GreCOR
GREEN CORRIDOR
Oslo - Randstad

The Interreg IVB
North Sea Region
Programme

Investing in the future by working together for a sustainable and competitive region

Pilot projects within the GreCOR project

European Union
The European Regional Development Fund

Pictures in the report are a courtesy of Swedish Transport Administration, SWECO and Swedish Maritime Administration

Title Pilot projects within the GreCOR project

Publishing date December 2014

Publisher WP7 coordinator, Lindholmen Science Park/CLOSER

Contact Work Package Coordinator Nicklas Hansson, nicklas.hansson@sweco.se

Layout Swedish Transport Administration

Distributor Swedish Transport Administration, S-781 89, Borlänge, Sweden.
Telephone +46 771 921 921. www.trafikverket.se

Executive summary

The pilot projects within Work Package 7 of the GreCOR project represent different perspectives on logistics and transportation and thereby also on corridor development and implementation, e.g. more efficient usage of existing infrastructure, possibilities of innovative techniques and new business models supporting cooperation between a number of actors.

Different aspects on and factors for building a Green Corridor can be linked to a model developed within the Swedish Green corridor Network (Illustrated on page 4). These “building blocks”, shown in the figure, promote the view of logistics/transports as a system of integrated services and properties aiming at increasing efficiency and reducing the negative ecological impact. A project can and shall thereby be composed of a mixture of the different building blocks or one specific block.

Findings from on-going Green Corridor projects have shown that all four areas must be addressed in order to promote further development of the multimodal freight transport corridors. The concrete content for each of the pilot projects is further developed in this report which concludes a summary of all the pilots.

The pilot projects are part of achieving some of targeted objectives within the GreCOR project, such as:

- Making the North Sea Region attractive to business sector
- Testing innovative and logistics solutions through the development of the pilot projects
- Reducing transport/freight related emissions

As part of Work Package 7 with responsibility for their own specific pilot projects are:

LINDHOLMEN SCIENCE PARK

TARGET holding

VOLVO

TRAFIKVERKET

REGIONFÖRBUNDET ÖREBRO

Port of Amsterdam

provincie Drenthe

Readers Guide & Overview of the content

A main contribution from the GreCOR project includes its ability to demonstrate possibilities to promote real changes by concrete examples. The pilot-projects tested in GreCOR are crucial as they promote solutions that increase the value of the actual transport corridor, for in-depth details of each pilot please visit project specific reports available at www.grecor.eu.

Pilot projects

Alternative fuels for trucks

Volvo have within this pilot project been evaluating the environmental impact from using liquefied natural gas or biogas to fuel trucks for high capacity transports in a pilot project. Data from two Volvo trucks owned and run by PostNord Logistics has been collected and analysed.

Shuttle lines

The Region of Drenthe has been preparing for a cargo rail shuttle from the multimodal logistic terminal in Coevoreden, Netherlands to Malmö in Sweden. After market analyses and thorough preparation, the shuttle pilot which will be operational from 28 January 2015.

Circle Lines

Within the Port of Amsterdam they have developed the concept of Circle Lines. Originally designed as a barge concept for regional service, it is now considered as a logistics program that aims for the development of intermodal transports by bundling cargo. The pilot project in GreCOR within Circle lines concept aimed at using shortsea feeder vessels to bundle containerized cargo between deep see ports and hinterland ports which will be finalized during spring 2015.

High Capacity Transports by truck

The Regional council of Örebro made a study on HCT trucks, which in Sweden is considered larger or heavier than 25, 25 meters and 60 tons. This was done by identifying sustainable HCT solutions for given transport relations and to show their potential for energy savings and positive effects on the environment. This was done by looking closer at two cases in the region of Örebro (Sweden): Zinkgruvan Mining and Kopparbergs Brewery.

Longer trains

The Swedish Transport Administration has made a trial during the autumn 2014 with extended train lengths between the rail/road terminal in Örebro and the Port of Gothenburg. The normal 630 meter long train was extended to 730 m for a period, and the effect on capacity and functionality was evaluated.

Professional Intelligent Transport Solutions (PITS)

Target Holding has been the responsible partner behind the PITS project with support from both Technical University of Denmark (DTU) and Hochschul-Institut Logistik (HILOG). A project focused on perceiving a need in the North Sea Region for the development of a logistics service that enhances multi-modal logistical planning for small and medium sized enterprises (SME's). The PITS platform aimed at providing a software system, functioning as a simulation and benchmark tool, combined with expert consulting services on modelling transport streams, schedule information, cargo-type and capacity models to all major actors of the transport market.

Other Deliverables

Synergy-report

This deliverable consists of an in-depth analysis of the synergies and links to other WPs and within WP 7, consisting of four different pilot projects and one test site.

Content

GreCOR – Green Corridor in the North Sea Region

GreCOR – Green Corridor in the North Sea Region – is an Interreg IVB North Sea Region project that started 1 January 2012 and will end in June 2015. GreCOR promotes the development of a co-modal transport corridor in the North Sea Region. Important in this collaborative approach, is the that the focus is not only on the corridor itself, but also on secondary networks and the hubs, and the regional hinterland around the Green transport corridor between Oslo and the Randstad area (Amsterdam, Rotterdam, The Hague and Utrecht).

GreCOR has 13 partners and a total budget of 3.7 M€. The overall aim is to improve knowledge about the logistic needs and conditions and develop a strategy for the further promotion of environmentally friendly transports in the corridor. GreCOR focuses simultaneously on infrastructure and logistics for "greening" of transport and to make the region more competitive. The activities in GreCOR and the strategy will be a contribution to the EU objectives for transport as expressed in the White paper from 2011 "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system"

The work in GreCOR was performed in seven work packages. More information at: www.grecor.eu

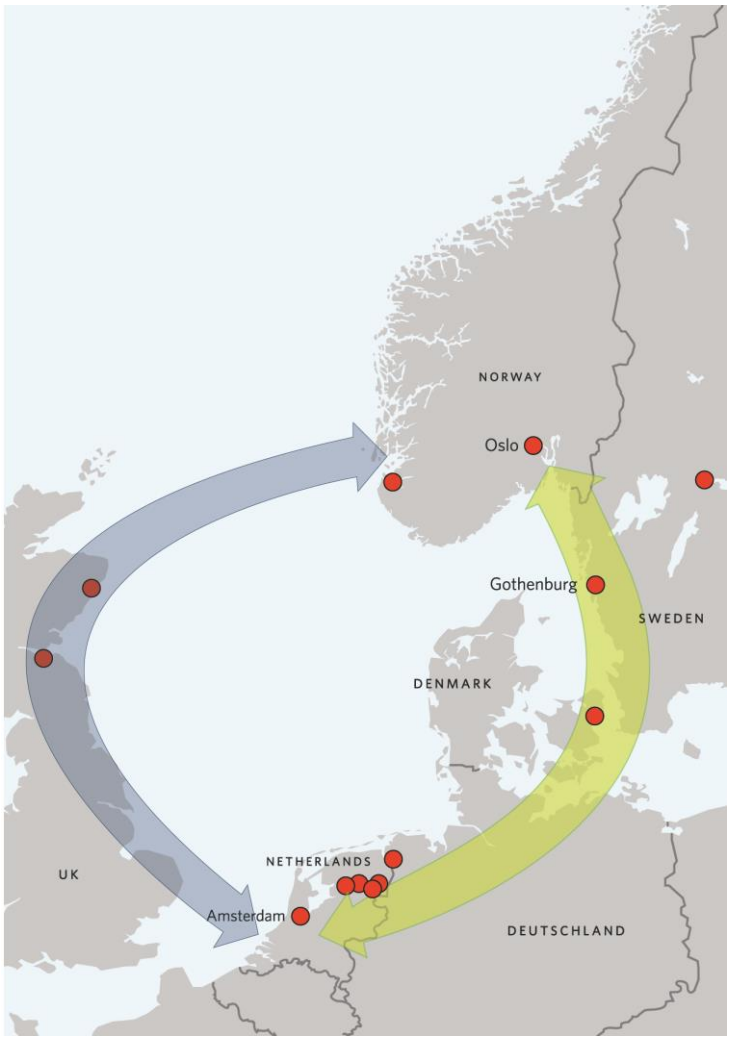


Figure 1. Map of the Corridor including locations of all project partners

Introduction to GreCOR WP7

Work Package 7 within the GreCOR project is about testing innovative and green transport solutions in pilot projects. The pilots are expected to promote innovative examples and show that they can be applied successfully in a transport network. Not only smart ideas and solutions are communicated, but also potential pitfalls are highlighted.

Background & Structure

The main idea of the project is to have a positive influence on infrastructure and transport development in the North Sea Region. Furthermore the GreCOR project aims to:

- Improve knowledge about the logistics needs and conditions in the corridor
- Test innovative logistics solutions through the development of pilot projects
- Promote the development of sustainable transport in the North Sea Region
- Focus on the role of the hubs and the regional hinterland
- Understand and develop the logistics utility creation in a green corridor taking a co-modal perspective.

To achieve these aims, work package 7 has functioned as the platform for testing innovative logistics solutions through pilot projects. These pilot projects have both been initiated and developed during the GreCOR project while others were initiated at the start of the GreCOR project. The pilot projects have, whilst being developed, been supported by information and material produced in earlier studies, both as part of other projects and work packages. The work package manager, has within this work package had the role of coordinating the activities in order to secure the red-thread within and between the pilots and to support the continuous exchange of early findings and results. One of the initial tasks for the managers of this work package was to develop an internal synergy report. The process involved all pilot project leaders as well as other partners within the GreCOR project in order to clarify in which areas cooperation could be achieved. Coordination has also been the main task during all internal and external activities during the GreCOR project, such as e.g. partner meetings, dissemination and cooperation with other EU-projects etcetera.

The overall structure of the GreCOR project is illustrated below. Divided into seven work packages, the pilot project is seen as one of the final outcomes of the GreCOR project.

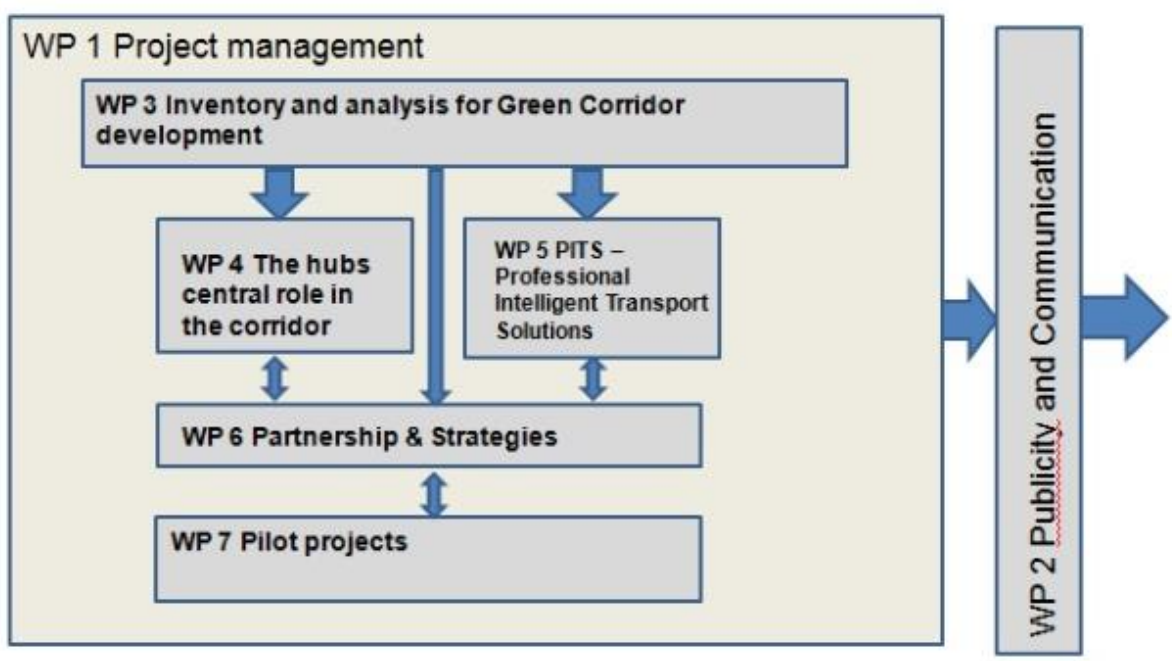


Figure 2 illustrates the systematic approach including work packages of the GreCOR project

The vertical approach in the structure is work based, including a knowledge base structure developed within Work package 3 to 5. The next step from a knowledge base contains strategies and cooperation which is part of Work package 6. Demonstrations and testing is the final stage of the structure, enabling the opportunity for business cooperation and pilot tests. This is followed by a horizontal approach which is focused on making results available in different forums and dissemination. The horizontal and vertical approach has been applied simultaneously as publicity and communication is included in every step of the work process.

Purpose & Aim of this report

This report is aimed to give the reader an overview and compilation of the work that has been produced within the Work Package 7. For further information about the pilot projects, please find specific pilot project reports which are available at the GreCOR webpage: www.grecor.eu. Overall conclusions and recommendations will be presented including lessons learnt.

Work package 7 within the GreCOR project

To achieve the overall aims of the GreCOR project, work package 7 has functioned as the area for testing innovative logistics solutions through pilot projects.

Pilot Projects

The activities in Work Package 7 mainly consist of the work carried out in the six pilot projects on the different sites.

The pilot projects within Work Package 7 of the GreCOR project represents different perspectives on logistics and transportation and thereby also on corridor development and implementation, e.g. more efficient usage of existing infrastructure, possibilities of innovative techniques and new business models supporting cooperation between a number of actors. Different aspects on and factors for building a Green Corridor can be linked to the model developed within the Swedish Green corridor Network (se figure below).

Cooperation within the pilots has consisted of both participants from the private and public sector with assistance from academic institutions - to find joint opportunities for improvement. Securing cooperation to form this 'triple-helix' of stakeholders is the foundation of all four elements of the Green Corridor Model. Cooperation has also provided a platform to exchange opinions between different levels of stakeholders within the corridor. This has secured strong and functioning conceptual and/or implemented solutions for more efficient and sustainable transport in the logistics sector in the pilots.

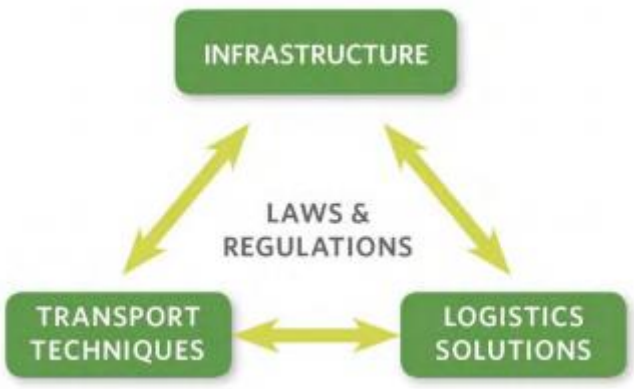


Figure 3 all aspects when building a green corridor

These "building blocks", shown in the figure, promote the view of logistics/transports as a system of integrated services and properties aiming at increasing efficiency and reducing the negative ecological impact. A project can and shall thereby be composed of a mixture of the different building blocks or one specific block.

Findings from on-going Green Corridor projects have shown that all four areas, shown in the picture above, must be addressed in order to promote further development of the multimodal freight transport corridors. The concrete content for each of the pilot projects will be based on existing activities and experiences among the partners but also on the outcome from WP 3, 4, 5 and 6.

By showcasing various successful examples, agreements can be achieved both between nations and the users of the infrastructure. Perceived outcomes from successfully implemented pilot projects include increased knowledge, promotion of innovative ideas and a potential transferability towards more environmental friendly and commercially viable alternatives.

Project: Alternative fuels for trucks

Within this pilot project, Volvo is evaluating the environmental impact from using liquefied natural gas or biogas to fuel trucks for high capacity transports.

Background

The Nordic region is a challenge to all logistics companies, it is home to just 4 percent of the population of Europe but accounts for nearly 20 percent of its area. Distances are long, and many areas are sparsely populated. Volvo's business partner in this pilot project, PostNord Logistics, has a unique position in the Nordic region as they operate one of the most comprehensive distribution networks in the region.

The pilot project led by Volvo, is based on using a Volvo truck model that can be fuelled with LNG or LBG. It is named Volvo FM MethaneDiesel and is operated on a mixture of diesel and gas. Presently there are LNG stations in Malmö, Gothenburg, Stockholm and one in Örebro. The pilot project is carried out between Volvo and PostNord Logistics, as the trucks are being implemented into PostNord´s ordinary routings. As a start, the two LNG trucks were used by PostNord logistics in their goods flow of packages as they transported freight between their company owned terminals. The transports were performed by using EMS – the European Modular System i.e. 25.25 meter trucks with a maximum weight of 60 tons.

During the pilot, the environmental and economic benefits of using the MethaneDiesel truck compared to a conventional diesel truck were evaluated. The trucks were also evaluated from a user perspective in cooperation with PostNord Logistics. During the pilot Volvo also aimed to identify problems related to transport efficiency in the corridor and the possible solutions for PostNord. To complement the pilot test with PostNord Logistics, Volvo also investigated what kind of problems other transport companies experience when it comes to transport efficiency in the corridor. To collect data, interviews with transport companies, e.g. with transport planners and drivers have been conducted, see Work package 3 for report.

The framework of the pilot project was in this initial stage set to evaluate the effects of alternative fuels, there are however large possibilities to improve further greening by extending the number of added applications. Examples could be:

- Advanced driver support
- ITS – Tracking and surveillance

The purpose with this pilot was to investigate the environmental impact from using LNG and LBG as a complementary fuel together with diesel in trucks that are used for high capacity transport. This based on vehicle combination modularity within the pilot project as part of Green Corridors Area Oslo – Rotterdam. Utilizing very energy efficient and flexible engine technology which allows for any mixture of liquefied methane gas ((fossil or biological) and diesel) with an initial goal at demonstrating 20 % to 80 % overall reduced CO_2 per tonkm depending on fuel availability. The evaluation in the pilot consisted of three parts. The environmental benefits of LNG were measured by follow up of the vehicles in terms of transport efficiency. The LNG vehicles were compared to the current diesel vehicles used today. The LNG trucks were also evaluated from a user perspective by PostNord Logistics. A comparison between the use of LNG vs. diesel as fuel was included, e.g. re-fuelling and vehicle range. During the pilot, Volvo also aimed to identify problems related to transport efficiency in the corridor and the possible solutions for PostNord. The pilot was not only considered to be a demonstration project, but also aimed to collect information on possible improvements for the future.

The results of the pilot project have indicated that for heavy-duty road transport, the greenhouse gas emissions can be reduced by using available dual-fuel technology as follows:

- Liquefied biogas (LBG) blended with diesel – more than 30 % reduction,
- Liquefied natural gas (LNG) blended with diesel – no reduction.

When only the CO_2 emission was counted, dual-fuel with LNG would mean a small improvement compared to pure diesel combustion. However, when including the methane slip[1] in the analysis, the results with dual-fuel including LNG being at best break even with conventional diesel combustion. One issue with methane slip is that methane is a much more powerful greenhouse gas than CO_2, so even a small methane slip will outweigh the benefits of the CO_2 reduction.

Figure 4. Volvo FM MethaneDiesel truck in operation

[1]Methane slip refers to a small fraction of the liquefied gas going through the engine un-combusted and thus entering the atmosphere.

Project: Shuttle lines

This pilot project was led by the Province of Drenthe and aimed at developing a rail shuttle connection between the Northern Netherland via the region Emmen – Coevorden and Sweden as a result of the development of a business model from initial work within Work Package 4.

Train shuttle

Until now all of the transport of goods between the Northern Netherlands (incl. the region Emmen – Coevorden) and Sweden are performed either by road transportation or via short sea vessels. Preliminary research conducted by the terminal operator in Coevorden (EuroTerminal Emmen-Coevorden-Hardenberg BV) showed that, when meeting a certain number of conditions, it should be possible to establish a feasible business case for a rail connection between Coevorden and Malmö (connecting to existing services to a.o. Örebro) and attract sufficient flows of goods to make it efficient and attractive as an alternative to road transport.

This initial conclusion was based on conversations with a number of transport buyers in the Northern and Eastern Netherlands transporting a substantial amount of goods by road for some large shippers from the Northern Netherlands to Sweden.

The pilot Shuttle lines included the development of a rail shuttle connection between the city of Coevorden (NL) and Malmö (SE). This pilot project consisted of two main activities: developing a business case and implementation of the shuttle service.

The pilot had the following goals:

- Developing the logistics industry in the region Emmen – Coevorden and along the corridor Coevorden – Malmö and connecting to Örebro.
- Promoting sustainable, efficient and intermodal transport.
- Enhancing a modal shift from road to rail transport.
- Promoting cooperation between different logistics stakeholders within the supply chain (rail operators, terminal operators, forwarders and production companies).

The result of the pilot is a sustainable shuttle connection (3 days a week), starting the 28th of January 2015 between Coevorden and Malmö with the aim to achieve a positive and profitable operational return within the period of one year.

Figure 5. Shuttle line Coevordn (NL) – Malmö (SE)

For developing the business case, an identification of relevant freight flows was needed, not only in terms of volumes and types of goods, but also in terms of other parameters that have to be taken into account (time schedules, the need for temperature controlled transport, types of containers / trailers used, etc.). Individual business meetings with relevant transport buyers and freight forwarders formed the basis for the analysis. It has been seen as crucial to promote the rail service to the identified companies and to investigate price limitations (and specific demands on an individual basis) and their willingness to switch from road to rail transport. The focus of the analysis was on goods flows between Coevorden, Malmö and Örebro but there is also potential in the future to combine the volumes in this specific service with additional flows originating from other regions, with the aim to further reduce the freight costs per TEU and serve an even larger market.

The actual service has been given the necessary support and with the start in January 2015 the shuttle service on the line Coevorden-Bentheim-Malmö will be operated by the German rail operator Kombiverkehr in close cooperation with the Bentheimer Eisenbahn AG and Euroterminal Emmen-Coevorden-Hardenberg BV. An agreement has been signed to offer the service for a period of at least 12 months, running the shuttle three times a week between Coevorden and Malmö (connecting to existing serviced to Rotterdam, Örebro, Gothenburg and Stockholm.

The business case provided a description of the steps that have been taken to develop the rail service and the major challenges that were encountered. Moreover, it shows how the different parties involved have been cooperating and describes their role in the process.

This information is also relevant for other regions seeking to set up train shuttles within Europe promoting rail transport as an alternative to long distance road transport. As soon as the pilot starts in January, a business-to-business meeting is planned on 29 of January 2015 in Malmö to acquire return flows from Sweden and promote the new rail service. This will be done jointly with the Bentheimer Eisenbahn AG, Kombiverkehr GmbH & Co. KG, the Northern Netherlands Development Agency, the Dutch embassy in Sweden and the Swedish Region of Skåne.

> "The rail shuttle saves approximately 45 700 kg of CO2 on every run. A reduction of more than 80 % compared to road haulage used today."
>
> - *Based on EU standard 16258*

Project: Longer Trains

This pilot project showed the possibilities to use longer trains. This case was focused on the path between Örebro and the harbour of Gothenburg. The assessment made in this pilot is interesting because of the possibilities to implement the structure on other relations in Europe with connections to major ports and terminals.

About

This pilot project was a collaboration project between the Swedish transport administration, Port of Gothenburg, APM Terminals and TM Rail.

Initiating the pilot and thereby investigating the prerequisites and possibilities for the pilot project the Swedish Transport Administration focused on the following content:

- Test a train round trip in existing infrastructure
- Collect operative data from the trip
- Interviews with train operator, terminal operator and infrastructure manager
- Cost benefit analysis

The test train consisted of 25 six-axis train cars with an average length of 28 meters. Train including engine was thereby 722 meters long.

The effect of running a longer train in comparison to a normal length train was highlighted to include a big difference. Not having the extra train length of 100 meters might not necessarily result in the usage of an additional train but instead, the usage of road transports. A longer train gives significant results and the benefits of the test train are as follows:

Table 1. Benefits of using a 720 meter train in comparison to normal train length and lorry.

Yearly benefit of the test train	Freight train with normal length 630 m	Lorry (18 m)
Operating cost	0,15 MEURO	0,7 MEURO
Environmental impact	0,0 MEURO	0,2 MEURO
Sum	0,15 MEURO	0,9 MEURO
Lowered CO_2-emission	4,4 ton/year	470 ton/year

Test

The pilot test was done on September 25th 2014. A prerequisite was that the train should both depart and arrive during peak hours and also in accordance with the specific needs of the train operator and the terminal operator at the Port of Gothenburg.

- Southbound: only a minor delay (due to an unrelated incident with a derailed commuter train) was noticed when the train entered the area of Gothenburg,
- Northbound: No delays noted, the train arrived on time at the terminal in Örebro and the train operator was very satisfied. The handling of cargo units in the Port of Gothenburg was performed smoothly and without any disturbances.

Figure 6, The 722 meter long pilot freight train.

Conclusions

The benefits of operating a train that is 100 meters longer was shown to be significant. This pilot project should be seen as a way to improve the long distance freights on rail and sea internationally.

To add the train with a length of 100 meters will increase the profitability with around 12 %. To move over freight from road to rail gives a significant benefit.

Transporting goods by lorry instead of a 100 meter extra-long train (equivalent to the amount of goods) gives a greater cost for the transport operator and has a higher environmental impact.

Highlights:

- It is possible to allow one 730 meter long cargo train per day in both directions on this lane without any new infrastructural investments
- A good assumption is that this test also can be done on other corridors or part of corridors when the infrastructure pre-requisites are in place
- There are no significant technical problems to add length to a train regarding rolling materials and terminals, provided the locomotive can manage the cargo and the speed is maintained. However, the infrastructure must be adjusted and possibly upgraded to suit 750 meter trains, especially the bypass tracks.

Project: Circle Lines

Port of Amsterdam has developed a concept of Circle Lines which can be seen as an innovative logistic system to organize goods transport in an intermodal and sustainable way between seaport and the industry. The aim of circle lines is to connect intermodal services in such a way, that using the systems is as easy as a buss service.

Circle Line Short Haul Feedering: Coasthopping

The Circle Line Short Haul Feedering aims at using short-sea feeder vessels to bundle containerized cargo between deep-sea ports and hinterland ports. In this case, the pilot aims at attracting a short-sea feeder service instead of numerous inland ships between Amsterdam and Rotterdam (Randstad). Also referred to Coastalhopping as the actual project.

One of the short sea legs in the system has been set up between Tilbury (UK) and Amsterdam (NL). The base cargo is export of waste imported for the high efficiency waste incineration plant in Amsterdam. After set up return cargo, bricks and other building material for London residential build have been added. Due to lack of aggregation of traffic, several inland ship services are currently sailing at below breakeven in economic terms. In order to save (sailing) time, cost per unit and emissions per unit, the concept entails bundling and using short-sea feeder services. An increase (in scale) both in volume and therefore also in vessel size would necessitate high infrastructure costs adapting inland bridges, locks and other nautical and related facilities. By using smaller short-sea vessels, these costs can be avoided.

Originally designed as a barge concept for regional service, circle line is now considered as a logistics program that aims for the development of intermodal transport by bundling cargo. The pilot aimed at using short sea feeder vessels to bundle containerized cargo between deep see ports and hinterland ports. The concept aimed to be:

- Market driven - without public involvement - with an aim to be subsidy-free
- Actively working on changes in psychological perceptions with shippers and a flexible proposition of the involved logistics to providers and operators - a commercial approach to pilots.

- Demonstrating a working flow of cargo through the new logistical concepts, where a long term effect can be achieved that can lead to expansion of the service.

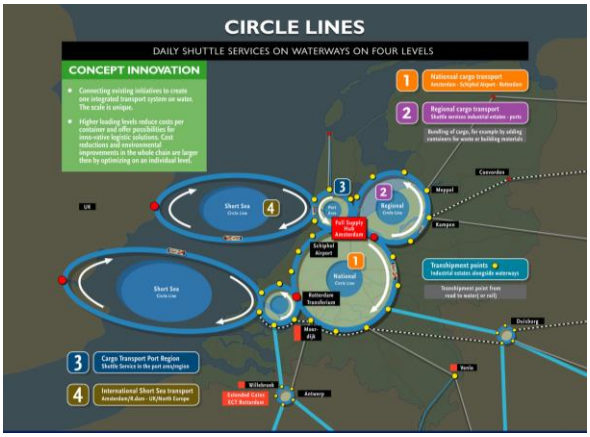


Figure 7. Illustration of the circle lines concept

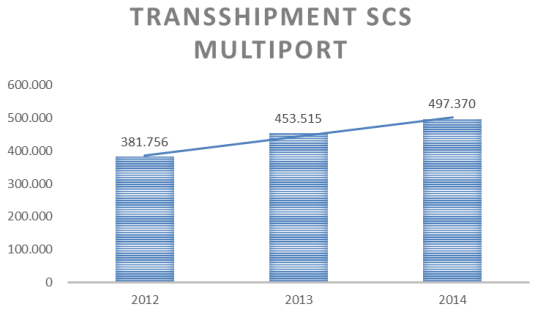
Through the process of developing the pilot project, initial operational shipping costs was identified to compare inland ships vs. 394 TEU coasters. With the short haul feeder shuttle, taking the outside route with a small short sea vessels (see figure below) is seen as a possible option to reduce sailing time.

One of the challenges identified is that port call costs for short sea ships are much higher when compared to the inland shipping costs. A possible continuation could be to create agreements on (temporary) exemption with port authorities for the pilot test case. Short sea vessels acts within a different customs regime than inland vessels, even when operating the same routing within the Netherlands. Port of Amsterdam has within the research discovered commercial, environmental and infrastructural advantages. Use of existing infrastructure and logistics practices makes integration easier and should make switching costs, both actual costs as mental shift costs of users as low as possible. Building on the service between Amsterdam (NL) and Tilbury (UK) this concept has the potential to extend to other harbors within a sailing time of 20 hours. Antwerp and Hamburg but also to Tilbury and Aberdeen are identified as a potential future connects. Initial in this first stage been on the short haul between Amsterdam and Rotterdam.

Not initially anticipate, from a commercial and operational perspective Zeebrugge has come into focus and has now been added to service as a short haul feeder. At one point an issue arose with the waste collector and the incineration plant, posing a threat of complete stop of the shortsea liner services as well as the addition of Zeebrugge. The cargo flow is now still moving through Tilbury and Amsterdam but the end receiver is a different waste plant.

Results

- The short sea service has moved in total 1.3 million tons of cargo off the road. This re-calculates to an approximate 24.000 trucks that do not crowd the corridor between the UK, Belgium and the Netherlands.



- Zeebrugge has been added to circle lines for the short hauls feeder service.

Next steps in the development of Coasthopping

- Setting up a formal consortium of partners that will be run as an umbrella business.
- Adding Duisburg Germany in the system. The Duisburg area is an important hinterland destination on the UK – Germany corridor, and with its' industry a capture area for cargo flows. Either by barge or by rail.

Project: Professional Intelligent Transport Solutions, PITS

The PITS project perceives a need in the North Sea Region for the development of a logistic and/or transport service that enhances multi-modal logistical planning for small and medium sized enterprices, SME's.

GreCOR recognizes that in a modern society there's ample opportunity to provide companies in the SME sector with a user friendly marketplace that informs and advises on the use of multimodal transport solutions. The solution provided within the GreCOR project is called PITS - *Professional Intelligent Transport Solutions.*

Development of the PITS marketplace

The result of the PITS project will contribute to the priority: "Enhancing Multi Modal Logistic chains with new innovative services" as stated in the European transport ambitions. The EU Communication (Com 2009 279/4) emphasizes the importance of service innovation: "The most immediate priorities appear to be the better integration of the different modes of transport as a way to improve the overall efficiency of the system and the acceleration of the development and deployment of innovative technologies."

The PITS project has had the ambition to develop a marketplace that integrates real time transport knowledge from different sources. The marketplace gives easy access to service providers in the logistics chain and presents multi modal transport options to SME companies in a comprehensive way without changing these underlying logistical chains. On the supply side the marketplace delivers better insight in and access to multimodal transport possibilities to SME companies who offer cargo. On the demand side PITS will realize a more efficient use of available cargo space in short sea shipping by enlarging the amount of guaranteed demand in favor of peak and urgent shipments that are largely transported by road at the moment. The real time management of supply and demand on the market place will lead to more efficient use of multimodal transport. Furthermore the PITS marketplace will be a place where SME companies can gain knowledge and share experiences about multimodal transport opportunities.

The figure below displays the essence of the PITS platform: to present schedule information for the best suited route to the user on how their freight can be moved from A to B based on the preferences time, price and CO_2 footprint.

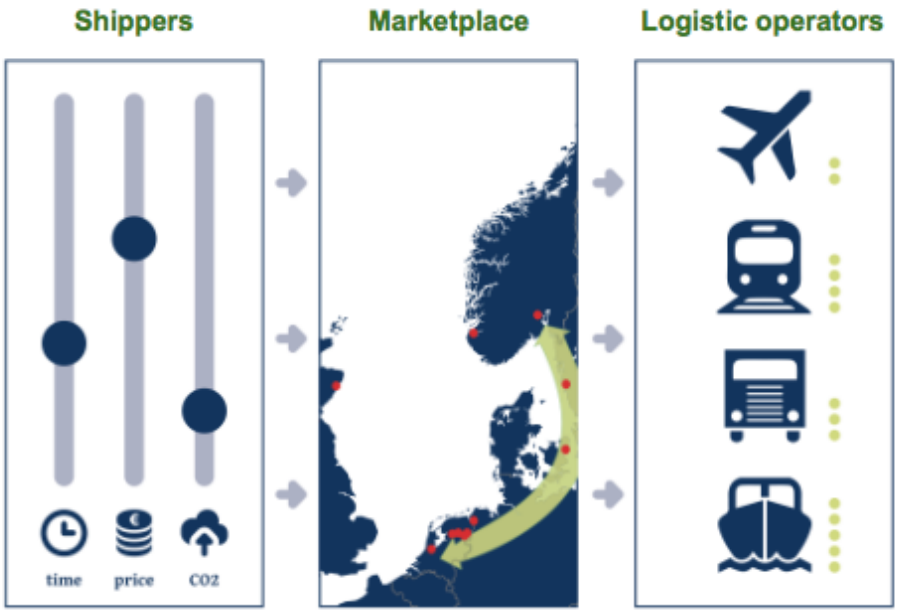


Figure 8. Representing the different parts included in the PITS model.

The PITS platform has become, besides a marketplace, a multipurpose platform. Since a lot of information is available such as orders, schedules, transport modes and emissions there are a lot of possibilities. For example, by the usage of Liquefied Natural Gas, different new transport modes can be added in the model which thereby can be used as simulation and decision support. These capabilities of the framework can be used when complete business cases should be developed. Currently the platform is already capable of running the Green Zones assessment. This functionality can easily be applied to different corridors. A requirement for the model engine is to retrieve real transport data from the specific region, which is determinable for the potential of transfer the results of the pilot.

For further information about the user interface, model engine and database layer, please see the final report from Work Package 5 at www.grecor.eu.

"The main functionality of the marketplace is to provide routing calculation for a schedule based multimodal freight transport network based on Logistics Service Providers scheduled data given a various range of user's preferences. In order to align with the main goals of the GreCOR project the most important user preferences are the time, cost and environmental impacts trade-off."

- Final report on Professional Intelligent Transport Solutions, PITS *market place available at: http://pitsmarketplace.eu/*

Project: High Capacity Trucks

The Örebro regional development council has led the pilot project investigating the potential of High Capacity Transport (HCT) solutions by road which was developed in two case studies in the Region of Örebro, Sweden. The purpose of these studies was to identify sustainable HCT solutions for a given transport relation and to show their potential for energy savings and positive effects on the environment.

Case study: Zinkgruvan Mining plc

From the Zinkgruvan site the full annual volume of concentrate is trucked to the inland port of Otterbäcken, on the shores of lake Vänern. The concentrate is unloaded by tipping the truck and then the trailer. A conveyor transports the concentrate to a storage building, awaiting further transport by ship – around five departures per month – via canal and sea directly to another European port. Each shipment is estimated to carry 4000 ton which represents the full load volume. There is no intermediate stop in the port of Gothenburg or any other Scandinavian port. Often the concentrates are transshipped in port and further transported by barge to European smelter customers, mainly located in the Netherlands and Germany.

The analysis of the transport relations resulted in three potential HCT systems which was compared and analyzed. A summary of the results for the case study was presented in the table below. For the transport cost, the relative difference is valid for the current transport volume of about 250 000 ton per year.

Table 2 *Summary of results for case study Zinkgruvan Mining.*

HCT-system, gross weight	Net weight per vehicle (ton)	Roundtrips per year (approx.)	Distance covered (km per year)	CO2 emission (ton per year)	Transport cost (SEK per ton)
60 ton	42	5 700	1 300 000	2 850	74
64 ton	+8%	- 400 roundtrips	-7%	-6%	-4%
74 ton	+24%	- 1 100 roundtrips	-19%	-4%	-7%
90 ton	+52%	- 1 900 roundtrips	-34%	-11%	-17%

Highlights

- Any of the investigated HCT systems, as compared to the current transport structure, leads to a reduction in distance covered, fuel consumption and emission of CO2.
- The 74 ton concept will likely be possible to operate on Swedish roads 50 and E18/E20 without special allowance in the short term perspective. This means that the special permission is needed for limited parts of the route only.
- An investment in any of the investigated HCT system, as compared to the current transport structure, is profitable from a transport economy perspective.

Case study: Kopparberg Brewery

The largest share of production is trucked to intermediate storage points, either in Örebro (the Mosås terminal) or Hallsberg (the Hallsberg terminal). At these terminals the pallets are unloaded and stored before being stuffed in containers for further transport, mainly on train from Örebro or Hallsberg to the port of Gothenburg. Also, the ports of Helsingborg and Västerås are used.

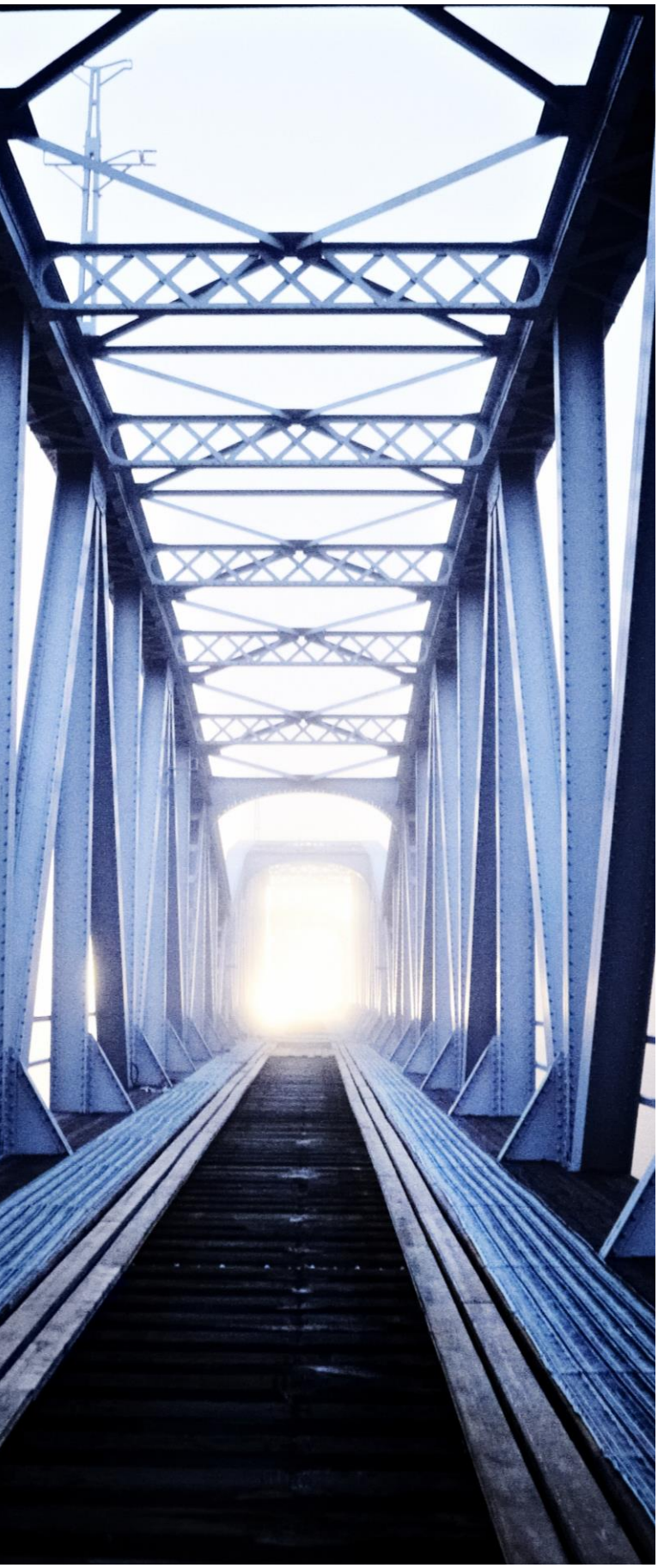
As a result of the initial analysis, any weight-oriented HCT system was rejected. The only relevant HCT system to further investigate was therefore the Duo2 concept. A summary of the results for the case study is presented in the table below. For the transport cost, the relative difference is valid for the current transport volume of about 365 000 sea pallets per year, and without time restrictions for the Duo2 concept.

Table 3. *Summary of results for the case study for Kopparberg Brewery. *Change of transport cost for Duo2 is presented both (without/with) time restrictions.*

HCT-system, length	Number of sea pallets per vehicle	Roundtrips per year (approx.)	Distance covered (km per year)	CO2 emission (ton per year)	Transport cost (SEK per sea pallet)*
Kopparberg - Mosås terminal					
24 m	38	9 600	1 750 000	3 850	68
25.25 m	5%	-500 roundtrips	-5%	-3%	-<1 %
32 m	37%	-2 600 roundtrips	-27%	-8%	-10 %/+15 %*
Kopparberg - Hallsberg terminal					
24 m	38	9 600	2 100 000	4 650	79
25.25 m	5%	-500 roundtrips	-5%	-3%	-1%
32 m	37%	-2 600 roundtrips	-27%	-8%	-10 %/+5 %*

Highlights

- From an environmental perspective the Duo2 concept is clearly more preferable than SWE24 vehicles. The use of Duo2 vehicles leads to a 27 % reduction of distance covered and an 8 % reduction of fuel consumption and emission of CO_2 respectively.
- Given that the Duo2 concept is allowed to operate without time restrictions, the transport cost for either transport relation can be reduced with about 10 % per sea pallet as compared to the current SWE24 or EMS25.25 concepts. Thus, such an investment is profitable from a transport economy perspective.
- The transport cost to the Hallsberg terminal is – for any type of vehicle – significantly higher (about 10-15 % per sea pallet) than to the Mosås terminal.



Conclusions

The GreCOR project has in total selected six defined pilot projects. Each pilot project is led and developed by a partner within the GreCOR project. All pilots within the GreCOR project have been selected because they are testing innovative logistics solutions – considering both the triple helix of stakeholders and aspects when building a green corridor, further described on page 4.

The feedback from these pilot projects will directly influence the area in which the pilot project have been conducted and will be of guidance towards future logistics solutions. One of the most interesting aspects of the pilot projects is that they were conducted in real life settings. This includes: A demand on an attractive business model, efficient and flexible logistics solutions and no deviation regarding transport parameters (trade off cost/time/security etc.).

A pilot project is an activity planned as a test or trial. It can be seen as a research project that is conducted on a limited scale that allows researchers to evaluate specific objectives. The goal of the pilot projects has been to evaluate the effects and to create and disseminate an understanding of the actual objectives included in the scope.

The scope is one of the challenges when working with a pilot project as the environment and circumstances are constantly changing over time. All pilot leaders initiated their approach, framework and milestones in a project plan which they have continued to use throughout the entire work process of the GreCOR project.

The pilot projects within the GreCOR projects can be regarded a success as they already within the project period had

some concrete results. Achieving success with a pilot project is however somewhat different than achieving a long term change in transport chains. The GreCOR project has delivered clear results within the pilot projects dealing with all aspects when building a green corridor.

Summing up, as one business respondent commented “By having the opportunity of a pilot study, we have now taken the next step towards greening our transport chain”

The majority of the pilot projects where conducted in real life settings, with pressure on efficient and attractive business models and transport parameters.

Recommendations

Prerequisites and situations constantly change over time and understanding the reasons why project goals were achieved or unattained should be regarded as equally important. The latter might even be of greater importance in some situations. Pilot projects aims at identifying potential effects in a large scale or testing innovative solutions with recommendations whether or not this solution should be further developed. From a process point of view, we recommend to work and continuously update project plans, to focus on the work process including lessons learnt and to highlight solid results. The success factors and continuation aspects of the pilot project shall also be in focus where one important factor is a well-developed business model.

GreCOR
GREEN CORRIDOR
Oslo-Randstad

Contact
Sofie Vennersten
sofie.vennersten@lindholmen.se

www.grecor.eu

The Interreg IVB North Sea Region Programme
Investing in the future by working together

European Union
The European Regional Development Fund