of rail transport in a given geographical area. Such an initiative could ensure that, in the start-up phase, major carriers and transport customers could find solutions to the economic outload risk. In other words, they will get their costs covered resulting from imbalances in the flow of goods between Europe and the Øresund Region.

Without initiatives in this area, there is reason to believe that freight between the Øresund Region and the German ports will primarily be moved by truck and that the rail capacity along the STRING corridor will exclusively consist of freight trains in transit between central Sweden and the European continent.

In order to exploit the full potential of the infrastructure in the STRING corridor, thereby ensuring the development of transport and logistics, coordination is necessary between the local cluster initiatives. The Declaration of Cooperation agreement between the five existing and recently launched logistics initiatives have marked how the Green STRING Corridor has taken the first steps towards a formalized cross-border cooperation and the promotion of a Northern European and Scandinavian distribution hub in the STRING region. In the next phase, the parties involved will be developing a plan for a specific cooperation project within logistics and transport.

IMPROVED ACCESSIBILITY AND MORE BUSINESS TRAVEL

In 2021, the opportunities for business travel and commuting to work, both by car and train, will dramatically change in the Øresund–Hamburg traffic corridor. The Fehmarnbelt fixed link and the new land works in Denmark and Germany will radically change the geography of time, as it will become possible to reach most of the Øresund Region in three or four hours from Hamburg by car.

This will mean the emergence of new opportunities for trade between Northern Germany and the Øresund region: Business travel will no longer require staying overnight. It will also become realistic to commute across the border on a completely different scale than is the case today. This will be the case for the immediate areas on both sides of the tunnel and the unique commuting that takes place between the metropolises in the region.

The ambitious development of the transport system will mean that the travel time by train between the Øresund Region and Hamburg will be the same as by air or by car between the cities in the corridor. In other words, the train will become far more competitive in relation to other modes of transport than is the case today [1].

However, the shortened travel times require the choice of a high standard when designing the land works in Denmark and Germany as opposed to the minimum standard of 160 km/h. In practice, this means that the newly constructed railway lines should have the same standard as the Hamburg–Berlin line, where the trains reach speeds of 230 km/h. If this happens, the trip by train will be cut in half from the present four hours and 45 minutes, and the number of departures can be multiplied.

Reducing the travel time by two hours will mean that the infrastructure development in the STRING corridor is one of the projects in Europe that will have the greatest impact on accessibility and travel times. Even in Germany, it is difficult to find corresponding examples.

In practice, the improved accessibility is attained via the Fehmarnbelt fixed link by combining a fast direct express train every hour with interregional departures every second hour to all of the cities along the corridor. This principle is known from corresponding corridors in Scandinavia.

Travel times – train, plane and car

Copenhagen - Hamburg, central-to-central						
	Transport to airport	Check-in	In flight	Check-out	Transport from airport	
Air	 0:15	 1:00	 0:50	 0:15	 0:24	2:44
High Speed Rail						2:30
Car						3:17

SOURCE: COPENHAGEN ECONOMICS

The timetable of the future

If a fully-fledged double track is established together with the same high-speed standard on the German and Danish sides of the crossing, it will be possible to plan a schedule of operations with multiple types of train systems, meaning that all of the larger cities will have connections to the neighbouring country. This paves the way for the actual objective behind the cross-border traffic system: promoting integration in the region.

In the future, it will no longer be necessary to spend the night in order to attend a business meeting that takes more than half a day. At present, it is typically necessary to leave home at 7am and return at 9pm in order to carry out a half-day meeting. In the future, the business traveller will be able to make it home from such a meeting in time for their 6 pm dinner. Flying from Copenhagen to Hamburg takes less than one hour, but when airport check-in times are included, it will take the same time as by train in the future. In other words, the green corridor will increase the accessibility for one-day business travel considerably. In the timetable below, two passenger trains will be running per hour.



ILLUSTRATION: FEMERN A/S

Example of a future timetable, Hamburg–Malmö



SOURCE: GREEN STRING CORRIDOR

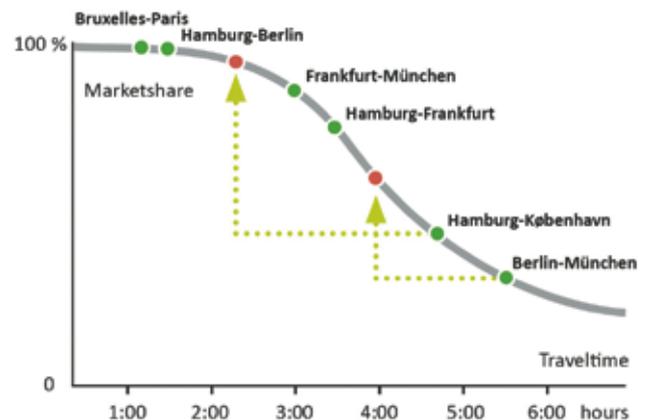
The example illustrates how the travel time between Hamburg and Malmö is almost three hours. It will thus be possible to reach Berlin in four and a half hours from Malmö. The express train will be able to run between Lübeck and Nykøbing Falster in slightly more than one hour. And the travel time between Lübeck and Copenhagen Airport will be two hours [1].

The train becomes more attractive

Experience indicates that reduced travel times result in a higher market share. Deutsche Bahn (DB) has a number of experiences with upgraded and improved rail lines producing positive market responses. Here the train becomes more attractive and passenger numbers increase correspondingly. One of the examples is the modernized Berlin–Munich rail line, where the travel times are successively reduced by one and a half hours so that the rail line will be able to handle a much larger share of the demand in the future [4].

This will have particular significance for the knowledge-intensive industries and research collaboration in the STRING region, as short flights will be replaced by train travel, which is much more work-friendly (i.e. the time spent travelling can also be spent working). A new study of the preferences among German researchers in the research environments in Berlin and Hamburg [5] has found that the opportunity to utilize travel time effectively is a high priority. Direct train lines between Lund/Malmö – Copenhagen and Hamburg – Berlin can thus support joint research ventures across national borders.

Travel time and market share



SOURCE: DEUTSCHE BAHN (2010) PROCESSED BY TDL (2014)

New traffic prognoses are currently being calculated for the future traffic across the Fehmarnbelt. While we do not yet know the findings of these prognoses, the impact of the upgraded and fully developed land works, where it will be possible to reduce the travel times for the long-distance trains (ICE) to two hours and 15 minutes, will increase the flow of passengers in the corridor, other things being equal (cf. the figure).



PHOTO: NORDEN.ORG



PHOTO: ANINE ASKLUND

The STRING region has two major international airports – Hamburg Airport and Copenhagen Airport – of which the latter has many global routes. The project has included an investigation of the implications for businesses in Southern Sweden when a direct access was established via motorway and rail to Copenhagen Airport in 2000 [6].

In 2000, direct access was established via the motorway and rail to Copenhagen Airport. This study has included companies located 100-400 km from the airport. The corporate structure is very different with respect to the degree of internationalization and globalization. There are many small companies and a few very large, well-known trademarks in the area under investigation. A pervasive theme is that the global accessibility is generally greater than in many other airports and that it has therefore become easier to get customers to come to visit [6].

In the long run, closer cooperation between the operators coordinating the rail and air traffic will be able to strengthen both modes of transport, not least the train. By establishing better cooperation between Copenhagen Airport, the airlines and railway operators, it will become

possible to make both modes of transport more attractive for passengers.

Such joint cooperation could include a common ticketing system whereby customers could use a single ticket for combined train and air travel(s). Flight information could be communicated via the train stations in the region, and it might even become possible to check one's luggage in at the train stations. Finally, it would be worth investigating whether the operators could work together to take care of the travellers in the event of delayed flights or trains.

There are examples of such cooperation in a number of different places in Europe, as in the case of train travel from Brussels to Schiphol and travel with Deutsche Bahn and Lufthansa via Frankfurt.

This kind of initiative will strengthen the development of a green corridor, because it will move more travellers to and from Copenhagen Airport by train, thereby reducing the impact on the environment.

Increased accessibility and growth

An analysis carried out for the STRING network indicates that there is a basis for 2,000,000 train passengers annually if high-speed train service were to be established between Hamburg and Copenhagen with a connection across the Øresund. This has been confirmed by a new market study for Hamburg–Øresund [4]. Obviously, the more attractive a high-speed connection becomes, the more people on both sides of the Fehmarnbelt will begin visiting their neighbouring country.

It can be very difficult to imagine the opportunities that will present themselves in 2021. The vast majority of people do not commute more than an hour to work. In that time, it is pretty much only possible to commute by car from Rødby to Burg on Fehmarn, whereas in the future it will become possible to reach the suburbs of Lübeck within an hours drive or from Oldenburg to Nykøbing Falster [2].

However, the local communities along the Fehmarnbelt will not be the only ones to enjoy new opportunities. Opportunities will also open up for the professions and trades that are willing to commute over greater distances. Moreover, the travel time to the closest “national” metropolis, Hamburg and Copenhagen, respectively, will be shortened. This will improve the opportunities to find employment in a labour market with which one is already familiar [3].

The areas in the middle of the corridor will also suddenly have access to the “other” national metropolis (i.e. Copenhagen for Germans and Hamburg for Danes), resulting in a cross-border labour market. Here, the commuting times will be one to two hours in each direction, however, making this most interesting for persons with specialized qualifications, such as fitters, IT consultants and doctors, etc. Obviously, this is only a small fraction of the wage earners at the present time, but the labour market is generally shifting in the direction of increased specialization.

From the perspective of the companies operating in the area, new opportunities will also emerge for recruiting qualified labour and particularly segments that face difficulties recruiting qualified labour. For the companies in the middle of the corridor in particular, the area from which they can attract labour will be expanded significantly. Again, this is particularly the case for specialized labour – individuals who are willing to commute over great distances, such as specialized health personnel.

Commuter relations after 2021



SOURCE: GREEN STRING CORRIDOR

For a company located in Nykøbing Falster, the employment area will be increased by 12 per cent for those willing to commute one hour and 33 per cent for two hours. The ability to recruit specialized labour will thus increase significantly. The impact is biggest for the companies on the Danish side, as the population density is greater on the German side, and the recruiting opportunities among the groups who commute weekly (e.g. tradesmen) will increase.



PHOTO: ANINE ASKLUND

Facts: Labour market trends and commuting

- Commuting is driven by imbalances in the labour market
- Commuting is driven by increased specialisation, which makes it harder to recruit local labour. Commuting distances are increasing
- Growth in sectors with high competency levels is increasing long-distance and weekly commuting



SOURCE: COWI 2013

In addition to the businesses in which people are willing to commute on a daily basis, the corridor will also be important to a number of persons who commute weekly between the large metropolises Hamburg and Copenhagen/Malmö, both of which have many specialized companies (e.g. pharmaceutical, research and development, finance, IT). Weekly commuting is often known from national commuting to and from the respective national capitals; within Scandinavia there is also quite a bit of weekly commuting between the metropolises. The average commuter over the Øresund, for example, only makes 1.4 trips/day, meaning that they are not making the trip to their workplace every day.

Driving forces of cross-border commuting

Cross-border commuting is also driven by factors other than travel distances and commuting times. While a considerable amount of commuting is already taking place across the Danish–German border and the Øresund, the STRING corridor will have its own driving forces. First and foremost, there are large metropolises at each end of the corridor. Other important driving forces include differences in wages, access to more interesting jobs, housing prices and sector-specific unemployment rates.

There is reason to expect commuting in the direction of Denmark, as Danish wage levels are generally higher (24,667 euro vs. 21,920 euro per year in the German part of the corridor). Taxes are lower in Germany, which means that it will be advantageous for some businesses to operate in Germany, as wage earners pay taxes in the country in which they are working. Unemployment was higher in the Danish end of the corridor in 2012 than in the German end (7.0 per cent as opposed to 5.5 per cent), although this situation can quickly change and labour can shift quickly, and labour shortages in specific sectors can also play a role. For example, an analysis of the impact on the regional labour market [3] indicates that an increasing number of German physicians will seek employment in

Denmark in the years to come. This is also related to expectations of an increased difficulty to recruit Danish physicians to specialist positions in Region Zealand and to the fact of better working conditions for physicians in Denmark than in Germany. Improved traffic conditions could possibly reinforce this tendency.

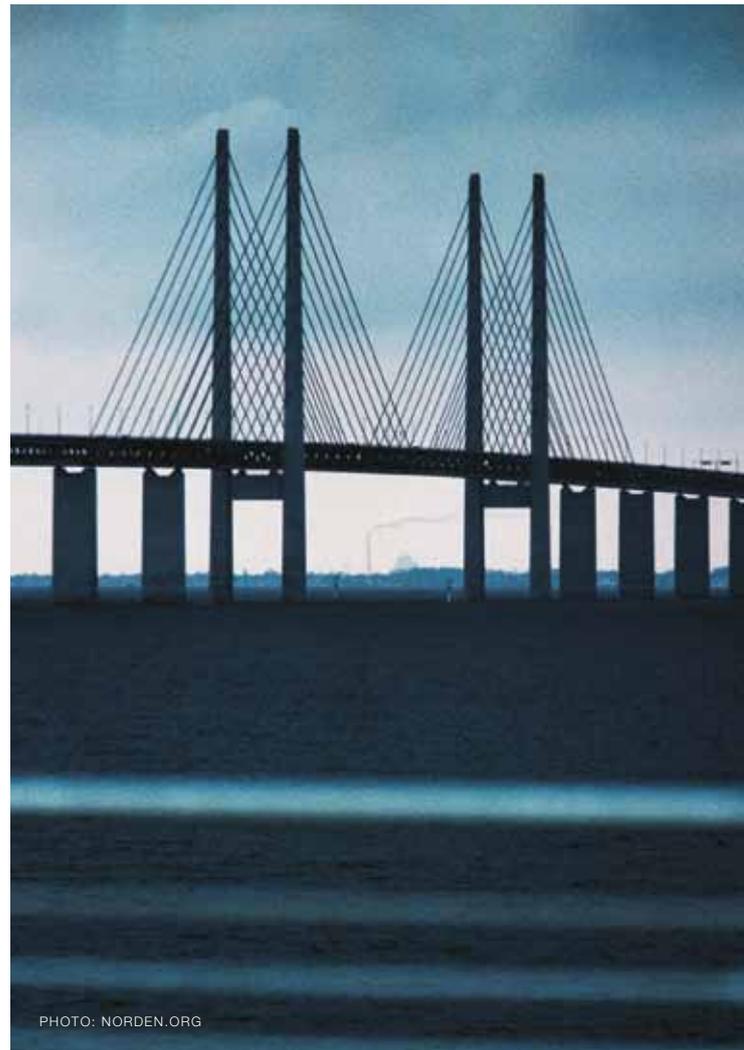
There is a clear correlation between income and education in the STRING region. Well-educated persons with high incomes are concentrated in the big cities. A new and improved transport system with shorter travel times to the educational institutions can encourage more people to pursue a higher education, which could help even out differences.

Experiences from the Great Belt and Øresund fixed links

Obviously, there are a number of barriers for increased cross-border commuting, such as language, culture, various conditions and traditions on the labour market and transport prices. However, there is already extensive experience from the Danish–German labour market on both sides of the border in Southern Jutland/Northern Germany. This experience can be utilized directly in order to reduce the administrative barriers. But there is one crucial difference – there is no price to be paid when crossing the border by car in Southern Denmark/Northern Germany. Commuting via the Fehmarnbelt will be more expensive, meaning that there is reason to expect relatively fewer commuters. Conversely, there will be relatively more commuters taking the train; and based on the experiences from other fixed links, there is reason to expect a greater share of long-distance commuters.

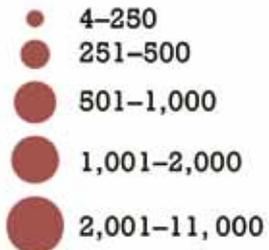
Even though the conditions are different in the STRING corridor, there is quite a bit of long-distance commuting and weekly commuting via the Great Belt and the Øresund fixed links. The following figure illustrates the cross-border commuting over the Øresund towards Denmark, where

the commuters reside in Swedish municipalities, and work in Denmark. Some of the cross-border commuters travel quite far to work. The experiences from the domestic commuting across the Great Belt also reveal a clear connection between income and commuting distances. This supports the presumption that the Fehmarnbelt fixed link will boost commuting activity among the groups that are willing to commute over greater distances.

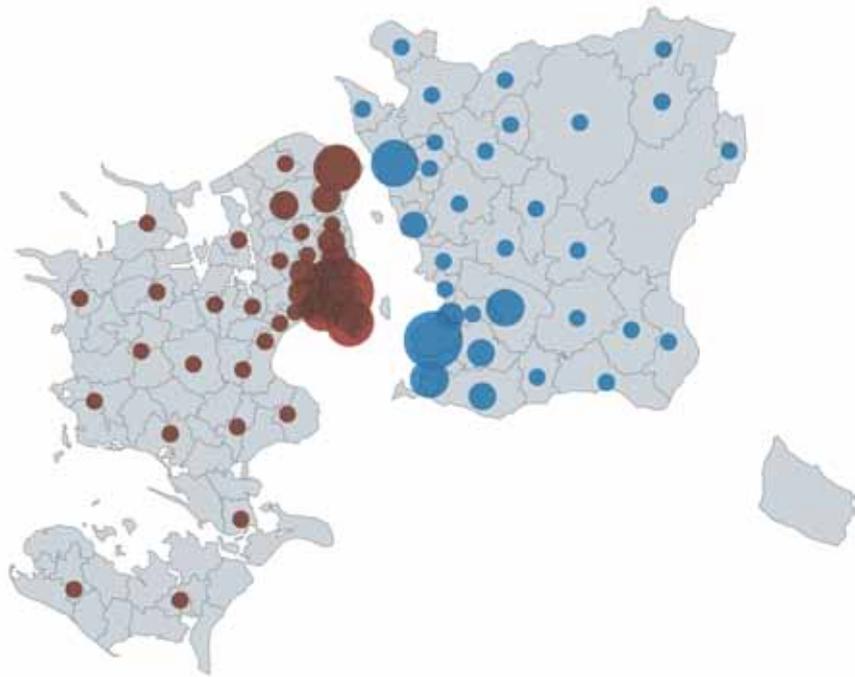
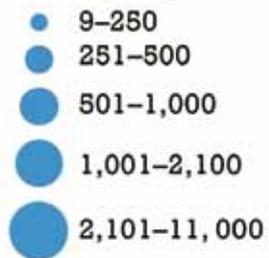


Commuting from the Swedish side of Øresund to Denmark (2010)

Jobs

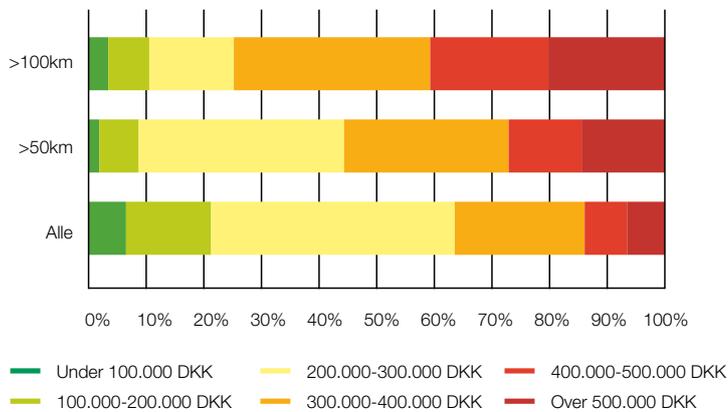


Municipality of residence



SOURCE: TENDENS ØRESUND, 2012

Income distribution for commuters in the Great Belt corridor



SOURCE: COWI, 2013

The objective is not the infrastructure in the corridor itself. Rather, the objective is to establish the conditions for a “developmental corridor” for society in general, which can contribute to growth.

The dynamic socio-economic impact, including the consequences for the labour market and business community, can generate far greater utilization than the costs of establishing the modern infrastructure. For example, thirteen years after its opening, the Øresund link has created a so-called “consumer surplus”, which is twice as great as the original investment. According to Öresundskomiteeen (the Øresund Committee), the utility amounts to 7 billion euro, in relation to construction costs of 3.5 billion euro.

A connection that will expand the capacity for freight transport considerably and create high-speed passenger train lines will support the cross-border region in a highly competitive global market. The two largest cities will enjoy a stronger position, but the dense and congested metropolitan centres will also benefit from a larger regional catchment area for labour with clearly improved accessibility. According to the OECD, a strong, competitive German–Scandinavian border region fits well with an efficient and proportioned infrastructure in which a modern railway network interacts with and supports both the ports, maritime transport and air transport.



Background and analysis

[1] *Traffic Analysis Malmö–Hamburg*, Vectura, 2012

[2] *Maps of travel time 2022 with automobile and public transport*, COWI, 2013

[3] *Regional labour market effects of an improved transportation system*, COWI, 2013

[4] *Market Study: Improved train service Øresund–Hamburg*, COWI, 2014

[5] *Exploring business travel in the STRING region: The case of ESS*. Roskilde University, September 2014

[6] *Regional business life and access to an international airport. The case of the Øresund Bridge*, WSP Analys & Strategi, September 2014

Conclusions

Based on the background analysis of travel patterns, labour market developments, business travel and the new improved travel opportunities, the following conclusions can be drawn:

The new traffic infrastructure will provide the basis for better revenue for the international train services, because:

- one standard in the corridor with a double track and speeds of at least 200 km/h will attract more passengers to the international traffic and reduce the impact on the environment.
- with the current forecasts for passenger traffic, there will be a commercial basis for the operation of express trains or ICE trains between Hamburg and Copenhagen/Malmö.
- interregional train connections in the STRING corridor will correspondingly benefit from the higher speeds and increased passenger numbers and can be established as ordinary public train service.

A green corridor will increase cross-border commuting and expand the specialized labour market, because:

- the Fehmarnbelt fixed link and high-speed train lines will significantly increase the employment opportunities for those living in the towns in between the larger cities, as there will be faster and better access to the large workplaces in the region.
- the companies in the rural areas will also enjoy better access to specialized labour within the health, industrial and service sectors due to improved accessibility.
- the knowledge intensive industries in the large urban areas, Hamburg and Copenhagen, will be fortified with the high-speed trains running between the metropolises. Business opportunities (B2B) in the STRING region will increase significantly, as business travellers can make it to meetings and back during the same day.

Accessibility to the airports in Hamburg and Copenhagen will be vastly improved and the impact on the environment will be reduced, because:

- the railways in the corridor will be linked to the German ICE-net, with direct train connections to Copenhagen Airport.
- more passengers travelling to the airports by train instead of by car will reduce the negative impact on the environment.
- a larger share of those living in the region will have less than two hours travel to a global airport.

Recommendations

An overall strategy for the commercial and publicly financed train traffic along the corridor should be developed. The Fehmarnbelt fixed link requires electric trains, and the railway operators themselves estimate that it will take four to five years to purchase new trains and have them certified. An overall strategy should therefore be in place by 2016 at the latest, meaning that such trains could be ordered in 2017 and put into service in 2021. Such a strategy ought to determine, among other things:

- the establishment of a coherent train system for the three countries from 2021. This demands an early coordination between the states and the regional public transport authorities plus engagement of relevant train operators.
- establishment of an interregional train connection from 2021. This can be achieved through an agreement between the transport ministers of Copenhagen and Kiel as well as the traffic companies DSB and LVS Schleswig-Holstein. A joint working group would be able to propose suggestions regarding the service levels, procurement of electric trains that can operate cross-border and models for the organization of train operations. Experiences from the Øresund connection can be useful.

The regional actors should be working towards a well-functioning interregional train service in the corridor, because:

- without well-functioning interregional train lines, cross-border commuting will only be done by car.
- cross-border commuting by car will reduce the interest in commuting and limit the opportunities for development for private companies and public institutions in the region.

Copenhagen Airport, airlines and railway operators should take the initiative to establish a air-rail ticket system, as such a project would:

- strengthen the competitiveness of air travel and not least train travel, as it will become easier and more reliable to make use of these two modes of transport.
- transfer more travellers to and from the airports by train, thereby reducing the impact on the environment.

APPENDIX



GREEN STRING CORRIDOR

Declaration for cooperation

This Declaration of cooperation between logistic initiatives in the STRING region was initiated by the Green STRING Corridor project in the framework of various dialogue fora activities.

The signing parties **DECLARE** their interest to create and initiate a closer cooperation between ongoing logistic initiatives/network in the STRING region in order to achieve more exchange of knowledge and innovation, and promote sustainable growth for the logistics and transport sector.

To achieve this, the signing parties in their respective responsibility:

1. **AIM** is to promote the development of the logistic and transport activities both within the STRING corridor and at European/worldwide level, through various cooperation activities.
2. **COMMUNICATE** with stakeholder's relevant activities and information on infrastructure issues/possibilities, especially cross-border relations.
3. **SUPPORT** business in the STRING region to apply for new project funding within the national and European supporting programs.
4. **INITIATE** a STRING logistic network along the supply chain bringing together academia, public organizations and companies.
5. **CONTRIBUTE** to promote cross-cluster cooperation and sustainable growth for the logistics initiatives.
6. **WELCOME** other business organizations and governmental institutions to support our activities.

Sors, 25 August 2014





GREEN STRING CORRIDOR

Logistic Initiative Hamburg



W. G.
Hamburg, 14.08.14
Place, Date: Werner Glom, Clustermanager/Sprecher der Geschäftsführung

Logistic Initiative Schleswig-Holstein



H. M.
Kiel, 09.09.14
Place, Date: Holger Mützen, Vorstandsvorsitzender

Logistic Initiative Zealand

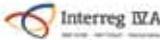
J. M.
Køge, 15-09-14
Place, Date: Jens Abildgaard, Business Development Manager, Køge Municipality

Copenhagen Capacity
COPENHAGEN
CAPACITY

C. L.
Copenhagen, 15-2-2014
Place, Date: Claus Larborg, CEO

Invest in Skåne
invest in skåne
part of business region skåne

T. S.
Malmö, 2014-08-15
Place, Date: Tony Spodnjak, Business Development Manager

GREEN STRING CORRIDOR PROJECT PARTNERS

- Region Zealand (lead partner)
- Region Skåne
- The Capital Region of Denmark
- City of Helsingborg Stad
- Lund Municipality
- City of Malmö Stad
- City of Copenhagen
- Køge Municipality
- Lund University
- Roskilde University
- Swedish Transport Administration

STEERING COMMITTEE OF THE GREEN STRING CORRIDOR

- Tue David Bak, Director, Innovation and Growth, Regional Development, Regional Development, Region Zealand
- René Lønnée, Chief Consultant, Regional Development, Region Zealand
- Mats Pettersson, Strategist, Regional Development, Region Skåne
- Henrik Madsen, Development Manager, Regional Development, The Capital Region of Denmark
- Håkan Lindström, Planning Manager, Strategic Urban Planning, City of Helsingborg
- Jan Haak, Planning Director, Department of Urban Planning, City of Malmö
- Britt Steiner, Planning Manager, Municipality Office, City of Lund
- Per Als, Deputy Head, Centre for Urban Development, City of Copenhagen
- Jens Abildlund, Business Development Manager, Commerce and Management Staff, Køge Municipality
- Patrik Rydén, Deputy Head, LU Open Innovation Center, Lund University
- Per Homann Jespersen, Associate Professor, Department of Environmental, Social and Spatial Change, Roskilde University
- Jens Friis Jensen, Deputy Head of Department, Department of Communications, Business and Information Technologies, Roskilde University
- Maria Hellqvist, Traffic Manager, Trafikverket (Swedish Transport Administration)
- Jacob Vestergaard, Managing Director, STRING Network Secretariat, Region Zealand

THE GREEN STRING CORRIDOR PROJECT MANAGEMENT

- Leif Gjesing Hansen, Project Manager and Head Consultant, Regional Development, Region Zealand
- Sandrina Lohse, Work Package Leader and Consultant, Regional Development, Region Zealand
- Sten Hansen, Work Package Leader and Infrastructure Strategist, Regional Development, Region Skåne
- Nicole Due, Work Package Leader and Consultant, Regional Development, The Capital Region of Denmark
- Anine Cheetham Asklund, Communications Consultant, Management Secretariat, Region Zealand
- Kirsten Grunddal, Project Coordinator, Regional Development, Region Zealand
- Anita Cendal Nielsen, Financial Consultant, Regional Development, Region Zealand

WORK PACKAGE 1 Developing the Green STRING Transport Corridor

- Sandrina Lohse, Work Package Leader and Consultant, Regional Development, Region Zealand
- Thomas Ney, Infrastructure Strategist, Regional Development, Region Skåne
- Sorin Sima, International Coordinator, Region Syd, Trafikverket (Swedish Transport Administration)
- Søren Hammer, Consultant, Regional Development, The Capital Region of Denmark
- Clement Guasco, Ph.D. Student, Department of Environmental, Social and Spatial Change, Roskilde University

WORK PACKAGE 2 Transport and Freight transport

- Sandrina Lohse, Work Package Leader and Consultant, Regional Development, Region Zealand
- Jan Magnusson, Business Developer, Business Development, City of Helsingborg
- Jens Abildlund, Business Development Manager, Business and Management Staff, Køge Municipality
- Patrik Rydén, Deputy Head, LU Open Innovation Center, Lund University
- Thomas Ney, Infrastructure Strategist, Regional Development, Region Skåne
- Tony Spodnjak, Business Development Manager, Invest in Skåne
- Markus Holzweber, Assistant Professor, Department of Communications, Business and Information Technologies, Roskilde University
- Göran Serin, Associate Professor, Department of Communications, Business and Information Technologies, Roskilde University
- Marianne Jakobsen, Project Coordinator, Department of Environmental, Social and Spatial Change, Roskilde University

WORK PACKAGE 3 Mobility and Accessibility

- Sten Hansen, Work Package Leader and Infrastructure Strategist, Regional Development, Region Skåne
- Søren Hammer, Consultant, Regional Development, The Capital Region of Denmark
- Göran Serin, Associate Professor, Department of Communications, Business and Information Technologies, Roskilde University
- Jessica Pettersson, City Office, City of Malmö
- Patrik Rydén, Deputy Head, LU Open Innovation Center, Lund University

- Per-Anders Foss, Chief Consultant, Regional Development, Region Zealand
- Sorin Sima, International Coordinator, Region South, Trafikverket (Swedish Transport Administration)
- Gert Højbjerg Mortensen, Consultant, Centre for Urban Development, City of Copenhagen
- Christina Ripa, Traffic analyst, Trafikverket (Swedish Transport Administration)
- Håkan Lindström, Planning Manager, Strategic Urban Planning, City of Helsingborg

WORK PACKAGE 4

Dialogue, Implementation and Network

- Nicole Due, Work Package Leader and Consultant, Regional Development, The Capital Region of Denmark
- Patrik Rydén, Deputy Head, LU Open Innovation Center, Lund University
- Jesper König, Project Coordinator, LU Open Innovation Center, Lund University
- René Lønnée, Senior Consultant, Regional Development, Region Zealand
- Sten Hansen, Work Package Leader and Infrastructure Strategist, Regional Development, Region Skåne
- Sandrina Lohse, Work Package Leader and Consultant, Regional Development, Region Zealand
- Anine Cheetham Asklund, Communications Consultant, Management Secretariat, Region Zealand
- Kirsten Grunddal, Project Coordinator, Regional Development, Region Zealand

DIALOGUE GROUP 1

Development of a Green STRING Transport Corridor

The following organizations from Sweden, Denmark and Germany have participated in at least one seminar in the Green STRING Corridor project:

- BALTIC Facility Solutions GmbH & Co. KG
- Behörde für Wirtschaft, Verkehr und Innovation Hamburg
- Dantax Steuerberatungsgesellschaft mbH
- Fachsprecher Verkehr Bezirksfraktion CDU Wandsbek
- FBBC – FehmarnBelt Business Council
- Geschäftsführender Gesellschafter – Hanseatic Transport Consultancy
- Gödecke Eurotrans GmbH
- Hamburg Chamber of Commerce
- Kreis Ostholstein
- Ministerium für Justiz, Kultur und Europa des Landes Schleswig-Holstein
- Staatskanzlei Hamburg
- The Capital Region of Denmark
- Baltic Development Forum
- CELF – Center for Erhvervsrettede uddannelser Lolland Falster
- Copenhagen Capacity
- Copenhagen Malmö Port
- Femern A/S
- Transport Data Lab
- Swedish Transport Administration
- Region Skåne
- Region Zealand

DIALOGUE GROUP 2

The future for transport and logistics clusters in the STRING region

The following organizations from Sweden, Denmark and Germany have participated in at least one seminar in the Green STRING Corridor project:

- Chambers of Commerce and Industry in Schleswig-Holstein
- Joint Spatial Planning Department Berlin-Brandenburg
- Logistics Initiative Hamburg
- Logistics Initiative Schleswig-Holstein
- Lübeck Business Development Corporation
- Hamburg Chamber of Commerce
- Lighthouse Logistics
- Sentiero Logistics Concepts & Systems
- LÜBECK Business Development Corp.
- Copenhagen Capacity
- Danish Chamber of Commerce
- The Confederation of Danish Industry
- Fehmern Belt Development
- European Maritime Development Center
- Køge Municipality
- Scandinavian Transport Centre, Køge
- Business Region Gothenburg
- Invest in Skåne
- The Transport Group – Transportindustriförbundet
- Vinnova
- Copenhagen Malmö Port

DIALOGUE GROUP 3

Challenges in connection with the cross-border railway traffic along the STRING corridor

The following organizations from Sweden, Denmark and Germany have participated in at least one seminar in the Green STRING Corridor project:

- Banedanmark
- Femern A/S
- Öresundsbro Konsortiet (The Öresund Bridge)
- LVS Schleswig-Holstein Landesweite Verkehrsservicegesellschaft mbH
- Swedish Transport Administration
- Øresundstog/Skånetrafiken
- DSB
- SJ
- STRING Network

The Green STRING Corridor
**From speed and transit to accessibility
and regional development**

September 2014
@ **Green STRING Corridor**

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