



How can we further develop the corridor to meet the needs?

# ThinkTank

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## Developing the Bothnian Corridor and its extensions into green corridors

By Lena Lorenc

The BGLC project promotes smooth intermodal large-scale and long-term transport solutions, improved planning, use and utilization of the infrastructure in the Bothnian Corridor and implementing other practices within the green corridor concept. The railway infrastructure of the corridor is of high importance for transnational cargo flows, thus improvement in its maintenance is essential to speed up the shift towards more environmentally-friendly and efficient transport logistics solutions.

Along with increasing integration between northern Scandinavia and the Barents region with the BSR and Central Europe, the BGLC project strives to find proper ways to successfully expand capacity and improve reliability, cost-effectiveness as well as other service quality issues along the corridor. Due to recurrent derailment, torn down electrical lines, etc., service reliability is seen by many shippers as insufficient compared to their expectations and to the performance level offered by competing transportation modes. In order to increase the benefits of the operators, transport buyers, society and other stakeholders, access to safe, reliable, green and cost-efficient transportation is necessary.

Investigation within the BGLC into the present state of infrastructure management shows that the capacity and credibility of the railway transport market is influenced by the frequency of traffic interruption due to infrastructure failure as well as track possession time for maintenance. In the last several years, 2.4% of the trains were delayed between Kiruna city and Riksgränsen due to the state of the railway infrastructure. Other valid problems existing in the current transport system are moreover empty wagon returns, different track gauges, border crossing issues and loading effectiveness.

An approach deployed in the project is the implementation of a green corridor concept through improved planning, use and utilization of the infrastructure in the Bothnian Corridor. Green corridors are characterised by sustainable logistics solutions for long-distance transport with documented, reduced environmental and climate impact, high safety, quality and efficiency; an optimum utilization of transport modes; harmonized rules with transparency for all stakeholders; a concentration of national and international freight in relatively long distances as well as efficient and strategically located transfer points.

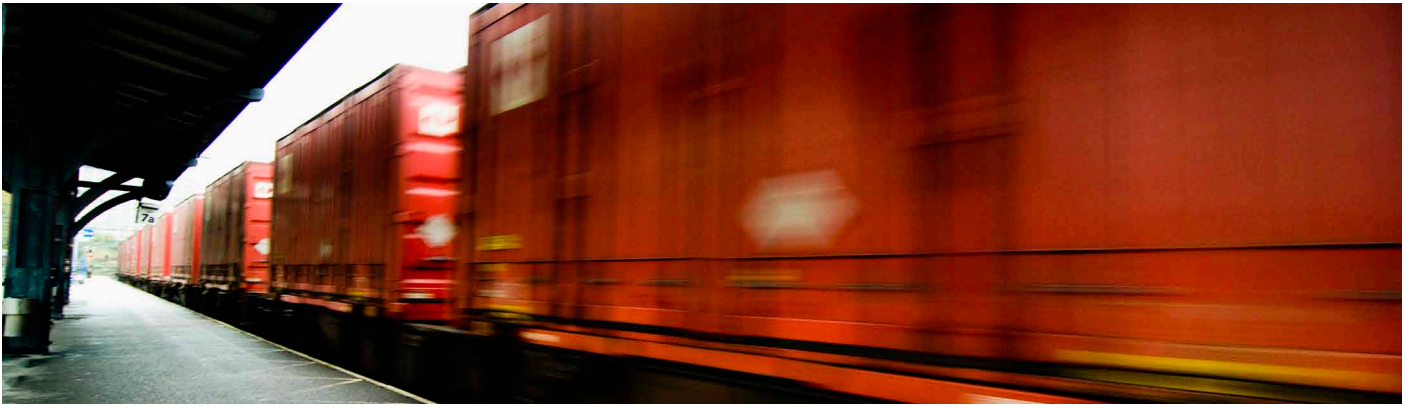
As an example of measuring green corridor performance within the BGLC, a route connecting the Atlantic Ocean with the Adriatic Sea through northern Norway, via Sweden and Poland to Italy (the A2A logistic corridor concept) was used. The impacts of transshipment, a shorter transport distance, electrification of rail and the size of trucks has been researched, with the use of two calculation tools: the NTM and ECOtransIT models. As a first step Bodø-Gdynia was chosen to be elaborated upon, being a part of the BGLC project's area. The hypothetical transport case was 1,000 tn of fish transported by train or truck in combination with a ferry crossing over the Baltic Sea, from Bodø in Norway to Gdynia in Poland.

According to the project's studies, the combination of train and boat has turned out to be much more energy-efficient than the combination of truck and boat, at least 40% more effective when using the NTM model and its background features, and as much as 70% more energy-effective when using the ECOtransIT model and its background features. If the entire railway was electrified the outcome from calculations indicates that energy consumption would decrease by 35% in the NTM model and 52% in the ECOtransIT model for the train/boat combination.

Research also stresses that, in order to achieve the objective of a green logistic corridor with improved utilization of the transport system, maintenance decisions and actions must be adequately monitored and managed.

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By Leena Sirkjärvi  
Senior Officer at Ministry of Transport and Communications, Transport Policy Department



I can surely agree that the Bothnian Corridor is an important intermodal connection between North and South. The important aspects of developing the corridor concern capacity, safety of the corridor and cost-effectiveness, but one point of view that has not been recognized well enough are future possibilities of smart transportation. Last year Finland adopted its new transport policy where we changed the basic philosophy of our strategy. The purpose will no longer be to improve the transport system by doing more or increasing its capacity, but by doing things in a smarter

way than before. In this the deployment of ICT plays an important role.

We need to find ways to use existing infrastructure more effectively. While expanding the capacity of infrastructure we need to focus on the development of the key links and interconnections, most difficult bottlenecks of the transport network and especially the cross-border sections. In addition special attention should be in the facilities, including ICT, that also improve the safety and environmental performance of the corridor. New traffic services that make use of information and communications

technology offer great market potential. The development and deployment of a new generation of smart transport solution towards integrated traffic management and improved transport safety needs to be one of the top priorities. This also follows the goals of the EU's transport policies.

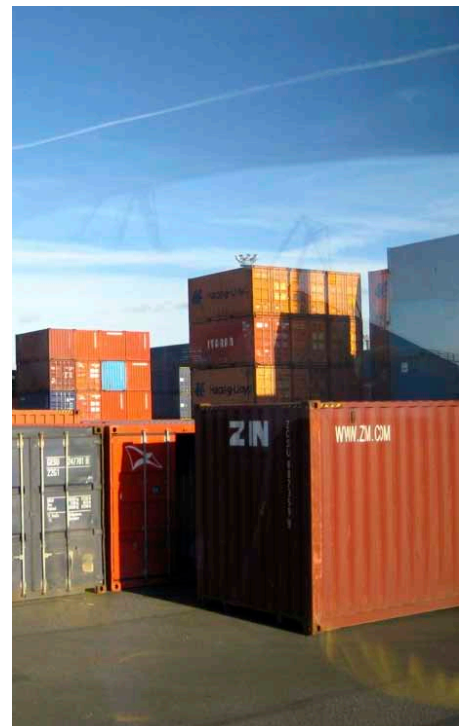
The green corridor concept is highly important and it should be further developed. The reduction in environmental impact in general and aiming at oil substitution and decarbonisation in particular are important objectives; specifically, the introduction of new technologies and alternative fuels. ●

By Tore Almlöf  
Head of Strategic Planning at Municipality of Karlskrona



The railway infrastructure in the ports of Karlskrona and Gdynia has been improved together with the railway stretch Karlskrona-Emmaboda within the TEN-T project "Baltic-Link Motorways of the Sea, Gdynia-Karlskrona", but this is not enough. Concerning the A2A corridor within the BGLC project, the main problem is the capacity of the national rail infrastructure as well as a lack of tracks long enough (750 metres). All parts of the corridor must also be electrified and the national rules must be changed so that the same locomotive and drivers are allowed to drive in different countries. The fact that from 2015 the Baltic Sea will be part of the Sulphur Emission Control Area (SECA) means a new pattern of ship traffic in the Baltic Sea. Adriatic Ports, together with train and ferry connections (e.g. Gdynia-Karlskrona) reaching Scandinavia, could form an alternative to sea transports. The result of this could be a huge demand for intermodal transports both in Scandinavia and on the European continent.

We are also convinced that in the future the way transported cargo affects the environment will be a competition issue. This means that environmentally-friendly transport, such as rail, will be demanded to an ever greater extent. One important thing is how the electricity used by trains is produced. In Sweden there is 'green' electricity on the railway system and this must be the standard in the whole corridor. ●





By Oddgeir Danielsen  
Director of Secretariat  
of the Northern Dimension,  
Partnership on Transport and Logistics



By Per Strømhaug  
Senior adviser at the Port of Bodø

One of the major challenges to overcome when looking into specific corridors and transport routes is to avoid a too narrow approach. In general, most projects are seeking to attract the existing cargo flows and are thus creating competitive scenarios instead of cooperative ones. A more general analysis of the current and future international trends could avoid this by attracting additional cargo flows. “A river flows where it could find its way”. Currently, the transport networks in the region are not connected in a way allowing for this, and cargo that could have been moving through the region is rooted elsewhere. So, in general, a more global view on the situation could bring some added value, i.e. additional cargo flows, if – and only if – adequate connections are provided. The NDPTL is targeting this by working to improve connections within the region as well as among all our member states. The Baltic Sea region is located between Asia and the USA as well as the Arctic and the EU. To fully use this potential we simply need better connections and competitive transport and logistics services. Seeing the region as such and realizing coordinated approaches would lead to developing the region into the “mother of all nodes”. This will, however, require different stakeholders to be able to abandon their rather narrow approaches and see the situation from a more holistic angle. ●

For the time being intermodal transport is losing market share to very cheap door-to-door road transport. In particular this applies to the high volumes of seafood transported from northern Scandinavia to the processing industry and markets in Poland and Central Europe. Therefore, a main challenge for future success of intermodal corridors in general is to organise more efficient and streamlined interfaces between different transport modes. This implies a need to identify and standardise the most efficient load carriers and handling equipment for loading and reloading and for a shift between different transport modes along the corridors.

Another challenge is long transport distances between north and south as well as too insignificant volumes to allow a high enough frequency of train connections to make them attractive enough for many industries. This also means that the market forces and competition don't work like in more heavily trafficked areas. On the other hand, there may be a need for more cooperation than competition between transport operators to attract more customers and better the economy for all.

For a viable economy in corridors it is also extremely important to identify and attract cargo in both directions, and also have efficient feeder solutions at the northern end of the main corridors as well as good connections to other international corridors and services at the southern end. As relates to the A2A corridor, it is in this context essential to have a strong hub in Gdańsk/Gdynia for consolidating northbound cargo from Central, Southern and even Eastern Europe and for distribution of southbound cargo to the rest of Europe.

Finally, taking into account the rather sparse population in the northern part of the BSR, both the EU and the national authorities will also need to provide better framework conditions for rail transport (as compared to road transport) in the form of increased investments in transport infrastructure and harmonising fiscal regulations related to using this infrastructure to promote from road to rail and sea. This is particularly important in the north where transport costs from production areas to main hubs often account for more than half of the total transport costs from origin to final destination. ●



By Ulla Juntti  
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We need to improve on monitoring the degradation of the railway system in order to find more cost-effective maintenance limits. This means that we need to collect the right data that measure the condition of infrastructure and the rolling stock. These data must be analysed and reported back as decision support to the personnel working with the maintenance on a national basis. If we then look at international traffic, there will be a necessity to build up systems for exchanging information across the borders, e.g. an e-maintenance system. See this as an example: today these data are collected e.g. by a wheel impact detector and stored in the infrastructure manager's database (not shared with the train operator). The wheel impact detector sends an alarm if the wheel is damaged or a flat wheel which can cause damage to the rail, causing derailment. An alarm situation – is a too late situation. The life length of a wheel and the rail have been shortened, cost has increased and it has probably caused train delays as well. However, if we instead put a tag (RFID) on every vehicle and store the track impact data every time the vehicle passes a wheel impact detector, then you can track the condition of the wheels. When it reaches a cost-effective maintenance limit, the detector sends an SMS or e-mail to the maintenance personnel informing that this vehicle now needs maintenance.

It is important that the railway is seen as one system including infrastructure and rolling stock and that we need to share important maintenance data amongst all parties involved. ●



By Jukka Lindfors  
BGLC Project Manager, Council of Tampere Region

One of the biggest challenges for the Bothnian Corridor is to connect two different railway systems: the wide-gauge system in Finland and Russia to the standard European gauge system in Sweden and Norway. This is also its biggest opportunity. In order to merge these two systems, development of an intermodal terminal in Tornio-Haparanda is crucial. In order for railway transports to be competitive, the interface between the systems should be efficient and cost-effective.

In Finland the lack of competition is also a real hindrance, both to national and international rail transports. In order to develop a real intermodal and cost-effective rail transport system we should focus on creating a fair business environment for new rail operators

and services. However, we currently lack a national willingness to promote a modal shift from roads to more energy-efficient and environmentally-friendly railways.

Intermodality is the key requirement of a modern transport system and reality in the most of Europe. In Finland almost all intermodal operations are handled in ports and we are lacking land-based intermodal road/rail terminals. For that reason our intermodal rail transport is near non-existent and is comprised mainly of transit transport from southern seaports to Russia. In order to develop the Bothnian Corridor's links to their neighbouring countries, an intermodal transport system is crucial to tackle the problems of different systems. ●



By Christer Stenström  
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Capacity and punctuality are essential for shifting transportation from air and road to rail. Therefore, planning of maintenance and reinvestments need to be proactive, which in turn requires right performance measurement and life cycle cost (LCC) analysis. Both these aspects are known to be lacking in rail transportation and need far more research.

One specific action for improving performance measurement is to standardise infrastructure and rolling stock indicators, similar to European Standards EN 15341 "Maintenance Key Performance Indicators". Such a standard would facilitate both internal and external benchmarking for identifying best practices. It would also provide more robust indicators for trend tracking, as well as guide the data collection and data quality requirements for RAMS<sub>4</sub> (reliability, availability, maintainability, safety, sustainability, maintenance supportability and security).

Likewise, development of operation and maintenance indices can simplify the performance measurement by summarising overall performance of a rail asset into a single figure, easier to interpret than presenting multiple indicators and figures. A good example of such indicators is OECD's "Handbook on Constructing Composite Indicators".

Regarding LCC analysis, research on the optimal balance between corrective and preventive maintenance is crucial for cost effectiveness. Following maintenance standards and with data from infrastructure managers and train operating companies, investments

in corrective and preventive maintenance can be simulated.

Lastly, infrastructure and rolling stock must be treated as a system of systems, or as Lardner wrote in the book "Railway Economy" in year 1850: "The rolling stock and the permanent way will be in a like condition". ●



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