



# Greening Transport

## Blueprints from the Baltic Sea Region

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## Declaration of purpose

This publication will give its reader a clear and concrete base for greening transports through collaboration, shared priorities and actual tools for improving the efficiency of operations for the sake of a sustainable growth.

It is targeted at decision makers at all levels of society and should serve as both inspiration and a guide to further action in the field of transport in order to plan, implement and manage transport systems involving a large variety of stakeholders, public and private. The condensed and synthesized material found here is done also thanks to the invitation of the European Commission's Directorate-General for Mobility and Transport, to take part in the set-up of the transport corridor management within the trans-European transport network (TEN-T).

The core network corridors, the new instrument for the implementation of the trans-European transport network – is a strong means of unfolding the respective potentials of stakeholders, of promoting the Cooperation between them and of strengthening complementarity with Member States' action

These blueprints or plans of action are based on experience and knowledge gained through several years of work in the Baltic Sea area and most recently the work done in transport projects funded through the Baltic Sea Region Programme 2007-2013. In 2011 the Programme launched an instrument known as cluster initiatives. The Programme supports four clusters in the following themes: energy, water, transport and innovation, all with the purpose to join forces in order to synthesize and present accumulated experience and good practices in the respective fields.

The publication presents findings, which stem from market needs, are developed with the business stakeholders and which are beneficial for sustainable regional growth.

We wish that the reader will find these blueprints highly relevant as they have been structured in a way that to as large an extent as possible shows their applicability outside the specific context in which they originally were developed.

## Adding to a unified transport network (TEN-T)

The European Commission has the ambition to create a powerful European transport network across all 28 Member States. Transport is seen as vital to the economy and the key success factor is to avoid a patchwork of national networks, as most of the transport infrastructures have been developed under national policy premises.

A core transport network is to be established by 2030 to act as the backbone for transportation within the European Single Market. The new core TEN-T network will be supported by a comprehensive network of routes, feeding into the core network at regional and national level.

This will largely be financed by Member States, with some EU transport and regional funding possibilities, including with new innovative financing instruments. The aim is to ensure that progressively, and by 2050, the great majority of Europe's citizens and businesses will be no more than 30 minutes' travel time from this comprehensive network.

Taken as a whole, the new transport network will deliver:

- safer and less congested travel
- as well as smoother and quicker journeys.

As a part of this work, the so called core network corridors will be created as a way to promote the coordinated development of infrastructure and resource-efficient ways of using it. The new policy focuses the most critical elements: cross-border projects, interoperability and inter-modality between different means of transport. European coordinators will support Member States and project promoters so as to reap optimal benefit from all investments.

It is a challenge to build a Single European Transport area, but the way forward is to work with the aid of sustainable solutions. Mr. Jean-Eric Paquet, Director of Trans-European networks and sustainable transport at the Directorate-General for Mobility and Transport welcomes expert input of the Baltic Sea Region projects that indeed may serve as a blueprint for other regions.

During the TEN-T Days on 17 and 18 October 2013 in Tallinn, the Commission will communicate ideas on setting up of TEN-T core network corridors. The preparation process for the corridor implementation plans is expected to be launched in early 2014.

The Baltic Sea Region is perfectly equipped for transnational cooperation with the framework provided by the EU Strategy for the Baltic Sea Region and can serve as a pilot region working on transport challenges and finding innovative solutions.

## A cluster of gained experience

In 2011 the Baltic Sea Region Programme 2007-2013 launched an instrument known as cluster initiatives. Eight transport projects joined forces in the transport cluster initiative to streamline results and make them better visible. The cooperation in the cluster was seen as an opportunity to identify synergies and complementarities between the transport projects, thus providing a better overview of their findings and outcomes.

Being a platform scaling the whole Baltic Sea Region and connecting all modes, the cluster cooperation has had the aim to lay out the formula for a green BSR transport network. The eight organizations taking part have by combining their vast knowledge covering all aspects of sustainable transport development produce several joint outputs. With this coherent concept they have taken joint standpoints on future EU and macro-regional transport and regional growth policies.

The individual organizations have produced, among others, a macroregional transport action plan with policy recommendations, a handbook for establishing and managing green transport corridors, strategies for transport nodes in an efficient transport network, vital information on clean shipping and developed on a number of very concrete improvements like the use of alternative fuels in long distance road transport and the application of transshipment technologies to non-craneable.

Links to all the material is available at:

<http://transportcluster.eu/>

## Blueprints for corridor implementation from the Baltic Sea Region

This section of the document presents transport greening solutions, which have been developed and tested during several years of work. They have been processed and their relevance tested. All of them are based on real business cases and are applicable to TEN-T core network corridors and other links.

### Management structure

#### Objectives

Transport corridors have become structural elements in modern transport and logistics systems. While costs remain important, decision makers are to a greater extent guided by connectivity, reliability and capacity considerations, security and energy concerns, and the environmental footprint. Accordingly, corridor managers are challenged to combine market-oriented corridor operations with a more green management.

In order to meet both the green and business objectives the management organization must fulfill three basic goals

- Support the development of the transport solutions in the corridor to the benefit of the regions served by the corridor and the stakeholders involved in the transport operations
- Support a practical deployment of the green demands on the transport operations in the corridor and monitor their development.
- Engage stakeholders, policy makers and funding organizations to support the corridor development and facilitate their involvement.

The first goal is a normal demand on assessment of logistic performance to improve the working of a transport chain, although often incomplete and not done with the required quality.

The second goal is the overarching demand for creating a green identity, which is founded on a clear vision of the green freight transport corridor and a well-defined methodology for its translation into practical deployment. A substantial part of the work is performance monitoring which of course includes the transport and the logistics activities.

The third goal emphasizes the need to market the corridor, to give it an identity, which facilitates the internal implementation of the monitoring mechanisms and the eventual restrictions imposed by the sustainability demands. A well-known identity also makes the corridor attractive to new operators, facilitates the reductions of bottlenecks and the financing of infrastructure as well as the funding of the management organization itself.

While the two first goals are fairly operational, the third goal is far-reaching and not so easy to define. However, basically it consists of the two activities policy support and communication.

#### Stakeholders

Successful corridor management requires agreements that set up clear targets, roles and responsibilities of different actors and stakeholders. A governance structure with the objective to maintain and improve international competitiveness and at the same time develop and deploy an international green transport corridor strategy involving EU and non-EU states requires involvement of a great diversity of stakeholders at trans-national level.

- Political supporters who ensure certain stability over time and the engagement of the necessary governmental institutions and qualify the corridor for recognition in Europe and beyond.
- National and regional administrations responsible for policy, road, rail and maritime infrastructure development as well as customs.
- Business undertakings, publicly and privately owned, that buy and sell transport services in the corridor.
- Industry associations, pressure groups and promotional programs for advancing trade, intermodal transport and sustainable corridor management.

A right corridor management structure featuring a coordinated policy support, leadership and stakeholder involvement shall depend on the nature of the corridor and the specific functions to be managed. In public-lead transport corridors infrastructure managers, regional, national and EU-level institutions are the main actors. In a business-oriented corridor, railway undertakers, intermodal operators, seaport and terminal operators are the main actors.

In order to succeed in the development, political support and business actor involvement are needed, where international cooperation, treaties and regulations are a prerequisite. The political support is based on the assumption that more trade and transport via the corridor is of benefit to the people in the affected regions. An active political support opens doors for facilitation of harmonized regulations and public funding of infrastructure. A focus on harmonized regulatory settings aiming at improving cohesion for transport corridors including market functioning and environmental demands is a precondition for meeting the green criteria.

## **Activities**

Fulfilling the general management objectives for the green transport corridor development requires seven types of activities:

**Policy support** – Translation of the political interests into operational policies for the development of the corridor engaging a kernel of dedicated stakeholders and a permanent group of supporting organisations. In a transport corridor with a green remit, it is especially challenging to transform the political ideas into policies, which can serve as practical guidelines for the work with their realization in the corridor. One activity should be to develop a harmonized set of KPIs and agree on a baseline for emission levels, energy use, social conditions, and economic performance, which characterizes a green transport corridor and makes it significantly better than the conventional transport service.

**Communication** – Communication is closely related to the policy activity. The relation between the political goals and the resulting policies must be explained, administrative and business organizations must be convinced and informed about challenges, goals, programmes and achievements. For a corridor with a green remit it is an important task to highlight the corridor's identity as a green transport corridor in support of the green policies and for external public relations but also for creating a joint internal view on the sustainability objectives to be reached. The green identity has to be supported by the dissemination of objectives, programmes and results through publications and seminars at all levels, i.e. local, regional, national and EU.

**Trade and transport facilitation** – Promotion of the development of transport infrastructure and transshipment points with a special focus on identification and removal of bottlenecks and other obstacles hampering the corridor performance, which promise

the best contribution to the green objectives. It also includes efforts to simplify national border crossings, customs clearance procedures with less or no paper documents involved and reduction of general bureaucratic bottlenecks. It engages key stakeholders with the decision power to support improvements. The facilitation activity relies on the support of the policy and communication activities to highlight technical and administrative problems in the corridor and convey arguments for their removal to the responsible organisations.

The one-stop-shop (OSS) for rail freight corridors could be considered as a service, which is part of the facilitation activity. Information facilitation contributes by creating the necessary prerequisites for the information interoperability between the parties involved. The OSS is defined by the European Commission as a coordination tool for the rail freight services in the corridor. It should be corridor-oriented and not nationally oriented.

**Performance monitoring** – Introduction of common standard procedures for identification of bottlenecks and other problems through regular assessment of performance development, especially the green Key Performance Indicators (KPI).

A transport corridor with the objective to establish itself as a green freight transport corridor has to carefully monitor the development of the performance of the corridor towards sustainable logistics solutions. It is a major task to introduce and monitor a set of indicators reflecting the sustainability dimensions in addition to the monitoring of the common operational indicators normally used in transport and infrastructure management. The selection of the indicators is complicated. On the one hand they should provide a reasonably true reflection of the performance of the corridor and on the other hand they should be possible to collect at a reasonable cost.

**Information facilitation** – Support to the development of a “soft infrastructure” ICT platform in order to facilitate efficient communication and information exchange between the stakeholders and green performance monitoring. The objective is to increase market transparency and to reduce the “friction costs” in the transport chain. The soft infrastructure consists basically of agreements and standards to enable the electronic information flow between the electronic management systems used in the corridor. Efficient communication and information sharing between all stakeholders are important tasks for the management of any logistics system. It is especially critical for a green transport corridor with its combination of the needs to be logistically efficient and the demands for high quality performance monitoring.

Provision of services as e.g. a One-Stop-Shop rail freight administrative services for booking, reporting and payment and the Single Window facility for interaction between authorities and commercial stakeholders. In the future, the single window concept may even be widened to provide easy access to booking of other logistics services and a single point for mandatory reporting.

**Development of a robust and reliable infrastructure** – The corridor infrastructure development derives from larger political issues, such as transport route prioritization both inside and outside the EU and modal shift. However, the dynamics of investments in transport corridor infrastructure are not taking place in an isolated context, but are stated clearly by strategic and operational decisions of all the stakeholders involved. Demands on routing flexibility at an international scale, due to ambitions of logistics market players to secure high supply chain resilience, are an important consideration for future corridor development. This requires most likely an aligned trans-national planning process with a network perspective on transport corridor infrastructure development taking into account different maritime and land-based infrastructure and transport modes in a synchronized way.



**Supporting private investments and operations** - Successful transport corridor requires both public and private investments. All transport corridors require not only transport infrastructure, but also investments on vehicles and terminal infrastructure and other development, e.g. shopping centres. This gives opportunities not only for transport operators, but also for property developers. Supporting private stakeholders along the whole corridor in finance, urban planning and communications guarantees successful operations for the transport corridor.

### **Management arrangements**

At the level of transport corridor management, the need for a coordinating body is fundamental given the wide range of stakeholders and the large number of governmental institutions that oversee different activities within a transport corridor. This coordination requires a public-private partnership to address a wide range of tasks including investment in infrastructure, information facilitation, performance monitoring and regulatory actions in the transport system, facilitating the improvement in transport and logistics.

Essential in the establishment of a corridor management is the classification of the functions to form a management structure, which can effectively handle a complex mix of policy aspects, coordination requirements and operational matters. A three level management structure can be foreseen involving all parties concerned:

1) A high-level policy organ, which could have different formats depending on the circumstances, e.g. inter-government or public-private cooperation. It should be politically appointed and based on a Memorandum of Understanding. The policy organ is the umbrella body for the corridor management and maintains the contacts to the member states. It provides strategic guidance, supervises the management committee and endorses the long-term business plan.

2) A corridor management committee representing the major public and private stakeholders. The management committee should be made up of adequate management representatives having decision-making powers responsible for implementation of the corridor within their organisation. The committee may establish working groups or set up ad-hoc advisory groups.

3) The management committee can appoint a permanent secretariat to support the implementation of the corridor and deal with operational activities. It is suggested that this permanent organisation is staffed by full-time, dedicated people, located at one place, eventually in the premises of one of the members.

A national trade facilitation committee may be organized to support the work of the management committee by harmonizing the implementation and the application of existing and new conventions and regulations and promoting facilitating rules and procedures affecting the efficiency of transport operations.

### **Key Performance Indicators**

The primary use of Key Performance Indicators (KPI's) in green transport corridors is to assess and monitor the status or development of the separate processes within the corridor in terms of sustainability. The indicators should be closely linked to practical transport logistics operation. Hence, the aim is to assess relevant and practical KPI's that can influence transport logistics services in a sustainable direction.

In order to reflect green transport and corridor performance, there is a need to include KPI's for both operational aspects, i.e. links and nodes, transport techniques and

transport logistics solutions, as well as enabling aspects, i.e. hard and soft infrastructures, standards, organisation, policies and regulations.

Furthermore, from a controlling management KPI-perspective, it is necessary to separate between corrective actions (early warnings) and long-term preventive actions (trends). Moreover it is important to differentiate between absolute and relative performance to enable the measurement of true performance development. Therefore, the indicators should be presented as an absolute value, as well as a relative value.

The selection of KPI's is somewhat different between various key stakeholders and the process of selecting indicators is therefore a delicate and pragmatic balance of relevance and access of data. It is furthermore clear that a specific selection will change over time, as data will become more available in the future.

### **Key corridor stakeholders**

Transport corridors involve several key stakeholders that are more directly involved in the overall performance:

*The transport service provider* has an essential role in developing and offering efficient transport solutions that fulfil market requirements. The use of KPIs is very common among transport providers and they have fairly good access of input data. The weak spot is freight forwarders use of various sub-contracting transport operators, thus losing direct operational control.

*The shipper* requires on time delivery and other relevant logistics services from their transport providers. Much of the KPI's have its origin from the transport provider. This means that reporting systems must be in place from the transport service provider including sub contracted transport operators.

*The infrastructure provider* acts long term and has a crucial role to play in the development and offering of efficient cargo flows. The infrastructure provider offers enabling factors for transport logistics operation. Data for the enabling performance indicators will most likely be fairly accessible.

*The corridor manager* plays a very special, and sometimes limited, role in governing and managing a somewhat virtual corridor based on cargo flows transported by different transport providers, on different modes and parallel infrastructure. Access to operational logistics data is probably only possible through confidential reporting.

### **Overview of relevant corridor KPI's**

Essential in the KPI design, linked to specific key stakeholders is the grouping of indicators into:

*Operational indicators* aiming at optimizing on-going cargo flows with regard to their overall sustainability performance. If possible these performance indicators may be aggregated on corridor level. These indicators are relevant for corridor managers, transport service providers and shipper.

*Enabling indicators* aiming to optimize long-term development with regard to sustainability performance and hindering sub-optimization. The enabling indicators are relevant infrastructure providers and corridor managers.

The following specification of KPI's is relevant for green corridor assessment:

<b>Performance area</b>	<b>Operational indicators</b>	<b>Enabling indicators</b>
<b>Economic efficiency and service quality</b>	Total cargo volumes On time delivery	Corridor ability and capacity
<b>Environmental efficiency</b>	Total energy use Greenhouse gases, CO <sub>2</sub> -e Engine standards ISO 9001 dangerous goods	Alternative fuels filling stations
<b>Social efficiency</b>	Deployment of risk management systems: ISO 31000 and ISO 39000	Safe truck parking Common safety rating Fenced terminals

**Motivation of specified KPI 's**

Economic efficiency and service quality

Total cargo volumes, aims at describing market relevance. Increasing transport volumes should mean market attractiveness.

On time delivery, describes the arrival time in relation to transport schedules. A key element is a uniform service provider and shipper entity for measuring lead times and its arrival time with relevant precision

Corridor ability and capacity, relates to a set of enabling factors for the complete corridor, best described in a separate corridor dashboard to provide a management overview. The intention with the dashboard is to emphasize the focus on cooperation and corridor performance instead of focusing on isolated nodes (seaports and terminals) or regions. There is no use in outstanding performance in one transport link or node, if upstream and downstream links or nodes perform less good or even worse.

Environmental efficiency

Total energy use, aims at describing the general environmental efficiency. Indirectly it also describes an efficient traffic flow. In addition this indicator, if based on fuel consumption, enables the calculation of SO<sub>2</sub> given the legal fuel conditions or the actual quality used.

Greenhouse gases (CO<sub>2</sub>, methane and nitrous oxide) describe impact on climate, as well as indirect the ratio of renewal fuels being used.

Engine standards (also includes exhaust gas after treatment devices) describe indirectly the emissions related to impact on health and nature. This indicator indirectly includes the traditional regulated emissions to air, such as NO<sub>x</sub>, PM and HC.

ISO 9001 dangerous goods, being in place indicates the proactive and preventive systematic work being carried out with regard to risks of dangerous effluents or emissions. This indicator also includes the cargo safety aspects.

Alternative fuel filling stations aims at describing the ability to supply fuels with less content of fossil carbon. This is an enabling factor best described in a corridor dashboard.

Social efficiency

ISO 31000, Risk management being in place indicates the proactive and preventive systematic work being carried out with regard to various security risks. This indicator also includes the cargo security aspects.

ISO 39000, Risk management being in place indicates the proactive and preventive systematic work being carried out with regard to traffic safety risks.

The risk management systems could relate to internal and external parties. If a more detailed social performance regarding direct performance related to corridor operators, KPI's such as sick leave, employee turnover, temporary agency workers and average salaries could potentially measure this performance. OHSAS 18001, occupational health and safety management system specification could also be an alternative.

An additional KPI, measuring more direct traffic safety performance would be number of road accidents.

Fenced terminals with access control, is linked to minimize all safety and security risks connected to cargo flows. This is an enabling factor best described in a corridor dashboard.

Safe truck parking, aims at minimizing security risks, such as thefts and violence, linked to long distance haul transport by road. This is an enabling factor best described in a corridor dashboard.

Common rating systems, relate to different market driven and common assessment systems being developed for increasing security and safety in the transport system. Present examples are TAPA, EuroRap, and Ship Vetting etc.

### **Important conditions and considerations in KPI development**

Important general conditions and considerations in the development of key performance indicators are:

- Operational control of cargo flows through key performance indicators has always been a common way of managing performance in transport logistics services. This experience needs to be included in the operational indicators.
- There are difficulties to capture relevant data with sufficient accuracy, with reasonable effort in order to not put all resources into data capturing itself.
- The system boundary of captured data must be well defined and constant over time when measuring improvements or relations to other corridors.
- Selected KPI's must be manageable in practice and not overruled by legislation or other external factors.
- The KPI's must be few, relevant and designed according to the identified key stakeholders needs.
- Performance indicators may change behaviour of organisations and people within the process being managed by KPI's. Reward systems may amplify this potential but also add a potential risk of sub-optimization.
- KPI's can be counterproductive in relation to the original objective, due to poor performance indicator design. If relevant KPI's are established, they may initially serve the purpose well, but may over time become out-dated. Hence there is a need to continuously evaluate their functionality.
- There is a need for both operational and enabling KPI's with totally different time frames, and significant trade-offs between short and long term ambitions. These two groups of indicators influence each other, but need very different design.

### **Comparison to SuperGreen KPIs**

The project SuperGreen was a Coordinated Action project supported by the European Commission (DG-TREN) in the context of the 7th Framework Program. The purpose was to promote the development of European freight logistics in an environmentally friendly

manner. Benchmarking of green corridors through KPIs was a major part of the project. As a parallel process, KPIs for the same purpose were discussed and tested in the Baltic Sea Region (BSR). Specially the EWTC II project was in close contact with SuperGreen, in order to compare results.

Originally SuperGreen proposed some 18 KPIs whereof some were expressed in absolute and some in relative values. From this extensive list a more compressed version was suggested by the project.

Essential differences between the findings in the BSR and SuperGreen are:

- BSR case studies indicate difficulty to capture economic data. The proposal is therefore to only measure economic performance as cargo volumes and on time delivery. The latter will need transport schedules in order to measure deviation rates. SuperGreen still includes economic data.
- In accordance with the presently developed CEN standard, the cluster proposes energy use and GHG emission in a well to wheel system boundary. In addition, the KPIs from the BSR, only measures regulated emissions as engine emission standards. Sulphur oxide is not part of the proposed indicators, as this is regulated by legislation and is scarcely something the transport sector would over perform in relation to legislation. SuperGreen does not include energy and all GHG. SuperGreen also includes sulphur oxide.
- In order to cover the full range of sustainability there is a need to include social KPIs. These social aspects should include performance regarding the corridor stakeholders, but must also include concern of third party being affected by the corridor. SuperGreen does not directly cover social aspects.

## Policy measures and incentives

In the implementation and operation of a green transport corridor a set of policy measures and incentives has to be identified and assessed that will help creating a successful green corridor. There are only a limited number of economic incentives implemented to steer the freight transport sector towards sustainability. Although the results are encouraging and important steps, it is not likely that economic means of control, based on higher fuel price or distance-related vehicle charges will be enough to achieve a substantial change towards sustainability or to make a green corridor attractive enough for shippers.

Economic incentives and means of control, e.g., CO<sub>2</sub>-tax, Road User Charging etc. should be designed to reflect the external costs that the transport service causes as close as possible. They must be neutral and not in favour of any particular mode of transport. Although this is extremely difficult to achieve, it is an important issue, in order to get acceptance for necessary changes. To make this happen it is necessary to reach international agreements. One country or region can be forerunner, but cannot have different rules and taxations compared to its competitors in the long run. The European transport business can advocate for an international regulation of the transport market into a more sustainable direction, by developing a system for internalization of external costs. To be able to get acceptance for these measures it is of utmost importance to have standardized emission calculation methods. The emission data can probably never be exact, but it can be accurate enough to measure and follow up the environmental impact and from that calculate external costs.

It is important that the environmentally induced fees and revenues do not become a fiscal system, where the money ends up covering state finances. Fees paid should be transferred back to the business in some way, for example as investments in infrastructure and terminals, in order to improve the prerequisites for modal shift and using the most suitable transport mode for each transport task. An efficient and

acceptable system for the users is where the transport companies pay according to your amount of pollution and other external costs that they causes, and get a repayment to the services that they have performed. In this closed system, the environmentally “bad performers” will have to pay to the competitors that are “good performers” and that triggers the willingness to invest in environmentally better technology and increase the efficiency.

CO<sub>2</sub>-tax and distance-based RUC have shown positive effects on the environment, but far from enough to break the trend of increasing demand for transport services or reduce the emissions of CO<sub>2</sub> in absolute measures from the freight transport sector. Thus, these measures must be combined with the other kinds of possible incentives; legal, supportive and voluntary measures to reach a substantial reduction of environmental impacts from the transport sector.

### **Incentives requested from the authorities**

For the transport industry and its customers, robust and reliable accessibility and time related factors like delivery precision, lead time and high security are of much more importance than transport cost, fuel prices or different taxes aiming to increase the price on transport services. For this reason is it necessary that a system supposed to attract actors to use a green corridor contain measures that give the actors these positive effects, i.e., infrastructure and terminals in the corridor that are adjusted to the needs of the freight transport sector and have high capacity and a well maintained, well-integrated and open ICT system, and finally a non-bureaucratic and smooth document handling system at customs and borders. In return they will probably be willing to invest in environmentally sound technology and open up for improving the load factor through cooperation and open rolling stock and freight exchanges.

### **Infrastructure and terminals**

Cooperation between the involved authorities along the whole corridor to reach a commonly accepted and high standard on the infrastructure is necessary. A chain is not stronger than its weakest link and to achieve a reliable standard and attractiveness for a green corridor there must be a high capacity and good maintenance on all links, terminals, seaports and all parts of the corridor. The possibility to establish attractive intermodal solutions will be important for the success of the corridor and it is important to make necessary efforts to strengthen critical links. A common action between the involved authorities on how to smoothen the time consuming paper work at borders, to remove inefficient bureaucracy and to establish a joint transport planning procedure are important issues for the authorities to address.

- Give the same priorities to the whole Green Corridor. All member states have achieved a high standard of infrastructure capacity. A common transnational planning of cross-border infrastructure and a high level of operational and maintenance of infrastructure.
- Improved efficiency in the interface of intermodal transfer.
  - Open access to infrastructure and terminals
  - Standardized equipment, rules and regulations
  - Increased capacity on critical nodes
  - Integrated terminals with good hinterland connections and more efficient terminal equipment
- The possible revenues from the internalisation of external costs shall be used for infrastructure investments
- Safety and security
  - Theft protection and safe rest areas for truck drivers

- Improved traffic safety systems for all modes
- Improved land-use/infrastructure planning
  - Strong cross-regional and trans-national planning, concentration of flows, possibly also in combination with road user charges
  - Notice the necessity to cooperate between municipalities, regions and countries

It is also important that the regional economic development caused by a green corridor will be measured and reported as a good example to help other green corridors to develop.

### **Digital infrastructure**

A well-functioning ICT platform is a prerequisite for a green corridor. A first step is to ensure open and reliable access to traffic information and route planning systems. However, the most important thing that the authorities can do for the transport business acting in the green corridor is to create a robust and open digital infrastructure. This is as important as creating a robust and flexible physical infrastructure. The authorities can open up access to their systems and make it possible for all actors to connect their own applications and IT systems and get access to necessary information. There are several bilateral and trilateral applications today that work perfectly, but when a new actor wants to connect, there is often a problem. This barrier can be removed if a commonly accepted and open ICT platform were developed.

- ICT infrastructure sufficient to handle the need for the green corridor
  - Better route planning systems with real time information
  - Implementation of "internet of things"
- Open Access to relevant information, Information Broker System
  - Traffic information
  - Transparency in supply chains and networks
  - Open for all actors
- Revenues from the internalisation of external costs should be used for ICT investments

Reliability and security in the information chain are key issues. Information related to the company's business must be kept secret.

### **Other incentives**

The authorities can also give dispensations from regulations in the corridor. Examples are:

- Dispensations from vehicle size and weight restrictions
- Dispensations on night delivery limitations and use of terminals and railways in night-time
- Prioritized access in ports, terminals, customs, and bus lanes in cities
- Tougher regulations and restrictions for transport outside the corridors

Authorities have several options to increase the accessibility and punctuality for the actors in a green corridor, like different kinds of dispensations, primarily to accept longer vehicles and allowing traffic during night-time to avoid congestion problems. If higher environmentally induced fees and taxes are introduced the revenue must be transferred back to the transport industry by investing in digital infrastructure and ICT solutions. The measures could also be used as a way to promote the green corridors by charging the

high polluting transport solutions and give the revenue as a reduction to those who have lower environmental impact.

The green corridor can also be used as a test bed for new technology and new business ideas. It can host pilot projects and implementation tests, like electrification and hybridization of the freight transport sector, alternative fuels for all transport modes, vehicle sizes, high capacity transport and platooning, etc.

### **Incentives requested from the transport industry**

In order to make a green transport corridor really “green” and to motivate the authorities to invest in necessary infrastructure and ICT systems the industry’s efforts must meet the expectations on upgrading the environmental standard on technology used in the corridor and a high load factor. A baseline on technology levels on vehicles and vessels operating in the corridor should be design by the involved actors. This means to define a set of rules on which minimum Euro class on trucks that will be allowed, ships and trains with modern exhaust after-treatment devices, like catalytic converters and particulate filters, alternative fuels etc. The vehicle and vessels used in the corridor shall also have a high load factor. A rolling stock exchange and a freight exchange for available capacity in the system are two other ways to increase the systems load factor. A harmonized reporting system should be implemented to achieve this.

It is recommended that a technology neutral system is developed. An agreed baseline of accepted emission levels per tonne transported in the corridor, significantly lower than the average transport service in Europe, shall be defined. This is much more efficient and fair than demands on certain vehicles or vessels. The transport sector can then choose how to meet these demands, by investing in new vehicles or vessels, or by actions like increased load factors, eco-driving or shift to other transport modes.



## The Baltic Sea Region as an innovative transport area

The updated version of the EU Baltic Sea Strategy Action Plan (released in January 2012) underlines that the main challenge with regard to the future transport development in the Baltic Sea Region is to reduce its remoteness. In order to achieve that, better links are needed in several directions. Links in form of transport corridors have been a strong focus for several stakeholders in the Baltic Sea Region during the last years. Corridor cooperation platforms have been established or are very near establishment.

Most importantly however, many corridor initiatives have streamlined their findings through e.g. the cluster work. One important conclusion is also that greening transport is closely linked to technological and organizational development. The Baltic Sea Region with its high level of expertise with a number of well-known manufacturers as well as highly renowned scientific institutes is front runners in the development of greening technologies for the transport industry.

Together with improved links a lot of focus has been put on testing innovative approaches to manage both hard and soft elements of the transport system in the region. The building blocks for a sustainable multimodal transport system in the Baltic Sea Region that will efficiently serve the trade exchange between the Baltic Sea countries, between the BSR and the neighbouring areas, and between the EU and other global economic powers, have been laid out. The tested and agreed principles are:

- A grid of transnational multimodal transport corridors for better external accessibility of the Region, with well-developed cross-border sections to secure interoperability of national transport networks.
- Interregional and regional transport links, which improve access from the transnational corridors to local and regional production areas and customer markets.
- Ports, airports and intermodal terminals - acting as interfaces between land, sea, inland waterway and air transport modes, well connected with their respective hinterlands and
- Efficient local and regional public transportation, contributing to better mobility within commuting areas and to more compact settlement structures.
- Innovative solutions in logistics and in traffic monitoring systems including alternative fuels /propulsion technologies, ICT/ITS concepts for more efficient operations, technological measures to improve intermodality (e.g. technical and organizational measures to increase load factor or to improve modal split by developing solutions for non-craneable containers).
- Platforms for cooperation between public administration, research and business sector to identify potentials and pave the way for future investments.
- Compatible and consistent transport planning and management processes between the governance levels and across the administrative borders.

All initiatives that have been active within the transport cluster are characterized by a high degree of innovation and technical advancement. The work leading up to the end of 2013 has been successful and in many parts implemented together with the transport industry. The work does by no means end here, but the stakeholders should be proud of the stepping stone they have jointly created for further initiatives for the sake of the Baltic Sea Region.