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PLAN ON GREEN CORRIDORS ISSUES**

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## List of Abbreviations

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
AEIF	European Association for Railway Interoperability
ATC	Automatic Train Control
ATM	Air Traffic Management
ATP	Automatic Train Protection system
BRIC	Brazil, Russia, India and China
CCNR	Central Commission for Navigation on the Rhine
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> -eq	All GHG expressed as equivalent units of CO <sub>2</sub> using the global warming potentials of UNFCCC
CTP	Common Transport Policy
DC	Danube Commission
DoW	Description of Work
DWT	Deadweight of a ship
EC	European Commission
ECA	Emission Control Area
ECSA	European Community Shipowners Association
EEDI	Energy Efficiency Design Index
EEOI	Energy Efficiency Operational Indicator
EEV	Enhanced Environmentally-friendly Vehicle
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMSA	European Maritime Safety Agency
ERA	European Railway Agency
ERTMS	European Rail Traffic Management System
ERTRAC	European Road Transport Research Advisory Council
ESC	Electronic Stability Control
ETCS	European Train Control System
ETS	Emissions Trading System
FP7	7 <sup>th</sup> Framework Programme
FTLAP	Freight Transport Logistics Action Plan
GDP	Gross Domestic Product
GHG	Greenhouse gas
GSM	Global System for Mobile communications
HNS	Hazardous and Noxious Substances
IA	Impact Assessment
ICE	Internal Combustion Engine
ICS	International Chamber of Shipping
ICT	Information and Communication Technologies
IM	Infrastructure Manager
IMO	International Maritime Organisation
ISPS	International Ship and Port Facility Security Code
ITS	Intelligent Transport Systems
IWT	Inland Waterway Transport
KPI	Key Performance Indicator
LHV	Long and heavy vehicles

LNG	Liquefied Natural Gas
LRIT	Long Range Identification and Tracking system
MARPOL	International Convention for the Prevention of Pollution from ships
MBM	Market-based measure
MCR	Maximum Continuous Rating of a ship's main engine
MEPC	The IMO's Marine Environment Protection Committee
MoS	Motorways of the Sea
MoU	Memorandum of Understanding
MS	Member State
NAIADES	Navigation and Inland Waterway Action and Development in Europe
NOx	Nitrogen oxides (NO and NO <sub>2</sub> )
NRMM	Non-Road Mobile Machinery
PM	Particulate matter
PSC	Port State Control
R&D	Research and Development
RFID	Radio Frequency IDentification
RIS	River Information Services
RNE	RailNetEurope
Ro-Ro	Roll on - Roll off
RTTI	Real-time Traffic and Travel Information
RU	Railway Undertaking
SDS	Sustainable Development Strategy
SEA	Strategic Environmental Assessment
SECA	Sulphur Emission Control Area
SEEMP	Ship Energy Efficiency Management Plan
SESAR	Single European Sky ATM Research
SOLAS	International Convention for the Safety of Lives at Sea
SOx	Sulphur oxides (SO <sub>2</sub> and SO <sub>3</sub> )
SRA 2010	ERTRAC's Strategic Research Agenda 2010
SSN	SafeSeaNet (a vessel traffic monitoring and information system)
SSS	Short Sea Shipping
STCIN	Standards of Training and Certification in Inland Navigation
TEN-T	Trans-European Transport Network
TEN-T EA	Trans-European Transport Network Executive Agency
TSI	Technical Specifications for Interoperability
UIC	International Union of Railways
UNCLOS	United Nations Convention on the Law of the Sea
UNECE	United Nations Economic Commission for Europe
UNIFE	the Association of the European Rail Industry
UNFCCC	United Nations Framework Convention on Climate Change
WP	Work Package
WTO	World Trade Organisation

## 0 Executive Summary

This document presents the work done under SuperGreen's Task 6.1, aiming at providing an overview of the regulatory framework that needs to be considered when developing the green corridor concept. A total of 35 policy documents, mostly of the EU but also of other international organisations, were reviewed in the framework of this task. Among them, the 2011 White Paper, which was released after submission of the first version of this report, enjoys a prominent position due to its significance. The analysis was performed in 8 themes (Strategic issues, Policy issues, Infrastructure, Logistics, Road transport, Rail transport, Maritime transport and ports, and Inland waterway transport).

In general, significant progress has been made by the European Commission during the last decade in creating a legal framework conducive to the needs of a modern European transport system. However, much remains to be done. Pending regulatory and market issues, most relevant to green corridor development, are:

*Liberalisation of transport operations:* Despite progress made, some transport market segments are not yet fully and de facto liberalised. This is the case for the port services market, which in some cases remains in the hands of local monopolies. In road transport, access to the national markets of Member States by hauliers established in another Member State ('cabotage') may only be carried out "on a temporary basis". Furthermore, in markets which have already been opened up to competition by EU legislation, inherited national regulations and market structure create obstacles to the entrance of new players. This is particularly the case for rail freight transport, which has been open to competition since January 2007.

*Internalisation of external costs:* Many of the external costs of transport today are still not internalised. Where existent, internalisation schemes are sometimes not coordinated among modes and Member States. With the recent release of the new White Paper, the European Commission sets year 2020 as the deadline for the full and mandatory internalisation of external costs for all modes with emphasis on road and rail transport.

*Creation of a European transport network:* Transport infrastructure has been historically designed to serve national rather than European goals and cross-border links constitute bottlenecks that are likely to become increasingly costly as the EU economy continues integrating. The recently introduced concept of a dual layer planning approach with a 'core network' as the top layer is an effort by the Commission to address this problem and create a transport network with true European added value.

*The corridor approach:* Particularly important for green corridor development is the fact that the corridor approach is seen as the basic instrument for core network implementation, on the grounds that the consolidation of large volumes for transfer over long distances is key to efficient intra-EU freight transport. These long-hauls along specially developed freight corridors can be optimised in terms of energy use and emissions, and become attractive to operators for their reliability, limited congestion and low operating and administrative costs.

*Interoperability and co-modality:* Market integration both within and between transport modes is still far from being achieved. Intermodal infrastructure is not sufficiently developed and exchanging data between the modes is difficult because of the co-existence of non-compatible modal ICT systems. Reliance on advanced ICT applications has an essential role to play in the greening of transport. Traffic management, congestion relief on

freight corridors and in cities, promotion of co-modality, in-vehicle safety systems, real time traffic and travel information and an open in-vehicle platform to integrate applications are among the priority issues identified.

*The transport modes:* The emphasis placed by the EU transport policy documents on setting emission standards, deployment of ITS, and improvement of safety is common for all transport modes. Issues of particular importance for SuperGreen include:

- Regulation 913/2010, which aims to establish a European rail network where sufficient priority is given to international freight trains. The following are important features:
  - the defining criterion (crossing by the freight corridor of the territory of at least three Member States, or of two Member States if the distance between the terminals served by the freight corridor is greater than 500 km);
  - the capacity allocation procedure aiming at increased freight transport;
  - the governance rules emphasising the necessary coordination of all parties involved;
  - the requirement to meet technical specifications related to interoperability (ERTMS); and
  - the performance monitoring provisions, with emphasis placed on journey time, reliability and user satisfaction.
- The intention of the new White Paper to further develop the ‘European maritime transport space without barriers’ into a ‘Blue Belt’ of free maritime movement in and around Europe so as to use waterborne transport to its full potential.

## 1 Introduction and objectives

The purpose of this document is to describe the work done in SuperGreen WP6 under Task 6.1 “Analysis of the regulatory framework.”

WP6 is the part of the SuperGreen project that focuses on policy implications. Its objectives are the following:

- assist the Commission in integrating green corridor considerations into the EU Freight Transport Logistics Action Plan;
- examine the implications of related regulatory policies on possible solutions proposed by the project;
- examine possible implications of the work produced during the project on regulatory policies;
- examine possible interactions of distinct policies among one another and identify ways to resolve possible conflicts, bottlenecks and other problems;
- provide assistance to the Commission in the formulation and harmonisation of policies on green corridors in both pan-European and regional levels and also as regards corridors between Europe and other parts of the world.

Task 6.1 is the first task of this work package. It aims at providing an overview of the regulatory framework that needs to be considered when developing the green corridor concept.

Task 6.1 started on 15 January 2010 and was concluded within a year as planned. There were seven partners involved in this task: the Port Authority of Gijon (PAG - task leader), the National Technical University of Athens (NTUA), CONSULTRANS (CONS), The Finnish Transport Agency (FMA), the VR Group (VRG), the Hellenic Shortsea Shipowners Association (HSSA), and the Turkish State Railways (TCDD).

The method foreseen in the DoW document of the project for Task 6.1 is literature survey. A list of seven recent EU policy documents concerning all transport modes is suggested in the DoW as the basis for the analysis, which should also cover activities at the global level as regards regulating greenhouse gas emissions for transport (United Nations, IMO, etc).

An extended list of recent policy documents published by the EU and other international institutions was prepared. These documents were grouped in the following categories in accordance with the division scheme of the official website of the European Commission related to transport issues:

- Strategic issues
- Policy issues
- Infrastructure
- Logistics
- Road transport
- Rail transport
- Maritime transport and ports
- Inland waterway transport.

Document reviewing was allocated to Task 6.1 partners on the basis of the categorisation mentioned above. The criteria used for work allocation were:

- expertise/specialisation of each partner institution,
- fair distribution of workload in accordance with input foreseen, and
- correlation with work allocated to the partners under other tasks of the project.

In addition to the listed documents, task partners were instructed to take into consideration the EU publication ‘Greening Transport Inventory’<sup>1</sup> This inventory was prepared in 2008 in the framework of the ‘Greening Transport’ package and shows the large number and diverse measures that were already in place to reduce the negative impacts of transport. The inventory begins by describing policies affecting several means of transport and then has a section for each main transport mode: air, maritime, inland waterway, rail and road. Each section is divided according to the main negative impacts: climate change; regional and local pollution, noise pollution, congestion and accidents.

Task partners were asked to use the ‘Greening Transport Inventory’ as a starting point for their analysis and focus on regulatory acts introduced after 2008, which are not covered by this inventory.

Each one of the following eight sections briefly describes the documents reviewed under one of the above categories and discusses their relevance to green corridor development. The conclusions reached are summarised in Section 10.

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<sup>1</sup> European Commission (2008). *Greening Transport Inventory*. Commission staff working document, SEC(2008) 2206, Brussels, 8.7.2008.

## 2 Strategic issues

The section deals with the key policy documents which set out the objectives of the Common Transport Policy (CTP) and the suggested measures for achieving these objectives. The documents of this nature that were released during the last decade and were selected to be reviewed in relation to green corridor development are the following:

- The 2001 White paper ‘European transport policy for 2010: time to decide’ [COM(2001) 370], which stressed the importance of shifting the balance between modes of transport, eliminating bottlenecks, placing users at the heart of transport policy and managing the effects of globalization.
- The Mid-Term Review of the 2001 White Paper ‘Keep Europe moving – sustainable mobility for our continent’ [COM(2006) 314], which drew attention to the changes occurred in the context since 2001, such as EU enlargement, greater concerns about security and terrorism, the acceleration of globalization, international commitments to fighting global warming and rising energy prices.
- The Communication from the Commission ‘EUROPE 2020 - A strategy for smart, sustainable and inclusive growth’ [COM(2010) 2020], which set five ambitious objectives - on employment, innovation, education, social inclusion and climate/energy - to be reached by 2020.
- The 2011 White Paper ‘Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system’ [COM(2011) 144], which focuses on the creation of a single European transport area, the role of innovation in terms of both technology and behavior, the provision of modern infrastructure associated with smart pricing and funding, and the external dimension of the EU transport policy.

### 2.1 The 2001 White Paper

The document formulated the European transport policy for the period 2001 – 2010. It proposed some 60 specific measures to be taken at Community level until 2010, with milestones along the way, notably the monitoring exercises and the mid-term review in 2005 to check whether the precise targets had been attained or whether adjustments were needed.

It is structured in four parts, each one containing a number of guidelines. A set of measures are proposed under each guideline. Only the guidelines of each part are presented below:

#### *Part One: Shifting the balance between modes of transport*

Two priority objectives needed to be attained by 2010:

- regulated competition between modes;
- a link-up of modes for successful intermodality.

The guidelines that formed the basis for Community action were:

- Improving quality in the road sector
- Revitalising the railways
- Controlling the growth in air transport
- Adapting the maritime and inland waterway transport system
- Linking up the modes of transport.

#### *Part Two: Eliminating bottlenecks*

The guidelines that formed the basis for Community action under this part were:

- Towards multimodal corridors giving priority to freight
- Towards a high-speed passenger network
- Improving traffic conditions through traffic management plans
- Major infrastructure projects eliminating bottlenecks
- Innovative approaches in project finance.

*Part Three: Placing users at the heart of transport policy*

The guidelines of this part were:

- Reducing the number of deaths on the road by half
- Towards gradual charging for the use of infrastructure
- The need to harmonise fuel taxes
- Intermodality for people
- Rights and obligations of users
- Diversified energy for public transport
- Promoting good practice in urban transport

*Part Four: Managing the globalization of transport*

The guidelines here were:

- The infrastructure challenge generated by EU enlargement
- The opportunity generated by EU enlargement for a well developed rail network
- The new dimension for shipping safety offered by EU enlargement
- A single voice for the European Union in international bodies
- The urgent need for an external dimension to air transport
- Galileo: the key need for a global programme.

The document makes no specific reference to the green corridor concept, which apparently had not been formulated yet. Of course, its primary concerns such as the liberalisation of transport services, the decoupling of transport demand growth from GDP growth, the modal shift towards more environmentally friendly modes, the elimination of bottlenecks in the trans-European networks (TEN-T), and the significant reduction of road accidents are not irrelevant to the concept of green corridors.

Of more direct relevance is the guideline towards multimodal corridors giving priority to freight, according to which “if rail transport of goods in Europe is to recover, efficient international train paths will have to be allocated to freight, either in the form of infrastructure or as time slots.” Rail access to ports and intermodal terminals is considered an essential element of such multimodal corridors.

Furthermore, under the guidelines of adapting the maritime transport system and linking up the modes of transport, the document proposes the following measures:

- include the concept of “Motorways of the Sea” in the future revision of the TEN-T;
- introduce a new “Marco Polo” programme to support intermodality and promote alternative solutions to road transport;
- simplify the regulatory framework for maritime and inland waterway transport by encouraging in particular the creation of one-stop offices for administrative and customs formalities and by linking up all the players in the logistics chain; and
- encourage the emergence of freight integrators and standardise loading units (containers and swap bodies).



## 2.2 The 2006 Mid-term Review

The document is the mid-term review of the 2001 White Paper, which was presented in the previous section. It identified the areas where the White Paper measures proved insufficient, and suggested further measures.

The overall objectives of transport policy remained the same: a competitive, secure, safe, and environmentally friendly mobility, fully in line with the revised Lisbon agenda for jobs and growth and with the revised Sustainable Development Strategy (refer to Section 2.3).

However, based on the experience gained between 2001 and 2006, as well as the results of further studies, the document concluded that the measures envisaged by the Commission in 2001 were not sufficient on their own to continue achieving the fundamental objectives of EU policy, in particular to contain the negative environmental and other effects of transport growth whilst facilitating mobility as the quintessential purpose of transport policy. In the enlarged EU, situated in a globalised, rapidly changing world, a broader, more flexible, transport policy toolbox was suggested. Solutions could range from European regulations and their uniform application, economic instruments, soft instruments, and technological integration to a geographically differentiated approach, using methods of tailor-made legislation or enhanced cooperation.

There are three basic differences between the 2001 White Paper and the 2006 mid-term review, which are directly or indirectly related to green corridors: *Firstly*, the corridor approach that was completely absent from the 2001 White Paper, has now started appearing in policy making. The basic argument is that “enlargement has given the EU a continental dimension and that the extension of the main trans-European network axes creates more corridors that are particularly suitable for rail and waterborne transport. At the same time, the greater diversity may in certain policy areas require more differentiated solutions, leaving room for local, regional and national solutions whilst ensuring a Europe-wide internal transport market.”

*Secondly*, while the 2001 White Paper emphasised decoupling transport demand growth from GDP growth, the mid-term review focused on decoupling demand growth from its negative effects such as greenhouse gas (GHG) emissions, moving away from the controversial issue of restraining mobility.

*Thirdly*, although both documents promote a modal shift away from road transport and towards lower emission modes, particularly rail, the mid-term review qualifies this target to seek modal shift only where appropriate, such as over long distances (> 500 km), on congested corridors and in urban areas. Furthermore, according to the mid-term review, each transport mode must be optimised. All modes must become more environmentally friendly, safe and energy efficient; the achievement of optimal and sustainable utilisation of resources is seen as resulting from the new concept of co-modality, i.e. the efficient use of different modes on their own and in combination.

The most interesting part of the document from the green corridor viewpoint is the section covering transport logistics and Intelligent Transport Systems (ITS). The document recognizes that “globalisation has led to the creation of large integrated logistics companies with worldwide operations, a trend that needs to be matched by public policies enabling the optimal use and combination of different modes of transport. This may include action to remove regulatory obstacles to co-modality, to stimulate learning and the exchange of best practice throughout the EU, to promote standardisation and interoperability across modes and to invest in transshipment hubs.” Adapting dimensions of containers and vehicles in order to meet the needs of intelligent logistics was also recognized as an issue to be considered. Moreover, the document reaffirmed the Commission’s intention to

examine a possible programme to promote a rail freight oriented network within the broader context of a new freight transport logistics policy.

Furthermore, the mid-term review emphasised the role of new Information and Communication Technologies (ICT) in providing new services to citizens and allowing improved real time management of traffic movements and capacity use, as well as the tracing and tracking of flows for environmental and security purposes. Through improving the load factor, enabling and stimulating transshipment onto rail and sea transport for long distances, optimising routing and timing, ICTs contribute to increasing mobility whilst decreasing environmental impact per unit of freight transported, thus rendering the industry's interest in cutting costs consonant with the public interest of ensuring financial and environmental sustainability.

The document suggested integrating these and other similar concerns in a framework strategy for freight transport logistics in Europe, leading to an action plan. It is noted that this is the Freight Transport Logistics Action Plan that introduced the green corridor concept one year later (refer to Section 5.1).

### **2.3 The Europe 2020 strategy**

The document presents a strategy to help Europe come out stronger from the recent economic crisis and turn it into a smart, sustainable and inclusive economy delivering high levels of employment, productivity and social cohesion.

It starts with the acknowledgement that the recent crisis not only has wiped out all gains of the last decade in economic growth and job creation, but has exposed Europe's structural weaknesses:

- average growth rate structurally lower than that of its main economic partners, largely due to a productivity gap that has widened over the last decade;
- significantly lower employment rates than in other parts of the world; and
- accelerating demographic ageing.

In the meantime, the world is moving fast and long-term challenges – globalisation of economies, weak worldwide financial system, and pressure on resources – intensify. These challenges are now greater than before the recession, whilst EU's room for manoeuvre is limited. Faced with these long-term challenges in combination with the immediate one of recovery from the crisis, the Commission has put forward three mutually reinforcing priorities:

- Smart growth: developing an economy based on knowledge and innovation.
- Sustainable growth: promoting a more resource efficient, greener and more competitive economy.
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.

To this end, the Commission proposes the following EU headline targets for 2020:

- The employment rate of the population aged 20-64 should increase from the current 69% to at least 75%, including through the greater involvement of women, older workers and the better integration of migrants in the work force;
- 3% of the EU's GDP should be invested in R&D;
- Reduce greenhouse gas emissions by at least 20% compared to 1990 levels or by 30%, if the conditions are right; increase the share of renewable energy sources in EU's final energy consumption to 20%; and a 20% increase in energy efficiency;

- A target on educational attainment which tackles the problem of early school leavers by reducing the dropout rate to 10% from the current 15%, whilst increasing the share of the population aged 30-34 having completed tertiary education from 31% to at least 40% in 2020;
- The number of Europeans living below the national poverty lines should be reduced by 25%, lifting over 20 million people out of poverty.

Recognising that these targets do not represent a "one size fits all" approach, the Commission proposes that they are translated into national targets and trajectories to reflect the current situation of each Member State and the level of ambition it is able to reach as part of a wider EU effort to meet these targets.

Moreover, the Commission puts forward seven flagship initiatives to catalyse progress under the three priority themes mentioned above:

- **"Innovation Union"** to improve framework conditions and access to finance for research and innovation so as to ensure that innovative ideas can be turned into products and services that create growth and jobs.
- **"Youth on the move"** to enhance the performance of education systems and to facilitate the entry of young people to the labour market.
- **"A digital agenda for Europe"** to speed up the roll-out of high-speed internet and reap the benefits of a digital single market for households and firms.
- **"Resource efficient Europe"** to help decouple economic growth from the use of resources, support the shift towards a low carbon economy, increase the use of renewable energy sources, modernise our transport sector and promote energy efficiency.
- **"An industrial policy for the globalisation era"** to improve the business environment, notably for SMEs, and to support the development of a strong and sustainable industrial base able to compete globally.
- **"An agenda for new skills and jobs"** to modernise labour markets and empower people by developing their skills throughout the lifecycle with a view to increase labour participation and better match labour supply and demand, including through labour mobility.
- **"European platform against poverty"** to ensure social and territorial cohesion such that the benefits of growth and jobs are widely shared and people experiencing poverty and social exclusion are enabled to live in dignity and take an active part in society.

In order to tackle existing bottlenecks and deliver the Europe 2020 goals, the Commission proposes to mobilise EU-level instruments, such as the single market, financial levers and external policy tools. Furthermore, the Commission describes what needs to be done to define a credible crisis exit strategy, to pursue the reform of the financial system, to ensure budgetary consolidation for long-term growth, and to strengthen coordination within the Economic and Monetary Union.

The Europe 2020 strategy requires stronger economic governance, which relies on two pillars: the EU-level priorities and headline targets outlined above (the 'thematic' approach); and country reporting that includes helping Member States to develop their own strategies, the issuance of country-specific recommendations and the issuance of policy warnings in case of inadequate response.

The document presents a vision of Europe's social market economy for the next decade and it is much wider in perspective than a sectoral document on transport. Nevertheless, two of its three headline priorities, namely the ones on smart growth and sustainable growth, are relevant to the green corridor concept. According to the definition of this

concept, as contained in the Freight Transport Logistics Action Plan, “green corridors could be used to experiment with environmentally-friendly, innovative transport units, and with advanced ITS applications,” rendering their smart and sustainable characteristics evident.

Along the same line of thought, green corridors can be viewed as an instrument for achieving the “20/20/20” climate/energy- target of the Europe 2020 document, while the target of investing 3% of EU’s GDP in R&D can be considered as a necessary input for developing the innovative environmentally-friendly technologies to be applied on green corridors and elsewhere. Finally, green corridor development is expected to benefit from three out of the seven flagship initiatives of Europe 2020, namely those of “Innovation Union”, “A digital agenda for Europe”, and “Resource efficient Europe.”

## **2.4 The 2011 White Paper**

The main document of the 2011 White Paper ‘Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system’ [COM (2011) 144] is accompanied by the following three documents:

- Commission staff working document [SEC(2011) 391];
- Impact assessment [SEC(2011) 358]; and
- Summary of the impact assessment [SEC(2011) 359].

The main document and the first two of the complementary ones are briefly presented below. SEC(2011) 359 simply summarises the impact assessment and needs no further analysis.

### **2.4.1 The main document**

Building on the lessons learnt, this document takes a global look at developments in the transport sector, at its future challenges and at the policy initiatives that need to be considered in the coming decade. It contains the Commission’s vision of future transport and the corresponding strategy. The latter is transformed into a long list of actions to be taken at Community level. A set of 10 benchmarks is also specified for achieving the ambitious target of reducing by year 2050 greenhouse gas emissions by at least 60% with respect to 1990.

The document is structured in the three parts that are briefly presented below:

#### *1. Preparing the European transport area for the future*

Serving as an introduction, this part refers to the challenges that transport faces despite the progress made during the last decade. Since the 2001 White Paper on transport:

- further market opening has taken place in aviation, road and partly in rail transport;
- the Single European Sky has been successfully launched;
- the safety and security of transport across all modes has increased;
- new rules on working conditions and on passenger rights have been adopted;
- trans-European transport networks have contributed to territorial cohesion;
- international ties and cooperation have been strengthened; and
- a lot has been done to enhance transport’s environmental performance.

However, the transport system remains unsustainable and new challenges have been added to the old ones. Reference is made to:

- the ability to provide unconstrained mobility while anticipating resource and environmental considerations;

- the remaining bottlenecks and other barriers in relation to the internal transport market;
- the need to unite the transport systems of the eastern and western parts of Europe;
- the need to reduce Europe's oil dependence;
- the need to drastically reduce world greenhouse gas emissions in line with Europe's international commitments;
- the need to develop and deploy new technologies for vehicles and traffic management as a means to fundamentally change the transport system;
- the need of the European transport industry to develop and invest in order to maintain its competitive position;
- the need to address congestion, particularly on the roads and in the sky;
- the need to provide adequate and intelligent infrastructure; and
- the increased pressure on public resources for infrastructure funding.

2. *A vision for a competitive and sustainable transport system*

The paramount goal of European transport policy is to help establish a system that underpins European economic progress, enhances competitiveness and offers high quality mobility services while using resources more efficiently. Curbing mobility is not an option. New transport patterns must emerge, according to which larger volumes of freight are carried jointly to their destination by the most efficient (combination of) modes. Individual transport is preferably used for the final miles of the journey and performed with clean vehicles. Information technology provides for simpler and more reliable transfers. Transport users pay for the full costs of transport in exchange for less congestion, more information, better service and more safety.

Future development must rely on three strands. These, together with the related benchmarks for achieving the GHG emissions reduction target (by at least 60% of 1990 GHGs by 2050) are listed below:

- Improving the energy efficiency performance of vehicles across all modes. Developing and deploying sustainable fuels and propulsion systems;
  - (1) Halve the use of 'conventionally-fuelled' cars in urban transport by 2030; phase them out in cities by 2050; achieve essentially CO<sub>2</sub>-free city logistics in major urban centres by 2030.
  - (2) Low-carbon sustainable fuels in aviation to reach 40% by 2050; also by 2050 reduce EU CO<sub>2</sub> emissions from maritime bunker fuels by 40% (if feasible 50%).
- Optimising the performance of multimodal logistic chains, including by making greater use of inherently more resource-efficient modes, where other technological innovations may be insufficient (e.g. long distance freight);
  - (3) 30% of road freight over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050, facilitated by efficient and green freight corridors. To meet this goal will also require appropriate infrastructure to be developed.
  - (4) By 2050, complete a European high-speed rail network. Triple the length of the existing high-speed rail network by 2030 and maintain a dense railway network in all Member States. By 2050 the majority of medium-distance passenger transport should go by rail.

- (5) A fully functional and EU-wide multimodal TEN-T ‘core network’ by 2030, with a high quality and capacity network by 2050 and a corresponding set of information services.
- (6) By 2050, connect all core network airports to the rail network, preferably high-speed; ensure that all core seaports are sufficiently connected to the rail freight and, where possible, inland waterway system.
- Using transport and infrastructure more efficiently through use of improved traffic management and information systems (e.g. ITS, SESAR, ERTMS, SafeSeaNet, RIS), advanced logistics and market measures such as full development of an integrated European railway market, removal of restrictions on cabotage, abolition of barriers to short sea shipping, undistorted pricing etc.
- (7) Deployment of the modernised air traffic management infrastructure (SESAR) in Europe by 2020 and completion of the European Common Aviation Area. Deployment of equivalent land and waterborne transport management systems (ERTMS, ITS, SSN and LRIT, RIS). Deployment of the European Global Navigation Satellite System (Galileo).
- (8) By 2020, establish the framework for a European multimodal transport information, management and payment system.
- (9) By 2050, move close to zero fatalities in road transport. In line with this goal, the EU aims at halving road casualties by 2020. Make sure that the EU is a world leader in safety and security of transport in all modes of transport.
- (10) Move towards full application of “user pays” and “polluter pays” principles and private sector engagement to eliminate distortions, including harmful subsidies, generate revenues and ensure financing for future transport investments.

### 3. *The strategy – What needs to be done*

This section of the document transforms the vision described above in a 4-tier strategy:

- A Single European Transport Area  
Obstacles to a smooth functioning of and effective competition in the internal market persist. The objective for the next decade is to create a genuine Single European Transport Area by eliminating all residual barriers between modes and national systems, easing the process of integration and facilitating the emergence of multinational and multimodal operators. A vigilant enforcement of the competition rules across all transport modes will complement the Commission’s actions in this area. A higher degree of convergence and enforcement of social, safety, security and environmental rules, minimum service standards and users’ rights must be an integral part of this strategy, in order to avoid tensions and distortions.
- Innovating for the future – technology and behaviour  
Innovation is essential for this strategy. EU research needs to address the full cycle of research, innovation and deployment in an integrated way through focusing on the most promising technologies and bringing together all actors involved. Innovation can also play a role in promoting more sustainable behaviour.
- Modern infrastructure, smart pricing and funding  
The efforts towards a more competitive and sustainable transport system need to include a reflection on the required characteristics of the network and must foresee adequate investments: EU transport infrastructure policy needs a common vision and

sufficient resources. The costs of transport should be reflected in its price in an undistorted way.

- The external dimension

Transport is fundamentally international. Because of this, many actions in this document are linked to challenges related to the development of transport beyond the EU borders. Opening up third country markets in transport services, products and investments continues to have high priority. Transport is therefore included in all trade negotiations with European participation (WTO, regional and bilateral). Flexible strategies will be adopted to ensure the EU's role as a standard setter in the transport field.

Furthermore, a total of 131 actions, organised in 40 concrete initiatives, are proposed by the document for the materialization of this strategy. In general, the document formulates the Common Transport Policy for the period 2011 – 2020. Although the term “green corridor” appears only once in it, the commonalities in the underlying philosophies of the White Paper and the green corridor concept are surprising. The five pillars of green corridors, as they have been expressed in the selected KPIs (efficiency, service quality, environmental sustainability, infrastructural sufficiency and social issues), have all a central role to play in the new policy. In a sense, the platform for innovations that characterises green corridors is expanded to include the entire Europe with emphasis on the new core network.

#### **2.4.2 The Commission staff working document**

The document expands on the current trends and future challenges of European transport, the vision and the strategy for 2050, as they have been presented in the main document. Its main objective is to describe the 40 proposed initiatives that need to be taken into consideration in the next ten years to meet the goals set, to put the transport sector on a sustainable path and bridge the gap between vision and reality.

Very important from the green corridor viewpoint is the recognition that the consolidation of large volumes for transfer over long distances is the key to efficient intra-EU freight transport. These long-hauls could use specially developed freight corridors optimised in terms of energy use and emissions, but also attractive to operators for their reliability, limited congestion and low operating and administrative costs.

Furthermore, these corridors would represent the freight part of a ‘core network’ or backbone of the EU transport system. They would link major urban centres and ports, and integrate regular services on sea, on rail freight lines and on inland waterways, plus road transport assisted by traffic management tools, capability for alternative fuels and multi-modal hubs. Such corridors would need to offer simplification of administrative procedures, optimisation of schedules and cargo tracking and tracing. The administrative burden linked to multimodal freight transport should, accordingly, be considerably reduced. Formalities related to the transport of goods could be performed only once – independent of the number of transshipments – and electronically (e-Freight).

Full market opening would have to be accompanied by uniform enforcement of common safety, security, environmental and social legislation. Removing barriers to market entry and modal integration would strengthen the role of multinational and multimodal logistic operators. Users would have a wider choice among transport services and their providers.

The alignment between this vision of intra-EU freight transport and the green corridor concept is evident.

### 2.4.3 The impact assessment

The document contains a detailed ex-post evaluation of the 2001-2010 EU transport policy and proposes a policy mix for the next decade after having assessed the effects of a number of alternative policy options.

The overall policy goal is to design a path towards a low-carbon, competitive economy that would meet the long-term requirements for limiting climate change to 2 °C. This general objective is translated into the following specific objectives:

- (a) a reduction of transport-related CO<sub>2</sub> emissions by approximately 60% by 2050 compared to 1990;
- (b) a drastic decrease in the oil dependency of transport-related activities by 2050; and
- (c) limiting the growth of congestion.

Meeting these objectives requires a structural change in the way the system operates. The Commission has identified seven policy areas in which concrete policy measures could have a key role in stimulating the expected shift of the transport system to another paradigm: pricing, taxation, research and innovation, efficiency standards and flanking measures, internal market, infrastructure and transport planning. Possible application of isolated intervention in either one of these seven policy areas has been considered. However, it appears that none of these instruments alone would be capable of tackling at the same time and in a satisfactory way all the various problem drivers and all the elements of the specific policy objectives.

Three policy options – in addition to the “no new policy” one – have been designed and assessed in detail. All three options envisage action in all seven policy areas and have in common a certain number of initiatives. What distinguishes them is the intensity of intervention that, depending on the option, is higher in some specific field and lower in others.

Two points are important for the purposes of the present analysis. The first concerns the characteristics of the policy option which, following the assessment exercise, was suggested as the most appropriate one on the basis of criteria like its effectiveness, efficiency and coherence. Knowing these characteristics is important because in addition to forming the underlying assumptions behind the estimation of expected costs/benefits, they indicate the decision makers’ priorities for the next decade. These features of the proposed policy option are presented in Table 1.

It appears that the proposed policy option assumes full internalisation of externalities and elimination of distortions in taxation, in particular concerning VAT on international passenger transport, vehicle taxation and company car taxation. It also includes measures with a strong focus on the completion of the internal market and infrastructure development. Although it subjects vehicles in all modes to CO<sub>2</sub> standards up until 2050, it assumes an intermediate level of intensity of R&D efforts, moderating the associated technology risk. It places emphasis on locally determined policies (pricing, support to public transport and non-motorised modes, integrated land planning) in urban areas. The intensity of the policy measures in urban transport is derived residually to achieve the 60% CO<sub>2</sub> emission reduction target.



Table 1. The basic measures of the proposed policy option

Policy area	Policy measure	Description
Pricing	Internalise local externalities for all modes of transport	100% internalisation of all external costs for heavy duty vehicles (HDV), passenger cars, motorcycles, passenger and freight rail, inland navigation and aviation for all Member States by 2050, according to the central value from the Handbook on estimation of external
Taxation	Taxation of fuels	<i>Phase I (2013-2019):</i>
		<ul style="list-style-type: none"> <li>revised structure of the Energy Taxation Directive and of national taxes and introduction of a CO<sub>2</sub> tax component;</li> <li>diesel rates based on the 2007 commercial diesel proposal, but CO<sub>2</sub> component included;</li> <li>current exemptions left unchanged;</li> <li>exemption of compressed natural gas (CNG), liquefied petroleum gas (LPG) and biofuels from the energy component. Taxation of biodiesel increased gradually;</li> <li>CO<sub>2</sub> tax component: 10 € per tonne of CO<sub>2</sub>.</li> </ul>
		<i>Phase II (from 2020 onwards):</i>
		<ul style="list-style-type: none"> <li>elimination of exemption for diesel use in rail, local public passenger transport;</li> <li>commercial and non-commercial diesel use is taxed at the same</li> <li>abolition of exemption of kerosene for aviation and diesel for navigation. For aviation, given that it would be covered by the Emission Trading Scheme starting with 2012, the energy taxation would only consist of the energy component, but not the CO<sub>2</sub> component. The taxation of kerosene for aviation only applies to intra-EU flights, in line the provisions of the Chicago Convention.</li> <li>energy component for CNG, LPG and biofuels aligned with other fuels.</li> <li>CO<sub>2</sub> tax component: 20 € per tonne of CO<sub>2</sub></li> </ul>
		VAT on international passenger transport services
		Introduction of a minimum VAT rate of 19% on all intra-EU international passenger transport services
	Vehicle taxation	Establish a link in vehicle taxation with the environmental performance by introducing a CO <sub>2</sub> -related element in the annual circulation tax and the registration tax. In Member States that did not introduce a CO <sub>2</sub> -related element, we assume that at least 25% of the total tax revenue from registration and annual circulation taxes should originate in the CO <sub>2</sub> -based element of each of these taxes starting with 2015. From 2017 at least 50% of the total tax revenue from both the annual circulation tax and the registration tax would originate in the CO <sub>2</sub> based element.
	Company car taxation	Elimination of favourable taxation regime for company cars, reflected through changes in car ownership, vehicle size in the fleet and fuel consumption.

Table 1. The basic measures of the proposed policy option (cont'd)

Internal market	Opening transport markets and removing regulatory, administrative and technical barriers	Increase in the efficiency of all transport modes as a result of the removal of regulatory, administrative and technical barriers, reflected through decreases in the ticket price for passenger rail and operation costs and time costs for freight (10% to 25%, depending on mode) and higher load factors for road freight.
	Wide deployment of intelligent transport systems	Deployment of Intelligent Transport Systems reflected through a reduction in congestion and improvements in energy efficiency, due to more efficient use of infrastructure, vehicle
Infrastructure	Create a core backbone of high performing infrastructure in terms of environmental impact	Effects of the increase in the capacity and performance of the network resulting from the elimination of bottlenecks and addition of missing links, and increase in the train length (to 1.5 km) and maximum axle load (to 22.5 tonnes), reflected through decreases in operation costs and time costs (6% to 20%, depending on mode) and higher load factors for freight.
Transport planning	Better integrate urban mobility in the EU transport policy	Effects of shadow carbon pricing as a proxy for locally determined policies (pricing, support to public transport and non-motorised modes, land planning). <b>[The value of the CO2 shadow price is derived endogenously to achieve the 60% CO2 emissions reduction by 2050 compared to 1990].</b>
Research and Innovation	Battery costs, power density and speed of charge for electric vehicles	Assumed specific battery costs per unit kWh in the long run: 390-420 €/kWh for plug-in hybrids and 315-370 €/kWh for electric vehicles, depending on range and size, and other assumptions on critical technological components.
Efficiency standards and flanking measures	CO2 standards	Implementation of CO2 standards for passenger cars (95 g CO2/km), light commercial vehicles (135 g CO2/km), heavy duty vehicles (15% compared to 2005), powered two-wheelers (70 g CO2/km) and trains (20% compared to 2005) by 2020. In addition, for cars they go down from 95g CO2/km in 2020 to 20 g CO2/km in 2050 [for light duty vehicles: 135g CO2/km in 2020 to 55 g CO2/km in 2050; for heavy duty vehicles, trains, ships and aircrafts 40% , 40%, 45% and 60% improvement in
	Standards for controlling air pollution	Starting with 2030 implement standards for controlling air pollution. For passenger cars: 0.025 g/km for CO; 0.03 g/km for NOx and 0.0025 g/km for particulate matter. For heavy duty vehicles: assumed halving of the EURO VI limit values.
	Deployment of less GHG intense energy carriers	Share of blending of biofuels and carbon intensity for electricity in line with the Effective and widely accepted technology scenario from the Impact Assessment on "Low-carbon
	Eco-driving	Assumptions on reduction in vehicle energy consumption (MJ/km) by 2050, relative to the "no new policy option": 1.6% for cars and motorcycles; 2.1% for buses; 3.2% for vans; 1.9% for medium and heavy trucks; 2.2% for passenger rail and 1.3% for freight rail. For road and rail, virtually all drivers are
	Fuel efficiency labelling	Fuel efficiency labelling would have limited effect with mandatory CO2 standards enforced, but it would still play a role in raising awareness and ensuring independent and comparable
	Internalisation of NOx emissions in aviation	Inclusion of NOx emissions from aviation in the EU Emissions Trading Scheme starting with 2020 and apply a 2x emissions multiplier to account for the impact of NOx (1 tonne Nox = 2

The second point of this document that is of particular interest to green corridor development and the SuperGreen project is the list of core transport indicators that the document suggests monitoring for constantly evaluating the proper implementation and effectiveness of the proposed policy. These indicators are presented in Table 2 below.

**Table 2. Policy monitoring indicators**

<i>Key indicators</i>	<i>Definition</i>	<i>Relevance</i>
<i>Monitoring the environmental performance of transport</i>		
<i>Share of renewable energy in transport</i>	This indicator is the share of energy from renewable sources in gross final energy consumption for transport	This indicator monitors the progress achieved in reducing oil dependency of transport
<i>GHG emissions from transport</i>	Each greenhouse gas (CO <sub>2</sub> , methane, and nitrous oxide) is weighted by its global warming potential and aggregated to give total greenhouse gas emissions expressed in terms of CO <sub>2</sub> equivalents.	This indicator shows trends in the greenhouse gas emissions from transport by mode of transport.
<i>Emissions of particulate matter from transport</i>	This indicator is defined as the aggregated particulate-forming potential of emissions of particulate matter (PM10), nitrogen oxides, sulphur dioxide and ammonia from transport.	This indicator shows trends in emissions of PM10 from transport.
<i>Fragmentation due to transport infrastructure</i>	This indicator is calculated on basis of the mesh size of unfragmented areas, related to the construction of new or improved transport infrastructure	Indicator shows the state of fragmentation of land and ecosystems due to transport infrastructure
<i>Average CO<sub>2</sub> emissions per km from new passenger cars</i>	This indicator is defined as the average emissions of carbon dioxide per kilometre by new passenger cars sold in a given year.	This indicator measures the CO <sub>2</sub> efficiency of new fleet
<i>R&amp;D intensity in transport</i>	This indicator is defined as business expenditure in R&D in transport (manufacturing) as % of value added in the transport sector	This indicator measures R&D intensity in transport

Table 2. Policy monitoring indicators (cont'd)

<i>Monitoring the overall efficiency of EU transport system</i>		
<b><i>Modal split of passenger transport</i></b>	This indicator is defined as the percentage share of each mode of transport in total inland transport, expressed in passenger-kilometres. It is based on transport by passenger cars, buses and coaches, and trains.	This indicator monitors the achievement of a balanced shift towards environmentally friendly transport modes for passengers
<b><i>Modal split of freight transport</i></b>	This indicator is defined as the percentage share of each mode of transport in total inland transport expressed in tonne-kilometres. It includes transport by road, rail and inland waterways.	This indicator monitors the achievement of a balanced shift towards environmentally friendly transport modes for freight
<b><i>Investment in transport infrastructure to GDP</i></b>	This indicator is the ratio between total gross investment expenditure and GDP. Infrastructure expenditures cover new construction, extension, reconstruction and major repairs of selected EU-27 Member States for transport infrastructure for road, rail, air transport, sea ports and inland waterways.	Investments are one way in which the objective creating a single transport area can be realised
<b><i>Road safety</i></b>	This indicator is defined as the fatalities caused by road accidents include drivers and passengers of motorised vehicles and pedal cycles as well as pedestrians, killed within 30 days from the day of the accident	This indicator monitors the trend in road safety

[Source: SEC(2011) 358]

### 3 Policy issues

SuperGreen Deliverable D2.3 “Effects of changes in the operational and regulatory environment” identified a large number of intervention areas of EU public policies<sup>2</sup> in the transport sector, including:

- liberalisation of transport operations;
- internalisation of external costs;
- setting standards for energy intensity / emissions / noise;
- setting safety / security standards;
- standardisation of transport units and vehicles;
- harmonisation of infrastructure (interoperability);
- harmonisation of rules and their enforcement;
- standardisation of liability clauses and documentation for multi-modal transport;
- introduction of other regulatory measures;
- simplification of administration;
- ensuring satisfactory working conditions;
- enhancing education and training;
- employment of a spectrum of instruments to fund infrastructure and other actions;
- creation of freight-oriented corridors;
- development of green corridors;
- support to research and development;
- monitoring and publishing of service quality indicators;
- educating, informing and involving the greater public in transport policies (incl. labelling);
- promotion of international cooperation with EU neighbouring countries; and
- promotion of green public procurement.

An analysis of the regulatory framework of all these fields would consume far too many project resources when judged against its expected contribution to meeting the specific task objectives. Besides, some of the above fields like the standardisation of transport units and vehicles, setting standards for energy intensity / emissions / noise, harmonisation of rules and their enforcement, ensuring satisfactory working conditions, and the creation of freight-oriented corridors are mode-specific and will be covered in the relevant sections of this report. Likewise, the horizontal fields concerning infrastructural and logistical issues will be covered by separate report sections. The present section will deal with the first two fields of the above list, which are considered very important for the development of green corridors.

#### 3.1 Liberalisation of transport operations

Liberalising transport operations has always been a central EU policy objective. The first White Paper on the common transport policy, published by the Commission in 1992, was essentially dedicated to market opening, in line with the priorities of the time. Almost ten years later and following the efficiency gains achieved by the market opening in air transport, the 2001 White Paper set the liberalisation of road and rail transport operations

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<sup>2</sup> Excluding international relations with non-EU countries.



as one of its main objectives. More recently, the 2011 White Paper considers the remaining bottlenecks and other barriers in relation to the internal transport market as one of the challenges that transport faces, and renders the creation of a genuine Single European Transport Area one of the four tiers of the selected strategy for the next decade.

The most important regulations are briefly presented below for the road, rail and maritime sectors.

### **3.1.1 The issue of cabotage in road transport**

The EU policy objectives for road transport are to promote efficient road freight and passengers transport services, to create fair conditions for competition, to promote and harmonise safer and more environmentally friendly technical standards, to ensure a degree of fiscal and social harmonisation, and to guarantee that road transport rules are applied effectively and without discrimination. Cabotage, meaning the national carriage of goods for hire or reward carried out by non-resident hauliers on a temporary basis in a host Member State, is the basic regulatory failure in relation to securing an open market.

As of 14 May 2010, cabotage is governed by *Regulation (EC) No 1072/2009 of the European Parliament and of the Council of 21 October 2009 on common rules for access to the international road haulage market*. Its aim is to improve the efficiency of road freight transport by reducing empty trips after the unloading of international transport operations.

According to this regulation, every haulier is entitled to perform up to three cabotage operations within a seven day period starting the day after the unloading of the international transport. A haulier may decide to carry out one, two or all three cabotage operations in different Member States and not necessarily the Member State in which the international transport was delivered. In this case only one cabotage operation is allowed in a given Member State to be carried out within three days of entering that Member State without cargo. The haulier is obliged to keep in the vehicle documents like the consignment letters which provide proof of the incoming international carriage and of each consecutive cabotage operation undertaken.

Cabotage operations are subject to national legislation in the host EU country regarding the:

- conditions governing the transport contract;
- weights and dimensions of road vehicles;
- requirements concerning the carriage of certain categories of goods, in particular dangerous goods, perishable food items and live animals;
- driving time and rest periods;
- value added tax (VAT) on transport services.

To prevent discrimination on grounds of nationality or place of establishment, the above laws and regulations are applied equally to non-resident hauliers as they are to hauliers established in the host EU country. For some of the new Member States transitional periods still apply and hauliers from these countries are excluded from performing cabotage in certain other Member States.

Regulation (EC) No 1072/2009 attempts to strike a balance between the full opening of the market on one hand and fears on the other that such opening could result in a significant shift in jobs between countries and generate additional traffic due to existing differences across the EU, particularly on taxation and social rules. The 2011 White Paper calls for a review of the market situation of road freight transport as well as the degree of

convergence on, among others, road user charges, social and safety legislation, transposition and enforcement of legislation in the Member States, with a view to further opening road transport markets. Should the conditions permit it, the elimination of remaining restrictions on cabotage will be pursued.

### **3.1.2 Three railway packages so far**

In the last 20 years the Commission has been very active in restructuring the European rail transport market and strengthening the position of railways vis-à-vis other transport modes. Commission efforts have concentrated on three major areas which are all crucial for developing a strong and competitive rail transport industry: (1) opening of the rail transport market to competition, (2) improving the interoperability and safety of national networks and (3) developing rail transport infrastructure.

#### *The first railway package of 2001*

On 26 February 2001, the Council adopted the following three Directives known as the "first rail package":

- Directive 2001/12/EC of 26 February 2001 amending Council Directive 91/440/EEC on the development of the Community's railways
- Directive 2001/13/EC of 26 February 2001 amending Council Directive 95/18/CE on the licensing of railway undertakings
- Directive 2001/14/EC of 26 February 2001 on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification.

Its main objective was to enable rail operators to have access to the trans-European network on a non-discriminatory basis. To improve Europe's rail freight options, the Commission proposed the creation of a one-stop-shop to market freeways. It underlined the need to improve the distribution of train paths, establish a tariff structure that reflects relevant costs, reduce delays at borders and introduce quality criteria. The Commission also listed the actions to be taken with a view to setting up freeways.

#### *The second railway package of 2004*

On 23 January 2002, the European Commission proposed a new set of measures (known as the "second railway package") aimed at revitalising the railways through the rapid construction of an integrated European railway area. The actions presented aimed at improved safety, interoperability and opening up of the rail freight market. The Commission also proposed establishing a European Railway Agency responsible for providing technical support for the safety and interoperability work. The second railway package, which was adopted on 29 April 2004, consists of:

- Directive 2004/49/EC of 29 April 2004 on safety on the Community's railways and amending Council Directive 95/18/CE on the licensing of railway undertakings and Directive 2001/14/CE on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification
- Directive 2004/50/EC of 29 April 2004 amending Council Directive 96/48/EC on the interoperability of the trans-European high-speed rail system and Directive 2001/16/EC of the European Parliament and of the Council on the interoperability of the trans-European conventional rail system
- Directive 2004/51/EC of 29 April 2004 amending Council Directive 91/440/EEC on the development of the Community's railways
- Regulation (EC) No 881/2004 of the European Parliament and of the Council of 29 April 2004 establishing a European Railway Agency.

The second railway package of 2004 accelerated the liberalisation of rail freight services by fully opening the rail freight market to competition as from 1 January 2007. In addition, the package created the European Railway Agency situated in Valenciennes (France), introduced common procedures for accident investigation and established Safety Authorities in each Member State.

*The third railway package of 2007*

On 3 March 2004 the Commission proposed its "third rail package" containing measures to advance the revitalisation of the railways in Europe. It put forward new proposals to open up the international passenger transport market by 2010 and to regulate passenger rights and the certification of train crews. This third package was intended to complete the European regulatory framework for the rail sector. The third railway package, which was adopted in October 2007, consists of:

- Directive 2007/58/EC of the European Parliament and of the Council of 23 October 2007 amending Council Directive 91/440/EEC on the development of the Community's railways and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure
- Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community
- Regulation (EC) No 1370/2007 of 23 October 2007 on public passenger transport services by rail and by road and repealing Council Regulations (EEC) Nos 1191/69 and 1107/70
- Regulation (EC) No 1371/2007 of 23 October 2007 on rail passengers' rights and obligations
- Regulation (EC) No 1372/2007 of 23 October 2007 amending Council Regulation (EC) No 577/98 on the organisation of a labour force sample survey in the Community.

The third railway package introduced open access rights for international rail passenger services including cabotage by 2010. Operators may pick up and set down passengers at any station on an international route, including at stations located in the same Member State. Furthermore, the third railway package introduced a European driver licence allowing train drivers to circulate on the entire European network (the certification of cross-border drivers is foreseen as from 2009 and of all other drivers as from 2011). The drivers will have to meet basic requirements concerning their educational level, age, physical and mental health, specific knowledge and practical training of driving skills. Last but not least, the third railway package strengthened the rail passengers' rights. While long-distance travellers will enjoy a wider range of rights, minimum quality standards (non-discrimination of handicapped travellers or persons with reduced mobility, liability in case of accidents, and availability of train tickets and personal security of passengers in stations) will have to be guaranteed to all passengers on all lines.

*Are we done?*

The assessment of these interventions shows that although the practical implementation of the provisions is still ongoing, there are already visible effects. The relative position of railways towards other transport modes has stabilized, the high level of rail transport safety has been safeguarded and often improved, and losses in employment have been partially offset by the creation of jobs in newly established railway undertakings. However, this success has not been evenly spread. Between 2000 and 2008, rail freight transport activity rose by 54% in the Netherlands, by 40% in Germany and by 37% in the United Kingdom while it shrank by 30% in France. There is a positive correlation between market opening



and increasing volumes. Rail has gained market share mostly in those countries which liberalised their rail market early on. Some countries which delayed market opening struggled to keep the market share of their rail sector at the level at which it was at the start of the century.

Furthermore, the assessment accompanying the recent White Paper identified a number of remaining regulatory and market failures, which hamper the competitiveness of rail transport, where a complete and correct implementation and enforcement of EU legislation by Member States is still missing. The principal problematic issues stem from the relations between infrastructure managers and operators, which in many cases are still not fully independent, and the effectiveness of the regulatory oversight of market functioning. For instance, new rail freight operators often face discrimination in access to infrastructure or rail related services, due to the historic integration of the providers of such services and infrastructure managers with incumbent operators.

Market functioning is also hampered by a number of regulatory barriers, which have a protectionist effect. For example, relevant national rail authorities are reported to be reluctant to accept rolling stock certificates issued by other Member States, with the effect of hindering the free flow of trains across Europe and increasing red tape linked to the certification process.

In view of these problems, the 2011 White Paper intends to create “a true internal market for rail services”, which includes the following activities:

- Open the domestic rail passengers market to competition, including mandatory award of public service contracts under competitive tendering.
- Achieve a single vehicle type authorisation and a single railway undertaking safety certification by reinforcing the role of the European Railway Agency (ERA).
- Develop an integrated approach to freight corridor management, including track access charges.
- Ensure effective and non-discriminatory access to rail infrastructure, including rail related services, in particular through structural separation between infrastructure management and service provision.

### **3.1.3 Market access to ports**

Unlike developments in the road and rail sectors, the initiative to open up market access to port services has failed. Following fierce demonstrations by dockers, the European Parliament rejected the relevant Commission proposal in early 2006 and called instead for a directive on transparency and fair conditions of competition between ports. The Commission issued a Communication on a European Ports Policy in 2007 which contains an Action Plan that addresses a number of issues relevant to ports. The proposed actions are meant to support an improvement in port performance, a potential increase in port capacity, the modernisation of port activity, the improvement of the environmental credentials of ports and the attractiveness of ports both for workers and for the surrounding cities. Refer to Section 8.2 for more details.

Reviewing existing restrictions on provision of port services comprises an action of the 2011 White Paper.

## **3.2 Internalisation of external costs**

Transport activities give rise to environmental impacts, accidents and congestion. In contrast to the benefits, the costs of these effects of transport are generally not borne by the

transport users. The internalisation of external costs means making such effects part of the decision-making process of transport users.

The issue was raised in the 1990s (1995 Green Book on fair and efficient pricing) and appears in all basic European transport strategy documents since then. In 2006, the European Parliament asked the Commission to present "a generally applicable, transparent and comprehensible model for the assessment of all external costs to serve as the basis for future calculations of infrastructure charges". Furthermore, "this model shall be accompanied by an impact analysis of the internalisation of external costs for all modes of transport and a strategy for a stepwise implementation of the model for all modes of transport".

In response to this request and among other activities, the Commission services prepared the so-called 'Greening transport package', which was adopted in July 2008. The package seeks to steer the European transport sector towards enhanced sustainability and has five parts:

- Greening Transport Communication: summarises the whole package and sets out what new initiatives the Commission will take in this field.
- Greening Transport Inventory: describes the large amount of EU action already taken to green transport and on which this package builds.
- Strategy to Internalise the External Costs of Transport: focuses on making transport prices better reflect their real cost to society so that environmental damage and congestion can be reduced while boosting the efficiency of transport and ultimately the economy as a whole.
- Proposal for a Directive on road tolls for lorries: would enable Member States to reduce environmental damage and congestion through more efficient and greener road tolls for lorries. Revenue from the tolls would be used to reduce environmental impacts and cut congestion.
- Rail Transport and Interoperability communication: sets out how to reduce the perceived noise from existing rail freight trains by 50% and the measures the Commission and other stakeholders will need to take in the future to achieve this.

The Greening Transport Communication provides no new insights and doesn't need to be further discussed. The same applies to the Greening Transport Inventory, which has been discussed in Section 1. The remaining of this section is devoted to presenting the last three documents of the Greening transport package.

Before doing so, it is worth mentioning that with the recent release of the new White Paper, the European Commission sets year 2020 as the deadline for the full and mandatory internalisation of external costs for all modes with emphasis on road and rail transport.

### **3.2.1 The strategy to internalise the external costs of transport**

The aim of this document is to propose a common methodology for the internalisation of transport related external costs. The methodology is based on common principles that prevent any discrimination and ensure market transparency. In order to avoid hampering freedom of movement, the methodology ensures that charges are not disproportionate to the existing external costs. It also proposes setting up a monitoring system that will make the process clear and effective for all concerned.

The intention behind internalising external costs generated by transport activities is to give the right price signal; so that users will bear the costs they create and will thus have an incentive to change their behaviour in order to reduce those costs. According to economics literature, "social marginal cost charging" is the appropriate price setting mechanism that

does not lead to overexploitation of resources, and at the same time does not damage the transport sector, or ultimately the economy. According to this approach, transport prices should correspond to the additional short-term cost created by one extra person using the infrastructure.

Nevertheless, marginal costs vary according to time and place and, in practice, it is difficult to judge their exact level. A certain degree of simplification is therefore inevitable. In some cases, the marginal cost approach may have certain limitations. It does not necessarily make it possible to include infrastructure costs, as is the case where fixed costs are high or traffic density is low. In such cases, it may be combined with other market-based measures ensuring that infrastructure is funded according to the ‘user pays’ principle and external costs are internalised according to the ‘polluter pays’ principle. Furthermore, for some costs, such as those relating to noise, the method for estimating the marginal costs is very complex, and a pragmatic approach based on the average cost may be more feasible.

After setting the principles, the document proposes a methodology adapting the overall strategy of external cost internalisation to the characteristics of each mode of transport.

For the road sector, Directive 1999/62/EC on the charging of heavy goods vehicles precludes incorporating any of the external costs when calculating tolls. It was amended in 2006 to allow different tariffs to be applied depending on vehicles’ environmental characteristics. However, with the exception of mountainous regions, and then only in certain circumstances, toll revenues may not exceed infrastructure costs. This is the case even in more congested regions or regions with higher levels of pollution. The Commission therefore proposes to revise Directive 1999/62/EC in order to allow charges to include external costs (refer to Section 3.2.2). The same charging principles could also be extended to private cars. For reasons of subsidiarity, Member States retain the freedom to choose whether to do so or not.

For the rail sector, Directive 2001/14/EC allows internalisation of external costs. However, in order to avoid the measure leading to a mere increase in the revenue accruing to the infrastructure manager, the Directive allows internalisation only if there is an equivalent increase for competing modes of transport, which would be made possible after revising Directive 2001/14/EC for the road sector as mentioned above. In addition, the Commission intends to tackle noise pollution, which remains a major challenge for rail transport (refer to Section 3.2.3).

As for the maritime transport, the Commission wishes to include it in the post-2012 agreement on preventing climate change. If IMO does not make sufficient progress, the Commission will suggest taking action at European level; with one of the possible options being to include the maritime sector in the EU Emissions Trading System (refer to Sections 8.7 and 8.8).

The revenue generated by internalisation should also be earmarked for the transport sector and the reduction of external costs, always on the basis of cost-benefit studies or similar analyses which guarantee that the chosen uses maximise the net benefits to society.

However, for internalisation to be effective, the transport user must be price sensitive. Sometimes this is not possible for specific reasons, such as the lack of credible alternatives, insufficient competition with regard to a particular mode of transport, insufficient incentive to innovate and switch to clean vehicles, etc. Internalisation is a necessary step in itself, but it must be accompanied by other measures intended to create greater elasticity of demand, i.e. greater sensitivity to price variations, to make the supply of certain services more attractive or to speed up technological innovation. In order to reduce the external costs, we

therefore need a strategy that includes various other elements in addition to internalisation, elements such as providing infrastructure, encouraging technological innovation, competition policy, legislation and setting standards.

### **3.2.2 Proposal for a Directive on road tolls for lorries**

The objective of this document is to amend Directive 1999/62/EC in order to establish a framework which enables Member States to calculate and vary tolls on the basis of the costs of traffic based pollution and of congestion in a way compatible with the internal market.

Currently the external costs of road freight transport related to air and noise pollution, congestion, climate change and accidents are borne by the society either through general taxation or through the impact on people's health and quality of life. In most cases, current levies by Member States, in the form of fuel and vehicle taxes, time-based user charges (Eurovignette) or distance-based charges (tolls), fail to send the right price signals.

With the exception of climate change, most of the external costs are borne by the population and the local or national governments of the territory where transport takes place and not where the vehicle is registered, nor where the vehicle is refuelled. The best pricing instrument for assigning air pollution, noise and congestion costs to users in a fair and efficient way is tolls. Unlike fuel taxes, they can vary according to the emission standards of vehicles; contrary to vehicle taxes or time-based user charges (vignettes), they can vary according to the intensity, location and time of use.

As to climate change, the impact of motor vehicles is global. Hence, fuel taxes are usually considered a simple and efficient way of internalising this cost. On this issue, the Commission has already proposed improving coordination of taxes on motor fuels, partly by raising the minimum Community rate for commercial diesel fuel [COM(2007) 52]. A further revision of the general energy taxation Directive is due by the end of 2013.

The most effective instrument to internalise road accident costs is through insurance rates, as these risks are related more to complex behavioural factors (such as speeding, driving under the influence of alcohol or failure to use seat belts) than to the distance travelled. As such, these costs are not covered by the document under examination.

The Directive in force (Directive 1999/62/EC) limits revenues from tolls to what is strictly necessary to recover infrastructure costs, even in areas exposed to traffic-based pollution and congestion costs above the recoverable construction costs. The Directive provides an option for toll rates varying according to vehicle emission standards or congestion levels, but under a condition of revenue neutrality on a biennial basis which, due to high administrative burdens, has limited the exercise of this option only to Germany and the Czech Republic. In 2006, the Directive was amended by Directive 2006/38/EC to allow tolls in mountainous areas to be marked-up by up to 25% to co-finance alternative infrastructure labelled as TEN-T priority projects (this mark-up is currently applied on the Brenner motorway in Austria to co-finance the Brenner rail base tunnel). But in general, it fails to provide effective incentives to differentiate charges according to time periods, the place and the types of vehicles. Moreover, it covers only the use of the TEN-T network, which may lead to inconsistent pricing structures between the main corridors and other inter-urban roads used by international transport.

The proposed Directive enables Member States to integrate in tolls levied on heavy goods vehicles an amount which reflects the cost of air pollution and noise pollution caused by traffic. During peak periods, it also allows tolls to be calculated on the basis of the cost of congestion imposed upon other vehicles. The amounts will vary with the travelled distance,

location and time of use of roads to better reflect these external costs. The proceeds will have to be used by Member States for making transport more sustainable through projects such as research and development on cleaner and more energy efficient vehicles, mitigating the effect of road transport pollution or providing alternative infrastructure capacity for users.

Member States which opt for it must respect common charging principles together with mechanisms for notifying and reporting tolling schemes to the Commission. Member States must designate independent authorities to set the chargeable costs by using a common method which can be easily monitored and adapted to scientific progress. This will ensure that charging schemes are transparent, proportional to the objective pursued and do not discriminate against the nationality of hauliers.

The charge must be collected through electronic systems which does not create hindrance to the free flow of traffic and local nuisance at tollbooths, and which can be extended to other part of the network at a later stage without significant additional investments. A transition period for the current systems with barriers is planned. To avoid undue charging of users, other conditions must be met when a charge based on the costs of congestion and pollution is combined with a charge to recover the cost of infrastructure.

The proposal extends the scope of the current Directive beyond the TEN-T network to avoid inconsistent pricing schemes between major corridors and other interurban roads. It makes more practicable the provisions in the current Directive on the mark-up levied in mountainous areas to co-finance EU labelled priority projects.

It does not prevent Member States from applying on urban roads regulatory charges specifically designed to reduce traffic congestion or combat environmental impacts in built up areas.

### **3.2.3 Rail transport and interoperability communication**

The aim of this document is to suggest Community action reducing the exposure of citizens to rail noise by promoting the establishment of rail noise abatement programmes curbing noise emissions of freight trains without jeopardizing the competitiveness of rail freight mainly by retrofitting freight wagons with low-noise brakes as the most cost-effective type of measure.

Rolling noise of freight wagons has been identified as the biggest source of rail noise. The braking technology currently used (cast-iron brake blocks braking on the wheels' surface) produces rough wheel surfaces and subsequently leads to a high level of vibration of rails and wheels. As freight trains often operate at night, their noise emission is even more critical.

Measures at source (vehicles and tracks) have been recommended as more cost-effective than other noise abatement programmes like noise barriers. If barriers are coupled with measures at source, the length and/or height of barriers can be reduced, leading to significant cost savings. In December 2005 the Commission adopted technical specifications for interoperability relating to rail noise (Noise TSI) introducing limits for rolling stock used in the European Union. These limits apply to new and renewed rolling stock including freight wagons, which have to be equipped with low-noise brake blocks reducing the noise emission by about 50%.

However, given the long lifetime of rolling stock, it will take several years before overall noise emissions from freight trains can be reduced significantly under existing legislation and if no additional measures addressing the existing fleet are introduced.

In the past 10 years, several types of composite brake blocks have been developed by the industry in order to replace the conventional cast-iron blocks as the main source of rail and wheel roughness. The so-called K-blocks are a proven technology used for new wagons but entail high costs for retrofitting. Other types, so-called LL-blocks, are thus being developed explicitly for retrofitting. In early 2008 one type of K-blocks received definitive UIC homologation, while three types of LL-blocks have provisional homologation.

Retrofitting should in principle include all European freight wagons with an annual mileage of more than 10,000 km and a remaining life expectancy of at least five years. Cost-benefit analysis has shown considerable net benefits of retrofitting in the range of 3 to 10 as compared to costs. The main obstacle to retrofitting freight wagons on a large scale is financial, as stakeholders do not have sufficient resources or incentives to do it.

To overcome the obstacles to retrofitting, the Commission analysed different measures and concluded that a combination of noise-differentiated track access charges, noise emission ceilings and voluntary commitments is the most appropriate solution.

#### *Introduction of differentiated track access charges*

At European level, Directive 2001/14/EC<sup>12</sup> harmonises charging principles. One of these principles is that infrastructure charges may take account of the cost of the environmental impact of train operations, including noise. Any charge differentiation should in principle reflect the magnitude of the impact on the environment. Three basic models of differentiated track access charges could be used as an incentive:

- a cost-neutral bonus-malus system with reduced charges for silent wagons and higher charges for noisy ones;
- a bonus system consisting of charges which are reduced to enable the retrofitting of existing wagons with high degree of noise emissions; the infrastructure manager receives financial compensation from the Member State;
- a malus system consisting of increased charges for noisy wagons.

In the course of the recast of Directive 2001/14/EC, the Commission will propose legal requirements for the implementation of noise-differentiated track access charges. Infrastructure managers will be in charge of the installation of identification systems and necessary ICT tools. The completion of the retrofitting programmes is expected by the end of 2015 considering a timeframe of three years for the replacement of brake blocks.

#### *Introduction of noise emission ceilings*

The noise emission ceiling limits the average emissions within a determined period at a certain location along the line. Such schemes leave it to the rail sector to find optimal solutions: the railway undertaking may use vehicles with lower emissions to increase the number and/or speed of trains without exceeding the noise limits. The noise emission ceiling therefore gives an incentive to use low-noise vehicles.

In order to maintain the noise reduction achieved by retrofitting, the European Commission recommends Member States to introduce noise emission ceilings for major rail freight lines as a second step after the initial retrofitting programmes have been completed.

#### *Voluntary commitments by the rail sector*

Accompanying voluntary commitments can guarantee the effectiveness of differentiated track access charges and help to speed up their implementation even before legal requirements enter into force.

Voluntary commitments by railway undertakings on passing the noise bonuses received from infrastructure managers to the wagon owners (where they do not use own wagons)

will support market mechanisms to ensure that the noise bonus can be used to finance the costs of retrofitting.

Furthermore, voluntary commitments by the sector to set up and implement individual retrofitting programmes as soon as possible would lead to better coordination of individual activities and would increase the visibility of the action. The European Commission urges the rail sector to conclude such voluntary commitments without delay.

*Reducing costs of retrofitting*

Clearly, the technology available today cannot be regarded as sufficient for retrofitting on a European scale. The Commission therefore urges industry to further develop composite brake blocks in close cooperation with railway undertakings and wagon owners in order to reduce costs significantly. The Commission will continue to support appropriate research and demonstration projects within existing programmes such as FP7 and LIFE+.

## 4 Infrastructure

Establishing an efficient trans-European transport network (TEN-T) has constituted a key element in the European transport policy since its early stages. More recently, its importance has been reaffirmed in the re-launched Lisbon Strategy for competitiveness and employment in Europe, while it is also expected to play a central role in the attainment of the objectives of the Europe 2020 Strategy. The latest transport policy documents include statements on the line that “if Europe is to fulfill its economic and social potential, it is essential to build the missing links and remove the bottlenecks in its transport infrastructure, as well as to ensure the future sustainability of its transport networks by taking into account the energy efficiency needs and the climate change challenges.”

The European Union is supporting the TEN-T implementation by several financial instruments - the TEN-T programme, the Cohesion Fund, the European Regional Development Fund and European Investment Bank's loans and credit guarantees.

Nevertheless, the assessment of the 2001-2010 EU transport policy has identified weaknesses in transport planning with respect to the European network. TEN-T planning and implementation has so far not been driven sufficiently by a coherent European design. National infrastructure planning remains to a large extent disconnected from planning at EU level, and is mainly done at a modal level rather than in an integrated way across countries and modes of transport. Infrastructure projects have largely focused on developing individual priority projects rather than on creating a network.

The lack of international cooperation and coordination typically produced a number of inefficiencies: lack of joint traffic forecasts leading to differing investment plans; disconnected or even contradictory timelines; lack of joint investment calculation and joint financial structures; incompatible technical characteristics; inadequate joint management of cross-border infrastructure projects. The appointment of 9 European Coordinators in charge of an equal number of specific TEN-T priority projects and the creation of the Trans-European Transport Network Executive Agency (TEN-T EA) during the last decade have proved to be useful tools for enhancing the implementation of these projects, but incapable of addressing the fragmented nature of the planning process.

It follows that a business as usual scenario is not an alternative to be considered; a step change is required to deliver a true trans-European network that will be resource efficient, sustainable, safe and secure.

In this context:

- the Green Paper "Towards a better integrated trans-European transport network at the service of the common transport policy" [COM(2009) 44], published in February 2009, opened the TEN-T policy review and proposed a dual layer planning approach with a “core network” as the top layer;
- the document "Consultation on the Future Trans-European Transport Networks" [COM(2010) 212], adopted on 4 May 2010, presented the conclusions of six expert groups that were formed to support the analysis of related specific issues and launched a public consultation aimed at refining the available policy options; and
- a separate Commission staff working document on “The new trans-European transport network policy planning and implementation issues” [SEC(2011) 101], published on 19 January 2011, presented the results of the public consultation and included a description of the methodology to elaborate the core network.



Based on these intermediate steps, a major legislative proposal for the overhaul of the existing TEN-T Guidelines was expected by mid 2011. Due to the fact that the Commission's final proposal was not available by the time these lines were drafted, the present section focuses on the basic ideas, as they appear in the above three documents.

#### **4.1 The dual layer planning approach**

The main innovation proposed by the Green Paper was the concept of a dual layer planning approach with a “core network” as the top layer. The vast majority of stakeholders, as well as the EU institutions and consultative bodies, preferred this approach over the other two planning options put forward by the Commission.

This planning approach would be characterised as follows: While maintaining the fairly dense rail, road, inland waterways, ports and airports networks, which constitute the “comprehensive network” as the basic layer of the TEN-T and are, in large part, derived from the corresponding national networks, the “core network” would overlay the “comprehensive” network and give expression to a genuine European planning perspective focused on bringing about a systemic improvement in the transport system's resource efficiency and a significant overall reduction of GHG emissions from transport.

The “core network” would include axes and nodes of vital importance for transport flows within the internal market and between the EU, its neighbours and other parts of the world. It would also support the economic, social, and territorial cohesion of the European Union. It would provide, for all transport modes and across the modes, the necessary infrastructure basis for achieving the common transport policy objectives required to match the “Europe 2020” strategy and the decarbonisation agendas.

The general principles for designing the TEN-T at all strategic levels comprise:

- multimodality, including intermodal links and facilities for co-modal and/or combined transport;
- interconnectivity and network optimisation;
- interoperability and improved efficiency of all modes of transport;
- sustainability, by reducing GHG emissions ("de-carbonisation") to minimise climate change impacts and pollution as well as by respecting relevant EU environmental legislation, including the Espoo Convention and in particular the following Directives: SEA, EIA, Habitats and Birds, Water Framework Directive, Floods Directive;
- attention to biodiversity proofing, in particular Natura 2000 network when it comes to transport infrastructure;
- a focus on quality of service for both freight users and passengers;
- safety and security of transport infrastructure;
- application of advanced technologies and ITS; and
- minimisation of investment, maintenance and operational costs, while nevertheless meeting the relevant policy objectives and the set criteria in a balanced way.

Planning a core network is not meant to initiate a new infrastructure programme of immense scope: ensuring continuity for ongoing projects, giving due attention to the removal of key bottlenecks and building largely on existing infrastructure, it aims at becoming the basis for an efficient, less carbon intensive, safe and secure transport system.

In shaping the network configuration, based on a geographical approach, a number of criteria will need to be taken into account, such as spatial integration and cohesion effects, internal market needs, external and global trade flows, passenger and freight traffic and

customers' needs, inter-connectivity and multimodality of the network, environmental and climate change issues.

Planning the core network involves four successive major steps:

- 1) Identifying the main nodes that configure the overall layout of the network.
- 2) Linking the main nodes and selecting intermediate nodes for inclusion into the network.
- 3) Determining the relevant technical parameters to be applied, according to functional and capacity needs.
- 4) Including relevant complementary or auxiliary hard or soft infrastructure, so as to meet the requirements of operators and users, in line with specific policy objectives, and to enhance efficiency and sustainability.

The main nodes determining the basic structure of the network configuration will be:

- the biggest or most important nodes, such as Member State capitals, other cities or agglomerations of supra-regional importance in administration, economy, social and cultural life and transport;
- gateway ports, intercontinental hub ports and airports, connecting the EU with the outside world, and the most important inland ports and freight terminals.

On the other hand, the future comprehensive network should ensure accessibility of and access to the core network, and contribute to the internal cohesion of the Union and the effective implementation of the internal market. It should address a series of different needs:

- a reference for land use planning;
- a geographic reference for other policies;
- a reference on the requirements of the relevant EU environmental legislation and policies, in particular on the protection of biodiversity;
- a target for technical and legal requirements on interoperability and safety;
- the accommodation of technical standards to enable effective modal integration with the aim of door to door co-modality.

The future comprehensive network, would take the current comprehensive network as a starting point and:

- update the current comprehensive network to reflect progress in its implementation and adjust it where necessary to changes in national planning;
- add selected and well-defined missing links and nodes, especially in Member States which have acceded the EU since 2004, where necessary, to ensure homogeneous network planning and the interconnection of national networks and to contribute significantly to the TEN-T objectives;
- eliminate dead ends and isolated links in the current comprehensive network if not justified with geographical particularities.

#### **4.2 Other important characteristics**

The following four points comprise important aspects of the new approach. *Firstly*, the core network should give priority to transport infrastructure related measures that stem from EU policy goals. Intelligent Transport Systems, innovation and new technologies represent an important part of the core network. ITS should enhance the efficient use of infrastructure and is the key to genuine network integration. They can also contribute to environmental performance, (energy) efficiency, safety and security as well as passenger

and freight mobility, and can help to connect TEN-T corridors and urban transport networks.

The TEN-T should, in line with the 2020 goals, address technological innovation and knowledge, so as to be able to accommodate new generations of vehicles and boost infrastructure advances, in particular with respect to energy provision for transport. The use of clean, alternative fuels should be promoted as an integral part of future TEN-T development.

*Secondly*, the assessment and prioritisation of infrastructure projects is necessary in order to ensure a greater impact and leverage effect of the TEN-T funding. In order to allow implementing the projects with the highest European added value, it is of great importance to define the way those projects are identified and to implement them in a coordinated way. Furthermore, the introduction of coordinated or joint environmental assessment procedures of plans and projects (e.g. between the EIA, water framework and habitats/birds directives) could facilitate their implementation. Such coordination and joint procedures are especially relevant in the case of trans-boundary projects where EU coordinators could have an important role.

*Thirdly*, in order to meet the funding challenge, consideration should be given to setting up an integrated European funding framework to coordinate EU instruments for transport, such as the TEN-T programme and the TEN-T related contributions of the Cohesion and Structural Funds. The funding framework should not necessarily be restricted to supporting infrastructure investments only, but could also contribute to integrating other transport policy-related components (Marco Polo, SESAR, technological deployment, green corridors, links to the neighbourhood countries, research and development in transport) to promote the emergence of integrated transport systems.

*Finally*, reference is made to the Motorways of the Sea (MoS), a concept that builds on EU's goal of transforming shipping into a genuine alternative to overcrowded land transport and aims at introducing new intermodal maritime-based logistics chains in Europe by providing a special infrastructure funding scheme. However, the success of the concept has so far been limited. The need to better integrate the hinterland connections of the ports into the concept to avoid them becoming bottlenecks has not always been understood. Some of the projects funded so far do not really contribute to a modal shift as there is no viable land alternative and/or they do not contribute to a reduction of harmful emissions. Moreover, any MoS funding is bound to raise competition issues between ports. Nevertheless, the truly multi-modal nature of MoS is acknowledged and the concept deserves increased attention in further TEN-T development, provided that a revision of the present scheme addresses the weaknesses experienced.

#### **4.3 Relevance to green corridor development**

The corridor approach is reaffirmed in the documents covered above as the basic instrument for core network implementation due to perfectly suiting the complexities of cross-border projects. Organising the coordination structures for such projects – or corridors – could help resolving various problems, ranging from getting a proper environmental impact assessment done to the arrangement of appropriate financing.

These "corridor" structures could bring together the Commission, Member States, the regions, the local authorities, neighbouring countries where appropriate, but also the infrastructure managers, transport operators, and of course the financiers. They could facilitate the creation of Special Purpose Vehicles, anchors of any financing arrangement,

which could take loans or issue project bonds to finance partly or fully the cost of construction.

Although the scheme is not finalised yet, the new TEN-T Guidelines will probably include corridors that could be determined top-down for the most important traffic flows and be placed under the aegis of a European Coordinator with a Commission services' secretariat.

Corridors could be accompanied by a multi-annual corridor development plan that should identify, within a binding timetable, the major investments needed and smaller scale short term improvements that address interoperability and operational bottlenecks. Such development plans could facilitate long term availability of public funding and would allow creating and implementing at project level the synergies and added value between EU funds, between EU and national sources of funding.

Beyond these development objectives, the corridors could also address wider transport policy objectives facilitate modal integration and co-modal operations. Shippers and transport operators should be involved and commit themselves to reducing their carbon and environmental footprint on operations using the corridor.

Furthermore, the core network concept places emphasis on the European dimension of the transport networks and their integration, in a way that combines efficiency targets with the sustainable development goals of the EU. In this respect, the core network basically extends the green corridor concept across all Europe, making SuperGreen the laboratory of the new TEN-T policy.

## 5 Logistics

In the framework of the 2006 mid-term review of the 2001 White Paper, a number of significant changes in the environment in which transport operates were identified, in relation to the conditions prevailing during the inception of the original document. The most important of them were the acceleration of the globalisation of production, the insecurity of energy supplies, the increase in global warming and the continental dimension of the EU after enlargement to Central and Eastern Europe.

In view of these changes, it was suggested broadening the focus and the instruments of transport policy to meet the new challenges. To contribute to this objective, the 2007 Freight Transport Agenda<sup>3</sup> was launched, consisting of the following set of policy initiatives:

- The *Freight Transport Logistics Action Plan* [COM(2007) 607], suggesting a series of actions to promote freight and traffic management, sustainable quality and efficiency, simplification of administrative processes, and to review loading standards, vehicle dimensions and weights.
- The *Communication on a freight-oriented rail network* [COM(2007) 608], making rail freight more competitive, in particular by ensuring lower transit times and increasing rail's reliability and responsiveness to customer requirements.
- The *Communication on a European Ports Policy* [COM(2007) 616], providing a vision and a toolbox for enhancing the performance of ports as essential hubs in Europe's transport system, helping them attracting new investment, creating a stable dialogue between all stakeholders and improving their image.
- The *Commission staff working paper "Towards a European maritime transport space without barriers"*, starting a consultation process on allowing short sea shipping to fully benefit from the internal market through facilitation and simplification of administrative and documentary procedures, and which led to the *Communication and action plan with a view to establishing a European maritime transport space without barriers* [COM(2009) 10] two years later.
- The *staff working paper on Motorways of the Sea* [SEC(2007) 1367], describing progress made in developing Motorways of the Sea and suggesting further quality elements.

These policy initiatives adopt a common approach, which is characterised by:

- a focus on corridors, also connecting the transport chains to and from the neighbouring countries and overseas,
- the promotion of innovative technologies and practices in infrastructure, means of transport (such as vehicles, wagons and vessels) and freight management,
- the simplification and facilitation of freight transport chains and related administrative procedures, and
- the reinforcement of quality.

The present section deals only with the first document of the 2007 freight logistics package, as the remaining ones are pertaining to specific modes of transport and will be covered in subsequent sections.

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<sup>3</sup> European Commission (2007). *The EU's freight transport agenda: Boosting the efficiency, integration and sustainability of freight transport in Europe*. Communication from the Commission, COM(2007) 606, Brussels, 18.10.2007.

## **5.1 The Freight Transport Logistics Action Plan (FTLAP)**

The document presents a number of short- to medium-term actions that will help Europe address its current and future challenges and ensure a competitive and sustainable freight transport system in Europe. The proposed actions are organized in the following six themes.

### **5.1.1 e-Freight and Intelligent Transport Systems (ITS)**

Integration between transport modes is still far from being achieved. Multimodal infrastructure such as multimodal transshipment platforms for freight and integrated rail-air-public transport nodes for passengers is not sufficiently developed. Exchanging data between the modes is difficult because of the co-existence of non-interoperable modal ICT systems.

The concept of e-Freight denotes the vision of a paper-free, electronic flow of information associating the physical flow of goods with a paperless trail built by ICT. This will be made more practical and affordable by emerging technologies such as radio frequency identification (RFID) and the use of the Galileo satellite positioning system. The e-Freight Integrated Project, co-funded by FP7, was launched on 1.1.2010 to address the development, validation and demonstration of innovative e-Freight capabilities.

The project's vision is to produce a zero paper document needed for planning, executing and completing any transport operation within EU, independent of:

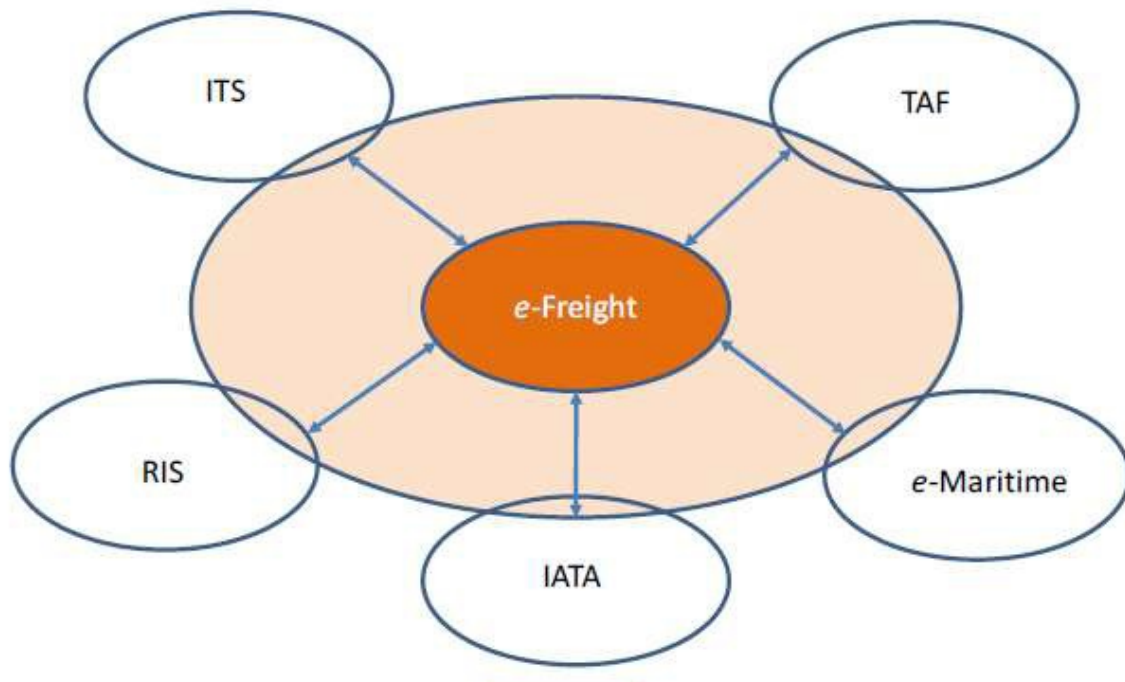
- the parties involved;
- cargo type;
- transport mode or combination of modes;
- authorities involved;
- type of service demanded; and
- transport corridor.

In addition, there shall be zero waiting time related to administrative procedures at all border crossings within EU or from countries outside EU, with which secure trade lanes have been established.

The e-Freight goals are:

- a standard freight information framework;
- a single European transport document;
- a single window and one stop shop for administrative procedures;
- simple, harmonised border crossings procedures; and
- secure and efficient transport corridors between Europe, USA, and Asia.

In line with the requirement for seamless flow of goods regardless of transport mode, e-Freight links all modes and facilitates logistics.



**Figure 1. e-Freight's role in linking all modes and facilitating logistics**

The e-Freight capabilities will support directly, from a transport perspective, the three pillars of European policy namely:

- strengthening of the internal market and competitiveness;
- improving regulation to create a more dynamic business environment; and
- promoting sustainable development.

Another dimension of e-Freight is contributing to the development of a European-wide surveillance system for cargo movements needed for the implementation of the various EU security and environmental related policies and directives, and evolving international regulations.

The deployment of Intelligent Transport Systems (ITS) in road transport is slow. A cohesive deployment strategy for ITS, incorporating the specific requirements of road haulage, such as for navigation systems, digital tachographs and tolling systems, could contribute significantly to material change in the logistics chain. Section 6.2 below provides more details on the ITS Action Plan.

### 5.1.2 Sustainable quality and efficiency

The theme contains actions concerning the identification of operational, infrastructural and administrative bottlenecks; improvements in training and supply of skilled personnel in freight transport logistics; improvements in the performance of transport chains through the establishment of a set of common generic indicators across modes; the benchmarking of intermodal terminals; the promotion of best practice in multimodal freight transport; and improvements in availability of statistical data.

### 5.1.3 Simplification of transport chains

This theme contains actions concerning the simplification of administrative procedures in all modes; the possible establishment of a single transport document for all carriage of

goods irrespective of mode; the possibility of establishing a uniform cross-modal liability regime; and improvements in security procedures with minimum effects on trade flows.

#### **5.1.4 Vehicle dimensions and loading standards**

Technological developments, changed transport requirements, and the need to increase the competitiveness of intermodal freight transport call for a review of the current standards concerning vehicle weights and dimensions, and standardisation of an optimal European Intermodal Loading Unit.

#### **5.1.5 “Green” transport corridors for freight**

The concept of green transport corridors is introduced to denote corridors of highly dense freight traffic and of relatively long transport distances. While these characteristics generate negative effects on the environment and the human habitat, the intensity of transport activity opens also possibilities for the introduction of innovative solutions. For these reasons, freight transport corridors are ideal environments for the development and introduction of solutions that help promote environmental sustainability and energy-efficiency, so that they may become showcases of “green” freight transport.

With this in mind, the FTLAP has proposed a corridor-centred approach to research and demonstration projects, as well as the networking of actors along transport corridors. This must include more than just the logistics and transport operators active along a specific corridor, since transport corridors also have an important industrial dimension.

Furthermore, the challenge is to overcome unimodal implementations of freight-related services and to ensure the physical interconnections of corridors through strategic multimodal transshipment hubs.

The SuperGreen project was launched on 15 January 2010 to assist the Commission in further defining the green corridor concept in the framework of this particular action of the plan.

#### **5.1.6 Urban freight transport logistics**

According to the Council of Logistics Management, the "last mile" in transport chains accounts for approximately 28% of total transport costs. Furthermore, it is well known that the density of population, economic activity and traffic in urban environments cause serious transport-related problems such as congestion, noise and other health threats which are particularly difficult to solve.

The role of the locally determined policies (pricing, support to public transport and non-motorised modes, land planning) in the policy mix suggested by the 2011 White Paper for meeting the specific objective of reducing transport-related CO<sub>2</sub> emissions by 60% by 2050 (compared to 1990) is indicative of the importance of urban transport (refer to Section 2.4.3).

In line with the subsidiarity principle, the relevant theme of the FTLAP introduces a holistic vision paying attention to aspects of land use planning, environmental considerations and traffic management.

### **5.2 Relevance to green corridor development**

The relevance of the document to green corridor development and the SuperGreen project is apparent. In addition to introducing the concept of green transport corridors for freight, which is the very subject of SuperGreen, all actions mentioned in the document contribute



towards developing integrated, efficient and environmentally friendly freight transport logistics chains.

Furthermore, of particular importance is the list of core indicators suggested by the Impact Assessment document accompanying the FTLAP [SEC(2007) 1320] for monitoring the evolution of the logistics industry and the impact of the policy measures suggested.

**Table 3. Indicators for monitoring the effectiveness of the FTLAP policy measures**

General objective	Indicators
Efficiency	total logistics costs to shippers
Sustainability	variation in CO <sub>2</sub> emissions, pollutants and noise attributable to freight transport
Specific objectives	Indicators
Better utilisation of transport infrastructures	variation in hours lost due to congestion capacity utilisation rates
Improved management of freight flows	adoption rate for freight-monitoring systems availability of service level guarantees
Simplified administrative reporting	variation of administrative costs
Pin-pointing of infrastructure investments	returns on transport infrastructure investments
Better loading factors	variation of vehicle load factors
Better integration of modes	variations in costs and duration of transshipments number of transshipments travel time of intermodal freight transport
More informed modal choices	number of people consulting promotion centres number of logisticians obtaining European training certificates
Reduced friction costs	variation in logistics providers' insurance and legal costs
Improve qualifications levels and mobility	number of logisticians obtaining European training certificates

## 6 Road transport

The EU legislation pertaining directly or indirectly to road transport is, at least in terms of sheer numbers of legislative documents, immense. Document COM (2008) 433 final, the Communication of the Commission to the European Parliament and Council on the “Greening of Transport” cites at least 40 related documents for the area of road transport. These are over and above legislative documents that touch upon road transport in a ‘horizontal’ sense (such as those described in previous sections of this deliverable). These documents (directives, regulations, communications, proposals, and others) cover a broad spectrum of issues, ranging from technology specifications for vehicles to economic instruments for emissions reduction, from intelligent car legislation to noise abatement measures, and from congestion reduction policies to road safety, to name just a few.

In this context, this section deals with key policy documents that specifically pertain to road transport and can be viewed as complementary to the documents reviewed in the previous sections. The discussion focuses on a few documents that are mostly relevant for the SuperGreen project. After that, an overview of the remaining documents is also made.

### 6.1 Legislation on European vehicles emission standards

It is clear that a major instrument toward decarbonising road transport is regulations on European vehicle emission standards. These define the acceptable limits for exhaust emissions of new vehicles sold in EU member states. The emission standards are defined in a series of European Union directives staging the progressive introduction of increasingly stringent standards. These can be summarized as follows:

#### *Emissions standards*

The purpose of *Directive 1999/94/EC of the European Parliament and the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO<sub>2</sub> emissions in respect of the marketing of new passenger cars* is to ensure that information relating to the fuel economy and CO<sub>2</sub> emissions of new passenger cars offered for sale or lease in the Community is made available to consumers in order to enable consumers to make an informed choice.

CO<sub>2</sub> emissions generated by vehicles are nowadays subject to a voluntary agreement between the EU and the car manufacturers. The ultimate EU target with voluntary agreements is to reach an average CO<sub>2</sub> emission of 120 g/km for all new passenger cars by 2012 (as measured according to Commission Directive 93/116/EC).

However, as it becomes increasingly clear that the agreement will probably not deliver (having achieved only 160 g/km in 2005, from 186 g/km in 1995) lawmakers have started considering regulation. To that effect, in late 2005 the European Parliament passed a resolution in support for mandatory CO<sub>2</sub> emission standards to replace current voluntary commitments by the auto manufacturers and labelling. In late 2006, in response to a new report by the European Federation for Transport and Environment documenting lack of progress on the voluntary targets, the European Commission announced that it was working on a proposal for a legally binding limit of CO<sub>2</sub> emissions from cars.

On 7 February 2007 the European Commission published its key draft proposal [COM (2007) 19] to limit average CO<sub>2</sub> emissions from the European fleet of cars to 120 g CO<sub>2</sub>/km. However, to this date, no relevant legislation has been enacted.

#### *Alternative Fuels*

In the area of fuels, the 2001 Biofuels Directive requires that 5.75% of all transport fossil fuels (petrol and diesel) should be replaced by biofuels by 31 December 2010, with an intermediate target of 2% by the end of 2005.

#### *Emission standards for Large Goods Vehicles*

Whereas for passenger cars, the standards are defined in g/km, for lorries (trucks) they are defined by engine power, g/kWh, and are therefore in no way comparable. The following table contains a summary of the emission standards and their implementation dates.

**Table 4. Euro norm emissions in g/kWh for category N2, EDC (2000 and up)**

Standard	Date	CO	NO <sub>x</sub>	HC	PM
Euro 0	1988-1992	12.3	15.8	2.6	none
Euro I	1992-1995	4.9	9.0	1.23	0.40
Euro II	1995-1999	4.0	7.0	1.1	0.15
Euro III	1999-2005	2.1	5.0	0.66	0.1
Euro IV	2005-2008	1.5	3.5	0.46	0.02
Euro V	2008-2012	1.5	2.0	0.46	0.02

In addition, “Enhanced environmentally friendly vehicle” or EEV is a term used in the European emission standards for the definition of a "clean vehicle" > 3.5 tonne in the categories M2 and M3.

#### *Relevance to green corridors*

Given the carbon reduction goals of the 2011 White Paper, it is clear that legislation on vehicle emissions standards and CO<sub>2</sub> in particular, is centrally relevant for green corridor development. This is mainly due to the dominant share that road transport enjoys in intra-European transport. Within the European Union, road transport is responsible for about 20% of all CO<sub>2</sub> emissions, with passenger cars contributing about 12%. The target fixed at Kyoto Protocol was an 8% reduction of emissions in all sectors of the economy compared to 1990 levels by 2008-2012. Relative CO<sub>2</sub> emissions from transport have risen rapidly in recent years, from 21% of the total in 1990 to 28% in 2004.

Within the SuperGreen project, the analyses relevant to the above area of legislation are mainly covered by WP3 (Green Technologies). WP3 is not limited to road transport.

## **6.2 Legislation on the deployment of Intelligent Transport Systems in Europe**

Aside from technology development in the strict sense, the main policy objectives arising from the challenges of mobility needs of the European economy and society are for transport and travel to become cleaner, more efficient (including energy efficient), safer and more secure. Innovative solutions are clearly needed if we are to achieve the rapid progress demanded by the urgency of the problems at hand. “Intelligent Transport Systems” (ITS) are expected to play their due role in enabling tangible results to emerge. These include, but are not limited to, greener transport.

The term “Intelligent Transport Systems” means applying Information and Communication Technologies (ICT) to transport. These applications are being developed for different transport modes and for interaction between them (including interchange hubs). Examples of ITS applications in road transport include urban and motorway traffic management and

control systems, electronic toll collection and route navigation. But until now there has been no similar coherent European framework for interconnection between road and the other transport modes.

The potential of ITS can only be realised if its deployment in Europe is transformed from the limited and fragmented implementation that is observed today into an EU-wide one. The EU can make use of several instruments: financial support, standardisation initiatives, legislative and non-legislative measures.

On 16 December 2008, the Commission's *Action plan for the deployment of Intelligent Transport Systems in Europe* was adopted to create the momentum necessary to speed up market penetration of rather mature ITS applications and services in Europe. This Action Plan was prepared on the basis of input provided by wide consultation of stakeholders. Traffic management, congestion relief on freight corridors and in cities, promotion of co-modality, in-vehicle safety systems, real time traffic and travel information and an open in-vehicle platform to integrate applications were among the priority issues identified.

The Action Plan outlines six priority areas for action. For each area a set of specific actions and a clear timetable are identified. The following is a summary of the 6 action areas.

*Action Area 1: Optimal use of road, traffic and travel data*

This action aims at fostering the development of Europe-wide services providing real-time traffic and travel information: travel time, alternative roads, navigation advices, congestions and accidents, weather forecasts. The equality of access by private service operators of data measured on the networks are addressed for the first time. Traffic regulations and recommended routes for heavy goods vehicles are also relevant objectives. The improvement and regular updates of digital maps through cooperation between Member States, road concessionaires and digital maps providers will also be addressed. Another initiative focuses on the promotion of multi-modal door-to-door journey planners.

*Action Area 2: Continuity of traffic and freight management ITS services on European transport corridors and in conurbations*

Good traffic management, e.g. dynamic speed limits or route diversions, can reduce the congestion on the roads. To ensure a seamless service for the user, traffic management has to work across borders, which is of particular importance to long-distance freight traffic. Traffic centres need to be better connected. This action aims at developing cooperation between regional authorities to improve the quality of traffic management. For instance, this cooperation between regions of different countries under the umbrella of EC projects, has already allowed to limit the consequences of bad weather conditions on traffic: road operators of one country were able within 30 minutes to start stopping vehicles before they could be stuck on snowy motorways abroad, offering them parking areas during several days, and advising departing vehicles to stay home. Also there is often a lack of coordination of urban with interurban traffic management. Common procedures and specifications are needed. In support of freight transport, the concept of e-Freight will be further strengthened by ITS (refer to Section 5.1.1). Further actions will create a specific ITS architecture for urban transport and finalise the interoperability of the European electronic road toll systems.

*Action Area 3: Road safety and security*

The Commission will address the further development of safety and security-related systems in road transport. The most promising systems in terms of saving lives are collision warning and avoidance, electronic stability control (ESC), lane keeping support and speed alert. All of these are already available or soon will. The Action Plan will promote their installation in new vehicles and will consider the "retrofitting" aspect. The

introduction of an electronic system automatically calling emergency services in case of an accident (e-Call) and a regulatory framework to ensure safe on-board human-machine interface, including the mobile devices taken into the vehicle, are other important points. Best practice guidelines are foreseen on applications for vulnerable road users (pedestrians, cyclists etc.) and for secure truck parking on highways.

*Action Area 4: Integration of the vehicle into the transport infrastructure*

Electronic communication and navigation systems are becoming standard equipment in our cars. It is very likely that even more electronic devices will be added in the future, e.g. for electronic toll collection and the emergency call functionality e-Call. With these many different equipment we are not only facing a growing diversion of the driver's attention but also the problem of missing common standards for the interoperability/interconnection of the car with existing and upcoming infrastructure systems and the services which supply traffic and traveller information. The Commission proposes a streamlining and integration of these applications into a standardised open in-vehicle platform, aiming to increase the safety and functionality of the car equipment, reduce costs and enable an easy “plug and play” usability of the personal electronic equipment in the car. In parallel, the functional specifications for the infrastructure-to-infrastructure, vehicle-to-infrastructure and vehicle-to-vehicle communication will be defined. The relevant standardisation issues will also be addressed.

*Action Area 5: Data security and protection, and liability issues*

The Commission will work with stakeholders to address the importance of security of ITS related data and the protection of personal data, based on the relevant directives. Also liability issues pertaining to the road information and traffic data will be addressed.

*Action Area 6: European ITS cooperation and coordination*

The Commission proposes a legal framework for the Europe-wide deployment of ITS. A European ITS Committee will be set up, composed of Member States' representatives, as well as a European ITS Advisory Group, formed by representatives of user associations, transport operators, industry, social partners, professional organisations, local authorities and existing fora. Both will advise the Commission on technical and user aspects. Specific rules will be worked upon for an ITS infrastructure assessment as a precondition for EU or national funding for building or operating infrastructure. The deployment and use of ITS in the urban context will be discussed with Member States and regional and local governments.

As a result of this Action Plan, Directive 2010/40/EU<sup>4</sup> was adopted on 7 July 2010 to accelerate the deployment of these innovative transport technologies across Europe. It is an important instrument for the coordinated implementation of ITS in Europe. It aims to establish interoperable and seamless ITS services while leaving Member States the freedom to decide which systems to invest in.

Under this Directive the European Commission has to adopt within the next seven years specifications (i.e. functional, technical, organisational or services provisions) to address the compatibility, interoperability and continuity of ITS solutions across the EU. The first priorities will be traffic and travel information, the e-Call emergency system and intelligent truck parking.

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<sup>4</sup> Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

### *Relevance to green corridors*

Reliance on advanced ITS technology has an essential role to play in the greening of transport:

- ITS tools constitute a core enabler for the management of logistic chains, notably in maintaining a paperless information trail in the management of the physical flow of goods (e-Freight).
- Real-time Traffic and Travel Information (RTTI) services, more and more combined with satellite navigation, are now being offered from both public and private sources to facilitate mobility.
- Navigation and tracking and tracing systems can help in providing remote in-route monitoring of vehicles and cargo.

Within SuperGreen, the relevant Work Package that deals with ICT is WP4, which, as WP3, is not limited to road transport.

## **6.3 ERTRAC Strategic Research Agenda 2010**

The European Road Transport Research Advisory Council (ERTRAC) was established to mobilise all stakeholders, develop a shared vision, and ensure timely, co-ordinated and efficient application of research resources to meet the continuing challenges of road transport and European competitiveness.

In 2010, ERTRAC published its Strategic Research Agenda 2010<sup>5</sup> (SRA 2010), which aims to provide private and public decision makers with a set of up-to-date recommendations for strategic research and innovation priorities in line with those of Europe for sustainable transport and environmental protection.

The guiding objective of the SRA is to deliver, by 2030, a road transport system that is 50% more efficient than today. This objective addresses the societal demand for decarbonisation, reliability and safety of the road transport system, as well as the growth, employment, skills and resource issues that are of critical importance for a globally competitive European road transport industry. Indeed, meeting the evolving demand for new sustainable and affordable mobility solutions will require a major transition towards a wide range of complementary, energy-efficient vehicle designs and power-trains. These new technologies will enable the introduction of a variety of (renewable) energy sources to the transport system and, through the use of information and communication technology (ICT), will become highly integrated with the next generation of road infrastructure and services.

In addition to the end-user's need for a more efficient road transport system, the SRA 2010 also recognizes the urgent need to ensure global competitiveness of the road transport-related industry in general and the automotive industry in particular. Aside from its domestic importance to the European economy and society, the European automotive industry is one of the most 'globalized' production sectors, and faces significant competition on the global market.

Efforts to address the urgent need for global competitiveness of the automotive industry aim at producing vehicles that are affordable and which meet (domestic and global) consumer's demands, as well as producing them in a sustainable way.

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<sup>5</sup> *ERTRAC Strategic Research Agenda 2010: Towards a 50% more efficient road transport system by 2030. Executive Summary.* October 2010.

ERTRAC's vision identifies four research and innovation domains: vehicles, infrastructure, logistical and mobility services, and energy and resources.

#### *Vehicles*

In the decades ahead, the challenge will be the need for a wide range of complementary propulsion systems and fuel/energy types to be developed simultaneously. Although the electrification of road transport will be a strong and inevitable trend, the fact is that, by 2030, the internal combustion engine (ICE) will remain the dominant propulsion technology.

Advances in vehicle technology will see a leap in intelligence through the progressive introduction of ICT. This will not only bring advances in vehicle performance and driver support systems, but will also enable the exchange of information with intelligent infrastructure and a variety of system services.

The cost-effective development of such a wide array of energy sources and associated propulsion technologies and vehicle concepts will depend on economies of scale. In this respect, the forthcoming decades will see a strong trend towards extended standardisation in terms of weight, dimensions and modularisation.

#### *Infrastructure*

The rate of expansion of the road transport infrastructure will not keep pace with the increase in demand for road transport services. The critical challenge will therefore be to make the best possible use of the available infrastructure in order to accommodate the growing transport demand (an estimated 50% increase over the coming two decades) through measures that increase its intrinsic capacity (e.g. the number of vehicles and travellers per area, and infrastructure uptime) as well as through advanced demand management measures.

As in-vehicle ICT systems are introduced, together with ICT-based logistics and mobility services, ICT-driven intelligence will also be progressively introduced into the road infrastructure.

The use of 'multi-modal hubs' (i.e. transport interfaces) and dedicated road capacity will enable the optimal integration of transport modes and services to relieve bottlenecks in specific areas of high congestion.

#### *Logistics and mobility services*

Increasing levels of congestion will place mounting pressure on the mobility services, particularly in the larger urban areas. This will give rise to comprehensive, integrated service concepts and business models that complement existing modes, and for which the dominant factor will be extensive cooperation between the various actors in the chain. In turn, this will serve to optimize the movement of goods and people to better reflect the actual demand for mobility services (including public transport). Models and service solutions will be introduced to support innovative business practices, route planning regimes and efficient transshipment of goods (in particular, over the 'last mile') and people, between modes and networks. Again, ICT and a better knowledge of transport demand will play a major role in these developments, as will the trend towards extended standardisation for freight carriers in terms of dimensions and modularisation.

#### *Energy and resources*

Although the energy basis for road transport will diversify considerably over the coming decades, the expectation is that fossil-based fuels will still dominate the energy pool for road transport in 2030. However, the supply of crudes and distillates will not be able to keep pace with the increase in global demand, and hence, the future energy market will

become volatile and competitive. Efforts will therefore aim at taking a ‘greening’ approach to diversifying the fuel pool through the development of new combustion-based propulsion technologies in order to achieve optimal performance on a well-to-wheels basis.

Additional decarbonisation will occur through the increased uptake of electrically-powered drive-trains, for which the electricity supplied by the power sector would need to be generated from renewable energy sources. Although some countries like Sweden claim that this additional electric power can be generated with zero emissions, this is not the case elsewhere. Another challenge will be how to store the electricity onboard the vehicle in such way that it can compete with hydrocarbon fuels in terms of the required energy density. In addition, the minerals used in the production of electric vehicles (e.g. neodymium, dysprosium and copper) are scarce and unevenly distributed throughout the world. Hence, to rely on such minerals would limit the security of supply and lead to fluctuations in pricing. There is, therefore, a strong drive towards minimizing the use of, and recycling, such precious materials and, potentially, replacing them with more abundant alternatives in order to achieve optimal performance in a life cycle analysis.

#### *Achieving global competitiveness*

During the next decades, the global market balance for the automotive industry will shift significantly in favour of the currently emerging markets in the BRIC nations (Brazil, Russia, India, China), as the rate of motorization in these countries begins to outpace that in Europe. The capacity for innovation in these countries will also grow as they benefit from their increasing share of the global mass markets, and this will place Europe in a critical position as it struggles to maintain its competitiveness.

#### *Relevance to green corridors*

The research and innovation proposed will enable improvements by addressing the broad range of challenges related to the road transport system, including: the supply of energy and resources; global climate change and the environment; health and safety; and increased global competitiveness of the road transport industry leading to economic growth and high quality employment in Europe. All KPI areas of green corridors will be positively affected by developments based on the research actions proposed by ERTRAC.

Within SuperGreen, the relevant Work Package is WP5 (Recommendations for Future R&D calls), which is not limited to road transport.

## **6.4 Miscellaneous other regulation**

Below we comment on miscellaneous other regulation on road transport.

### **6.4.1 Economic instruments**

Economic instruments such as fuel taxes, congestion charges, infrastructure charges and other market based measures can be critical in shaping user behaviour, investor response, and ultimately, sector efficiency and emissions produced. The Eurovignette directive<sup>6</sup> sets requirements for toll and user charge systems, where Member States choose to implement these on the trans-European road network. From 10 June 2008, with certain limited exceptions, these requirements apply to lorries weighing 12 tonnes or more.

Directive 2006/38/EC of 17 May 2006 amends the Directive with a view to establishing a new Community framework for charging for the use of road infrastructure. This makes it

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<sup>6</sup> Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures



possible to improve the efficiency of the road transport system and ensure the proper functioning of the internal market. The Directive lays down rules for the application by Member States of tolls or user charges on roads, including roads on the trans-European road network and roads in mountainous regions. From 2012 onwards Directive 2006/38/EC will apply to vehicles weighing between 3.5 and 12 tonnes.

Furthermore, in 2008 the Commission proposed the amendment of the Eurovignette Directive allowing Member States to internalise the costs related to pollution and congestion caused by heavy goods vehicles (external costs). Refer to Section 3.2.2 for more details on the proposed amendment.

At a more general level, economic instruments could be used to fully internalise the external cost of road transport. However, such full internalisation is, at this moment at least, still elusive. Circles associated with the European automotive and road transport industries are not in favour of such full internalisation, as they are concerned that the competitiveness of their industries would suffer as a result.

Given the decarbonisation goals set out in the 2011 White Paper, it is expected that the importance of economic instruments in EU road transport will increase in the future. However, coordination with similar measures in other modes is of paramount importance, so as to avoid distortions. Also, and given the push for increased use of electric vehicles, proper harmonisation with economic instruments used in the electricity sector (such as ETS) should be pursued.

#### **6.4.2 Noise Abatement**

EU rules set the maximum permissible noise emission levels for all new motor vehicles except tractors. In 2004 the Commission concluded that these standards are not a strong technical driver towards quieter vehicles and stated that efforts should be pursued to assess the possibility of introducing tighter limits. For 2 and 3 wheeled vehicles the Commission is currently examining the possibilities of setting new noise limits and test cycles based on results from UNECE work. EU rules require the Commission to propose a subsequent stage during which measures will be adopted to further reduce the sound level of these vehicles.

The Commission is committed to ways of removing noisier vehicles from existing fleets.

#### **6.4.3 Safety**

In 2003 the Commission proposed the European Road Safety Action Programme with the aim of halving the number of road accident victims in the EU by 2010. This programme was reviewed in 2006. The Intelligent Car Initiative (see section 6.2) will also contribute to achieving the Action Programme's objective, including through driver assistance systems.

Measures to improve road safety include speed limits, maximum vehicle dimensions, maximum vehicle weight, specifications on various technological aspects of vehicles, such as lights, tyres, brakes, etc, and standards for drivers training and certification, among others.

#### **6.4.4 Relevance for green corridors**

All of the legislation outlined above is highly relevant for green corridor development and the SuperGreen project. Noise and safety have been explicitly included in the set of KPIs, even though they did not make it into the 1st tier group of indicators.

Economic instruments are not explicitly foreseen to be evaluated in the SuperGreen project (in the sense of assessing their potential impact on KPIs). However in WP4 one of the ICT clusters to be examined is ‘expert charging systems’.

## 7 Rail transport

As in road transport, the EU legislation pertaining directly or indirectly to rail transport is vast. In this context, this section deals with key policy documents that specifically pertain to rail transport and can be viewed as complementary to ‘horizontal’ documents reviewed in the previous sections. The discussion focuses on a few documents that are mostly relevant for the SuperGreen project. After that, an overview of some of the remaining documents is also made.

Key player in rail development in Europe, in addition to the Commission, is the European Railway Agency (ERA), an agency set up in 2006 by Regulation (EC) No 881/2004, and tasked to provide the EU Member States and the Commission with technical assistance in the fields of railway safety and interoperability.

### 7.1 Legislation on a European rail freight network

As part of the 2007 Freight Transport Agenda (refer to Section 5), the Commission issued the *Communication on a freight-oriented rail network* [COM(2007) 608], which aimed at making rail freight more competitive, in particular by ensuring lower transit times and increasing rail's reliability and responsiveness to customer requirements. This initiative eventually led to the adoption of Regulation No 913/2010 (of which more below).

The rationale of the Communication was that the EU had been developing policies since 1990 so as to revitalise the rail sector but they had not yet produced the intended results and the fragmentation of the European rail market still remained a significant problem that needed to be tackled with a great diligence. The European Commission considered the creation of a European freight-oriented rail network as a key factor in order to sustain a strategy of revitalisation of rail freight transport. Therefore, it outlined several initiatives taken by the players in the rail sector towards developing international rail routes, to provide good conditions for the movement of freight or to develop coordination among infrastructure managers in investment planning or improving international freight traffic management. The Commission declared its intention to monitor these initiatives, to support and extend their use and to add new measures.

After studying several options, a specific programme that includes the following proposed actions was launched by the Commission to create a European freight-oriented rail network:

- 1) Creation of freight-oriented corridors
- 2) Measures on improving service quality along a corridor
- 3) Increasing infrastructure capacity of a corridor
- 4) Allocation of train paths: more coordination and more priority to international freight
- 5) Priority rules applying in the case of traffic disturbance
- 6) Improving ancillary rail services (especially terminals and marshalling yards)
- 7) Monitoring of the measures proposed.

*Regulation (EU) No 913/2010*<sup>7</sup> is the implementation of the measures suggested by the aforementioned Communication. It lays down rules for the establishment, organisation and

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<sup>7</sup> Regulation (EU) No 913/2010 of the European Parliament and of the Council of 22 September 2010 concerning a European rail network for competitive freight. Strasbourg, 22.9.2010.

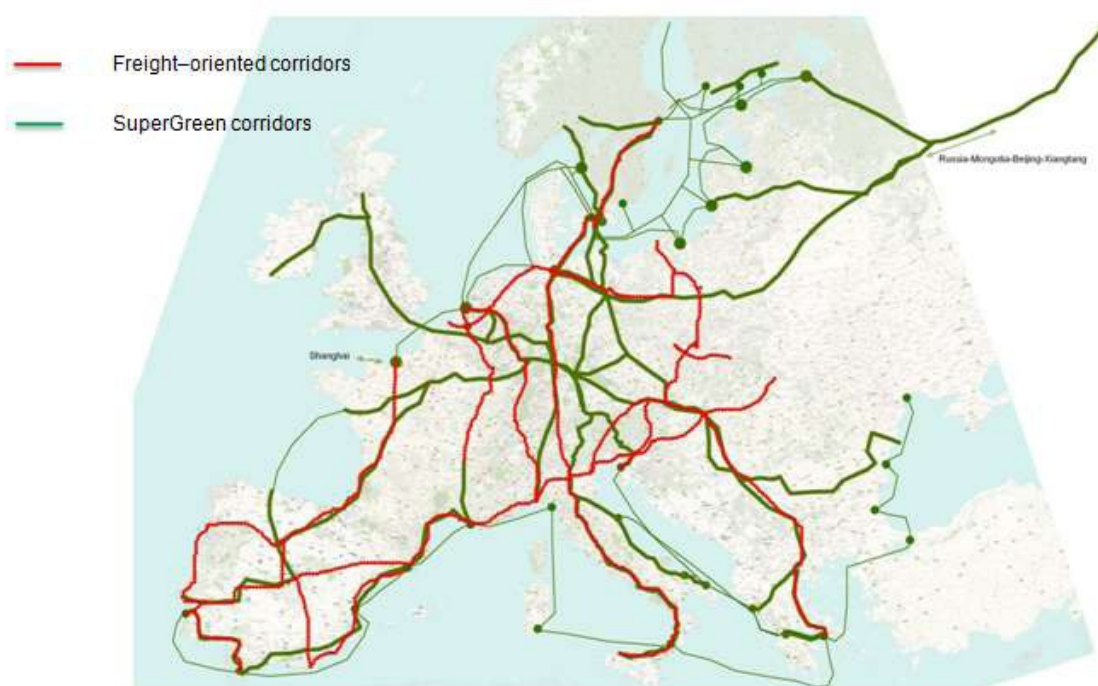
management of international rail corridors with a view to the development of a European rail network for competitive freight. The Regulation, among other things:

- Defines a "rail freight corridor" as all designated railway lines, including railway ferry lines, on the territory of or between Member States, and, where appropriate, European third countries, linking two or more terminals, along a principal route and, where appropriate, diversionary routes and sections connecting them, including the railway infrastructure and its equipment and relevant rail services in accordance with Article 5 of Directive 2001/14/EC.
- Designates the following 9 corridors as initial freight corridors:
  1. Zeebrugge-Antwerp/Rotterdam-Duisburg-[Basel]-Milan-Genoa
  2. Rotterdam-Antwerp-Luxembourg-Metz-Dijon-Lyon/[Basel]
  3. Stockholm-Malmö-Copenhagen-Hamburg-Innsbruck-Verona-Palermo
  4. Sines-Lisbon/Leixões Madrid-Medina del Campo/Bilbao/San Sebastian-Irun-Bordeaux-Paris/Le Havre/MetzSines-Elvas/Algeciras
  5. Gdynia-Katowice-Ostrava/Žilina-Bratislava/Vienna/Klagenfurt-Udine-Venice/Trieste/ /Bologna/Ravenna/ Graz-Maribor-Ljubljana-Koper/Trieste
  6. Almería-Valencia/Madrid-Zaragoza/Barcelona-Marseille-Lyon-Turin-Milan-Verona-Padua/Venice-Trieste/Koper-Ljubljana-Budapest-Zahony (Hungarian-Ukrainian border)
  7. Bucharest-ConstantaPrague-Vienna/Bratislava-Budapest Vidin-Sofia-Thessaloniki-Athens
  8. Bremerhaven/Rotterdam/Antwerp-Aachen/Berlin-Warsaw-Terespol (Poland-Belarus border)/Kaunas
  9. Prague-Horní Lideč-Žilina-Košice-Čierna and Tisou (Slovak/Ukrainian border)
- Makes it mandatory for each Member State with a rail border with another Member State to participate in the establishment of at least one freight corridor, unless this obligation has already been met with the 9 initial corridors.
- Lists a set of criteria that need to be accounted for in the selection of further freight corridors and their modification:
  1. the crossing by the freight corridor of the territory of at least three Member States, or of two Member States if the distance between the terminals served by the freight corridor is greater than 500 km;
  2. the consistency of the freight corridor with the TEN-T, the ERTMS corridors and/or the corridors defined by RNE (RailNetEurope);
  3. the integration of TEN-T priority projects into the freight corridor;
  4. the balance between the socio-economic costs and benefits stemming from the establishment of the freight corridor;
  5. the consistency of all of the freight corridors proposed by the Member States in order to set up a European rail network for competitive freight;
  6. the development of rail freight traffic and major trade flows and goods traffic along the freight corridor;
  7. if appropriate, better interconnections between Member States and European third countries;
  8. the interest of the applicants in the freight corridor;
  9. the existence of good interconnections with other modes of transport, in particular due to an adequate network of terminals, including maritime and inland ports.
- Sets up detailed rules for the governance of each freight corridor through:

- an executive board composed of representatives of the authorities of the Member States concerned;
  - a management board composed of the infrastructure managers concerned and, where relevant, the allocation bodies as referred to in Article 14(2) of Directive 2001/14/EC;
  - an advisory group made up of managers and owners of the terminals of the freight corridor including, where necessary, sea and inland waterway ports; and
  - a further advisory group made up of railway undertakings interested in the use of the freight corridor.
- Defines measures for implementing the freight corridor, including:
    - carrying out and periodically updating a transport market study relating to the observed and expected changes in the traffic on the freight corridor;
    - drawing up an implementation plan describing the characteristics of the freight corridor, including bottlenecks, the programme of measures necessary for creating the freight corridor and the objectives for the freight corridor, in particular in terms of performance expressed as the quality of the service and the capacity of the freight corridor;
    - drawing up and periodically reviewing an investment plan providing details of indicative medium and long-term investment for infrastructure and its equipment along the freight corridor, the relevant financial requirements and sources of finance, a deployment plan relating to the interoperable systems along the freight corridor which satisfies the essential requirements and the technical specifications for interoperability which apply to the network as defined in Directive 2008/57/EC, and a plan for the management of the capacity of freight trains which may run on the freight corridor, which includes removing the identified bottlenecks;
    - setting up an one-stop shop for application for infrastructure capacity, which would also display infrastructure capacity available at the time of request and its characteristics in accordance with pre-defined parameters, such as speed, length, loading gauge or axle load authorised for trains running on the freight corridor;
    - monitoring the performance of rail freight services on the freight corridor and publishing the results of this monitoring once a year; and
    - organising a satisfaction survey of the users of the freight corridor and publishing the results of it once a year.
  - Describes the process of capacity allocation to freight trains with a view to increasing freight transport through better coordination of priority rules relating to capacity allocation on the freight corridor, and prioritising, among freight trains, those that cross at least one border.

*Relevance to green corridors*

Even though the processes of corridor selection were basically different and independent of one another, one can detect resemblances between the above 9 rail corridors and the 9 corridors selected by SuperGreen Task 2.1 (which are not limited to rail corridors). Both sets are shown in Figure 2.

**Figure 2. Overlap between freight-oriented and SuperGreen corridors**

Regulation (EU) No 913/2010 lies at the core of green corridor development, as it constitutes the first piece of legislation towards their creation. Of particular importance to SuperGreen is:

- the defining criterion (crossing by the freight corridor of the territory of at least three Member States, or of two Member States if the distance between the terminals served by the freight corridor is greater than 500 km);
- the capacity allocation procedure aiming at increased freight transport;
- the governance rules emphasising the necessary coordination of all parties involved;
- the requirement to meet technical specifications related to interoperability; and
- the performance monitoring provisions, with emphasis placed on journey time, reliability and user satisfaction.

## 7.2 Interoperability

Smooth and efficient rail operation in Europe is a desirable goal, which is hampered by the patchwork of different rail systems that exist. Differences range across a wide spectrum, including rail gauges (at least 4 different widths), electricity systems (at least 4 different systems), signalling systems (at least a dozen different systems), various clearance profiles, various technical specifications of locomotives and other rolling stock, and many other differences, not the least of which is that trains in some countries run on the left and in some other countries on the right. Incompatibilities do exist even between systems that have similarities in many other respects. Such differences make the goal of rail interoperability very difficult to achieve unless specific, systematic and methodical action is taken.

The new railway interoperability Directive 2008/57/EC of 17 June 2008 aims to establish the conditions so as to achieve interoperability within the Community rail system. These conditions concern the design, construction, placing in service, upgrading, renewal,

operation and maintenance of the parts of this system as well as the professional qualifications and health and safety conditions of the staff who contribute to its operation and maintenance. The new Directive has superseded as of 19 July 2010 the previous Directive 96/48/EC on the interoperability of the European high-speed rail system as well as Directive 2001/16/EC on the interoperability of the European conventional rail system.

Interoperability of the trans-European rail system concerns two areas: Interoperability of the conventional rail system and interoperability of the high speed rail system.

Directive 2001/16/EC on the interoperability of the conventional rail system adopted on 19 March 2001, like that on the high-speed system, introduced Community procedures for the preparation and adoption of Technical Specifications for Interoperability (TSIs) and common rules for assessing conformity to these specifications. The directive required a first group of priority TSIs to be adopted within three years in the following areas: control/command and signalling; telematics applications for freight services; traffic operation and management (including staff qualifications for cross-border services); freight wagons; and noise problems deriving from rolling stock and infrastructure.

Interoperability of the trans-European high-speed rail system was first tackled in 1996, when the Directive 96/48/EC on the interoperability of the trans-European high-speed rail system was adopted.

In order to achieve the objectives of that directive, TSIs were drawn up by the European Association for Railway Interoperability (AEIF), which acted as the joint representative body defined in the directive, bringing together representatives of the infrastructure managers, railway companies and industry. A number of tools and methodologies had to be developed in order to prepare the TSIs. Pending the adoption of TSIs, and in order to guide the technical choices made in the projects in progress in several Member States, the Commission adopted two instruments: Decision 2001/260/EC on the characteristics of the European Rail Traffic Management System (ERTMS) (of which more below) and Recommendation 2001/290/EC on the basic parameters of the trans-European high-speed rail system.

A programme to develop the corresponding European standards was launched in 1998 and is regularly updated to reflect the work on TSIs. A number of EU legislative documents pertain to TSIs.

#### *Relevance for green corridors*

It is clear that rail interoperability is of paramount importance for green corridors, as many of the selected KPIs are significantly influenced by whether or not a rail corridor can function smoothly or not. Given the ‘patchwork’ nature of European railways, the importance of interoperability cannot be over-emphasised. It is speculated that even moderate gains in this department could translate in significant gains for the attractiveness of rail vis-à-vis other, less environmentally friendly modes of transport.

### **7.3 ERTMS**

One of the main characteristics of rail interoperability in Europe is ERTMS ("European Rail Traffic Management System"). ERTMS is a project which will serve to make rail transport safer and more competitive. One component of ERTMS, the European Train Control System (ETCS), guarantees a common standard that enables trains to cross national borders and enhances safety.

Currently there are more than 20 train control systems across the European Union. Each train used by a national rail company has to be equipped with at least one system but

sometimes more, just to be able to run safely within that one country. Each system is stand-alone and non-interoperable, and therefore requires extensive integration, engineering effort, raising total delivery costs for cross-border traffic. This restricts competition and hampers the competitiveness of the European rail sector vis-à-vis road transport by creating technical barriers to international journeys. For instance, the Thalys train sets running between Paris-Brussels-Cologne and Amsterdam have to be equipped with 7 different types of train control systems, which brings considerable costs.

The ERTMS project is developed by eight UNIFE members - Alstom Transport, Ansaldo STS, AZD Praha, Bombardier Transportation, Invensys Rail, Mermec, Siemens Mobility and Thales - in close cooperation with the European Union, railway stakeholders and the GSM-R industry.

ERTMS has two basic components:

- a. ETCS, the European Train Control System, is an automatic train protection system (ATP) to replace the existing national ATP-systems;
- b. GSM-R, a radio system for providing voice and data communication between the track and the train, based on standard GSM using frequencies specifically reserved for rail application with certain specific and advanced functions.

Following a 10- year phase of research and development, validation of the ETCS standard was carried out from 2000 to 2007 with real scale projects underway in parallel. Since 2005, feedback from projects prompted the need to fine tune the specifications in order to move from local to global compatibility and ensure interoperability between all projects in Europe. The specification, as modified by a Commission Decision on 23 April 2008, now guarantees that Europe's trains equipped with ETCS can travel on any line equipped with ETCS. On 22 July 2009 the Commission adopted a European Deployment Plan<sup>8</sup> for ERTMS which provides for the progressive deployment of ERTMS along the main European rail routes. This will reduce running costs and improve the system's efficiency on long cross-border distances.

Furthermore, in 2005 the European Commission and the rail industry (manufacturers, infrastructure managers and undertakings) signed a memorandum of understanding (MoU) on the deployment of ERTMS on a key part of the European network with an emphasis on six freight corridors.

#### *Relevance for green corridors*

ERTMS is very important for green corridors, as it is surely one of the tools for a more efficient rail system. In WP4, ERTMS is one of the measures to be investigated, in terms of its possible impact on the corridor KPIs.

## **7.4 Miscellaneous other regulation on rail transport**

### **7.4.1 Emissions reduction**

EU rules limit the emissions of CO, hydrocarbons and NOx combined, and particulates that can be emitted from new locomotive engines. From 2010 tighter values apply. For high-speed rail the technical specifications state that the materials selected for use on

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<sup>8</sup> Commission Decision of 22.7.2009 amending Decision 2006/679/EC as regards the implementation of the technical specification for interoperability relating to the control-command and signalling subsystem of the trans-European conventional rail system, C(2009) 5607, Brussels, 22.7.2009.



rolling stock shall minimise the emission of harmful and dangerous fumes or gases during use of the trains.

EU rules require gas oils intended for use by non-road mobile machinery (which includes locomotives engines) to have a maximum sulphur content of 1,000 mg/kg. In 2007 the Commission proposed to reduce this to 10 mg/kg on 1 January 2009, unless this needs to be changed in order to ensure that there is no increase in GHG emissions.

#### **7.4.2 Noise abatement**

Rolling noise of freight wagons has been identified as a serious source of transport-related noise. As freight trains often operate at night, their noise emission is even more critical. If no improvements are made, public opposition to rail could lead to restrictions on rail traffic along the most important European rail corridors, in particular freight trains, and a possible modal shift from rail to road on these corridors. Such a development would lead to increasing environmental impacts, in particular greenhouse gas emissions and increased bottlenecks.

The measures proposed by the Commission for addressing this issue have been presented in Section 3.2.3 as part of the horizontal discussion on internalisation of external costs of transport, and will not be repeated here.

#### **7.4.3 Safety**

Even though Europe's railways are among the safest in the world, the EU is looking to maintain high standards and to harmonise safety requirements EU-wide.

As well as ensuring optimal safety, harmonisation in this area helps improve the interoperability – of national rail systems. Different national safety rules are a major hindrance for new railway companies looking to establish themselves on the market or indeed for any company wanting to use rail infrastructure in different countries.

EU legislation sets the framework for a harmonised approach to rail safety in the EU. It lays down the conditions for granting the safety certification that every railway company must obtain before it can run trains on the European network. Furthermore, it obliges EU Member States to set up national railway safety authorities and independent accident investigation bodies.

The European Railway Agency (ERA) develops common approaches to safety, working closely with stakeholders from the rail sector as well as with national authorities, the EU institutions and other interested parties. Featuring a dedicated Safety Unit, ERA also monitors and reports on rail safety in the EU.

#### *Relevance to green corridors*

Reduction of noise pollution generated by freight transport activities and enhancement of safety are attributes of green corridors.

## 8 Maritime transport and ports

For maritime transport, the international legal context is particularly important, where the central element is safety, although environmental issues are becoming increasingly important, too. The major international treaties for the maritime sector are: the United Nations Convention on the Law of the Sea (UNCLOS); the IMO's (International Maritime Organisation) International Convention for the Safety of Lives at Sea (SOLAS), which covers the safety at sea of merchant and passenger shipping; and the IMO's International Convention for the Prevention of Pollution from ships (MARPOL 73/78). Moreover, the EU regulatory framework has been strengthened over the years and cooperation with member states has been increased to tackle issues such as prevention of accidents and incidents, pollutant emissions to the atmosphere, ballast water treatment and ship recycling among others.

The documents reviewed for the maritime transport (and ports) sector are listed below:

- The Commission's communication "An Integrated Maritime Policy for the European Union" [COM (2007) 575];
- The Commission's "Communication on a European Ports policy" [COM (2007) 616];
- The Commission staff working document "Report on the Motorways of the Sea. State of play and consultation" [SEC (2007) 1367];
- The Commission's communication "Strategic goals and recommendations for the EU's maritime transport policy until 2018" [COM (2009) 8];
- The Commission's "Communication and action plan with a view to establishing a European maritime transport space without barriers" [COM(2009) 10];
- The Revised MARPOL Annex VI, MEPC 58/23/Add.1.
- The report on "Feasibility Study and Impact Assessment of possible Market-based Measures" submitted to the IMO Secretariat, MEPC 61/INF.2.
- The adoption of EEDI and SEEMP, MEPC 62/WP.11/Add.1/Rev.1.

### 8.1 An integrated maritime policy for the European Union

Based on the clear recognition that all matters relating to Europe's oceans and seas are interlinked, and that sea-related policies must develop in a joined-up way if we are to reap the desired results, this 2007 document [COM (2007) 575] presents the Commission's proposal on developing an integrated maritime policy for the EU. This integrated, inter-sectoral approach will require reinforced cooperation and effective coordination of all sea-related policies at the different decision-making levels.

The Action Plan accompanying this communication gives a clear idea of the variety and magnitude of the work ahead. The following projects are of particular importance:

- a European maritime transport space without barriers (refer to Section 8.5);
- a European strategy for marine research;
- national integrated maritime policies to be developed by Member States;
- a European network for maritime surveillance;
- a roadmap towards maritime spatial planning by Member States;
- a strategy to mitigate the effects of climate change on coastal regions;
- reduction of CO<sub>2</sub> emissions and pollution by shipping (refer to Section 8.8);
- elimination of pirate fishing and destructive high seas bottom trawling;
- a European network of maritime clusters; and

- a review of EU labour law exemptions for the shipping and fishing sectors.

An integrated maritime policy requires a governance framework that applies the integrated approach at every level, as well as horizontal and cross-cutting policy tools. It will also require a sound financial basis, taking into account the results of preparatory actions. The Commission has set up a maritime policy function, with the task of analysing maritime affairs and the policies affecting them, coordinating between sectoral policies, ensuring that interactions between them are taken into account, and piloting the development of crosscutting policy tools. It has also started bringing together EU agencies with maritime-related functions, with a view to ensuring their collective contribution to the development of the maritime policy.

The following three horizontal tools are of major importance: maritime surveillance which is critical for the safe and secure use of marine space; maritime spatial planning which is a key planning tool for sustainable decision-making; and a comprehensive and accessible source of data and information.

An EU integrated maritime policy will focus its action primarily in the following five areas:

- 1) Maximising the sustainable use of the oceans and seas;
- 2) Building a knowledge and innovation base for the maritime policy;
- 3) Delivering the highest quality of life in coastal regions;
- 4) Promoting Europe's leadership in international maritime affairs; and
- 5) Raising the visibility of maritime Europe.

Many of the policies and measures presented in this paper are aiming to increase the safety (development of maritime surveillance etc.), cost effectiveness and operability (common strategies) of sea transports in Europe, which means that they also decrease the emissions and increase the environmental friendliness of shipping. Also the support for research and homogenous data availability will help finding new ways to decrease the negative impacts of sea transports. However, caution is needed in regulating emissions (e.g. SOx) in order to avoid back-shift from sea to less environmentally friendly land-based modes.

Maritime spatial planning is considered a fundamental tool for the sustainable development of marine areas and coastal regions, and for the restoration of Europe's seas to environmental health. This tool is important when developing green corridors.

Current EU programmes (TEN-T and Marco Polo) will continue to support the creation of the Motorways of the Sea/Short Sea Shipping networks. The future development of TEN-T should also take full account of the increasing uses of the seas in the energy field (e.g. the transport of LNG in tankers). Nevertheless, shipping remains at a disadvantage compared to other means of transport. Other transport modes benefit from more public investment. Furthermore, a vessel travelling between two EU ports is subject to more complex and time-consuming procedures than a truck would be, because a real internal market for maritime transport in Europe does not yet exist. In order to unlock the full potential of Europe's shipping industry this disadvantage of maritime transport compared with the other modes must be eliminated through the simplification of administrative and customs formalities for intra-EU maritime services.

## **8.2 The communication on a European ports policy**

This document [COM (2007) 616], being part of the 2007 Freight Transport Agenda, aims at a performing EU port system able to cope with the future challenges of EU transport needs, and sets an action plan for the European Commission.

The European ports face the following challenges:

- A demand for international transport amplified by its low cost.
- A major technological change, marked by the development of container transport, for which a major adaptation effort in land acquisition and management, in technology and social issues is required from ports and the cities hosting them.
- The commitment to reduce GHG and the current problems with air quality call for modal shift towards maritime transport (and towards rail and inland navigation, too).
- The necessity to develop a recurrent dialogue on performance and development of ports between port stakeholders and within the city, the region, and beyond where necessary.
- Last but not least the need to reconcile ports' development and management with transparency, competition, and in general the Community set of rules.

These challenges are addressed with objectives categorised in the following areas:

*Port performance and hinterland connections*

The first options to cope with increased demand for port capacity should be:

- to increase port efficiency and productivity rates, in terms of output or movements per ha of existing terminals space and throughout the access routes; and
- to explore alternative transport routes as a means to achieve a more intensive use of all existing ports - some of which are operating under capacity levels - and to have them nearer to users.

The desirable increase of maritime mode and SSS reduces the volume of road transport over long distances, but also inevitably leads to increased pressure to the hinterland connections of the ports. This often underestimated factor of port operations may lead to serious congestion that disturbs the smooth flow of cargo to and from the ports and negatively affects the health of the surrounding population. Reliable and sustainable hinterland connections are thus a key to the capacity rating and future prospects of a port. Significant improvements in this field are necessary and possible.

The Commission intends to evaluate ports hinterland connections status and needs and their impact on a balanced network of traffic flows on the occasion of the mid-term review of the trans-European transport network.

*Expanding capacity while respecting the environment*

This need arises when:

- Ports require additional facilities and/or appropriate connections with the hinterland.
- A new sustainable modal shift away from the road transport mode towards inland waterways or maritime navigation, such as a Motorway of the Seas, has been positively identified.
- Adequate port infrastructure is needed in order to ensure a better energy security of supply and enhance competitiveness of the related industries.
- It is necessary to redevelop the port area of the city, and/or shift the port industry and related hinterland traffic, for environmental and security reasons, away from the city center.

Regulatory measures exist for ensuring adequate waste facilities, proper management of water bodies and sediments, and reduced air emissions. Further actions by the Commission are proposed for all these areas. Of particular importance to green corridors is the Commission's intention to introduce financial incentives for the reduction of air pollution in ports.

#### *Modernisation*

The Commission has proposed the creation of a paperless environment for customs and trade, including a single window for the submission of data (e-maritime). This approach is directly related to "e-Freight" and the "e-Customs" initiatives and will fully benefit from modern ICT. Furthermore, the Commission intends to present a legislative proposal on the creation of a European Maritime Transport Space without Barriers (refer to Section 8.5) and develop with stakeholders, a set of generic European performance indicators allowing further specification at local level.

#### *Creating a level playing field*

The Commission does not intend to intervene to harmonise the existent heterogeneous port management schemes. However, it plans to improve the transparency of all merchant ports allowing for a complete picture of financial flows from Member States' public authorities to ports.

The Commission considers that, when safety is ensured, exemptions from mandatory pilotage for frequent users should be granted as they would reduce the costs of maritime transport and make it more attractive, in particular concerning short sea shipping.

#### *Establishing a structured dialogue between ports and cities*

In the context of ongoing work on maritime and port security, the Commission considers assessing the impact of security measures and providing guidance on how to reconcile the need for sound security measures with a fair degree of openness and accessibility to port areas. The review of legislation on maritime and port security will provide an opportunity to assess port access requirements and to examine the development of a European model for multi-purpose access cards.

Furthermore, the Commission proposes a European ports open day during the European maritime week (proposed with its communication on the integrated maritime policy), which would give the occasion for the general public to assess, and understand better port community work.

#### *Work in ports*

The Commission will propose a mutually recognisable framework on training of port workers in different fields of port activities. It will closely monitor the implementation to ports of Community rules on safety and health of workers at work.

### **8.3 Report on the Motorways of the Sea. State of play and consultation**

The concept of Motorways of the Sea (MoS), which is considered as a special feature of Short Sea Shipping, is defined within document SEC (2007) 1367 as follows:

“Motorways of the Sea are existing or new sea-based transport services that are integrated in door-to-door logistic chains and concentrate flows of freight on viable, regular, frequent, high-quality and reliable Short Sea Shipping links. The deployment of the Motorways of the Sea network should absorb a significant part of the expected increase in road freight traffic, improve the accessibility of peripheral and island regions and states and reduce road congestion.”

The document states that the success of MoS requires action beyond the framework of the trans-European transport network. The Commission services are integrating the concept of MoS into the broader policy of promoting efficient and sustainable multimodal transport chains with Short Sea Shipping in the central role. For instance, the Communication on port policy highlights the need for better organised infrastructure and facilities in existing ports, for better hinterland connections, for innovation and training and for simplification.

The planned e-maritime initiative is instrumental in streamlining the information flows that accompany the physical transport flows. MoS should be frontrunners in the implementation of e-maritime. Further simplification of administrative procedures should be achieved by establishing a “European maritime transport space without barriers.”

The document lists the key challenges that should be addressed in the effort to put into effect the MoS. Among these challenges are some which are closely related to the green corridors development namely: a) the integration of the MoS into a broader transport planning perspective, and b) the balancing of incentives for various modes of transport.

At EU level, support for the MoS has been substantially increased for the 2007-2013 financial programming period, with the integration of MoS into the multi-annual work programme of the TEN-T, as a new specific action in the Marco Polo II programme, and as measures to be funded over a range of operational programmes under the structural funds and cohesion funds. The document makes reference to the principal measures with an effect on greening MoS. These measures are presented in Table 5 below:

**Table 5. Effect of various measures on MOS greening**

Measure	Progress	Impact on MOS greening
Simplify the regulatory framework for maritime transport	Limited	Medium
Common legal framework for the provision of port services	Not done	Low
Transfer of ship register	Done	No
ITS in maritime transport	Limited	High
Implement funding programmes (Marco Polo I and II) to sustain intermodality	Done	High
European Maritime Safety Agency and safety rules for passenger ships	Limited	Low
Port state controls	Limited	High
Ship and port facility security	Done	High
Oil pollution damage compensation fund	Done	High
Sulphur content of marine fuel	Limited	High

#### 8.4 The maritime transport strategy until 2018

Document COM (2009) 8 was released in January 2009 and depicts a roadmap for maritime transport for the next 10 years. The Strategy identifies key areas where action by the EU will strengthen the competitiveness of the sector while enhancing its environmental performance.

With regard to the objectives of this deliverable, the most relevant part of the document is the one on quality shipping. The following paragraphs summarise the basic conclusions.

##### *Environmental performance*

The regulatory framework for the environmental performance of EU shipping has been strengthened. Cooperation with member states has been increased in order to tackle issues such as prevention of accidents and incidents, pollutant emissions to the atmosphere, ballast water treatment and ship recycling. However, it is stated that those efforts must

continue. The EC, MS and the European maritime industry should work together towards the long-term objective of ‘low-waste, low-emission’ maritime transport. To that aim, the key priorities should be to:

- Ensure permanent progress towards a coherent and comprehensive approach to reduce GHG emissions from maritime shipping, combining technical, operational and market-based measures.
- In that view, the EU should work close to IMO to pursue the limitation or reduction of emissions of greenhouse gases from ships. A legally-binding regime should be adopted at the next UNFCCC Conference. In the absence of progress in such efforts, the EU should make proposals at European level.
- To ensure that MS are able to achieve "good environmental status" in marine waters covered by their sovereignty or jurisdiction by 2020, as required by the new Marine Strategy Framework Directive.
- To reinforce EU legislation regarding port reception facilities for ship-generated waste and cargo residues. In that regard, ensure the availability of proper facilities and administrative procedures to meet the expected traffic growth.
- Follow up the proposals detailed in the Commission's communication on an EU strategy for better ship dismantling. To boost the adoption of the IMO Convention on Ship Recycling and steady progress towards its future implementation.
- Oversee the smooth implementation of the amendments adopted by the IMO in October 2008 to MARPOL Annex VI to reduce sulphur oxides and nitrogen oxides emissions from ships. This includes assessing which European sea areas qualify as Emission Control Areas, the availability of the adequate fuels and the impacts on short-sea shipping. The EC proposals should ensure that modal ‘back-shift’ from SSS to road is avoided.
- Promote alternative fuel solutions in ports, such as the use of shore-side electricity. The Commission will propose a time-limited tax exemption for shore-side electricity in the forthcoming review of the Energy Taxation Directive as a first step and elaborate a comprehensive incentive and regulatory framework.
- Try again the EC ‘Quality Shipping Campaign’, by means of partnership agreements with the EU maritime administrations, the maritime industries at large and users of maritime transport services.
- In that framework, promote a European Environmental Management System for Maritime Transport, targeting the continuous improvement of the environmental performance of shipping; consider modulation of registration fees, port dues and other charges, with a view to rewarding efforts towards greener shipping.

#### *Maritime transport safety*

Following the adoption and further implementation of the 3rd Maritime Safety Package, the EU now has one of the world’s most advanced shipping regulatory frameworks. Moreover, both the EU maritime administrations and shipping industry have invested heavily in the implementation of safety and security systems.

Nevertheless, the growth of the fleet, the entry into service of very large carriers for the transport of passengers and freight and the exponential growth in shipping operations in ports will significantly add to the pressure on maritime safety. Increasing the number of navigable waters will inevitably attract traffic through the so-called Northern Sea Route with its special requirements. An expansion of the Suez Canal would mean larger vessels and more traffic across the Mediterranean with bigger risks.

In the coming years, the EU and the MS should:

- Give priority to the enforcement of existing EU and IMO rules and the speedy implementation of measures introduced with the 3rd Maritime Safety Package.
- Revise the mandate and the functioning of the EMSA, to enhance the technical and scientific assistance it can provide.
- Increase the EU involvement in the IMO tasks and reinforce international cooperation with EU trading and shipping partners, promoting a shared maritime safety culture and common efforts.
- In that context, dedicate special attention to the challenges from navigation in extreme conditions, such as ice sailing, as well as the constantly increasing size of vessels.
- To ensure the systematic application of the IMO “Guidelines on the treatment of persons rescued at sea”, Europe should lead the efforts to provide assistance and clarify obligations regarding the rescue of distressed persons.
- Ensure that all European maritime administrations deploy the necessary economic and human resources needed to match the fulfilment of their responsibilities as flag, port and coastal states. All EU Member States should be on the "White List" of the Paris MoU of PSC by 2012 at the latest.
- Work within the IMO with the aim of reaching, as soon as possible, an agreement on an efficient international framework regulating liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea (HNS convention).
- To pursue by 2012, that all Member States are bound, in line with their commitments, by all the relevant international conventions and that they fulfil the requirements of the Code for the Implementation of Mandatory IMO Instruments, as well as the IMO Member State Audit Scheme.

#### *Maritime transport security*

The main challenge is to complete the already started work in establishing a wide framework of security measures based on prevention, reaction capacity and resilience. With due regard to the respective competences in this field, the action of the EU and its member states should have the following aims:

1. Terrorism threats: support the implementation of international security measures. Flag states and ship owners need to cooperate closely and seafarers need to receive the appropriate basic and continuous training.
2. Customs Code: the EC should take full advantage of the framework offered by the security amendments to the Community Customs Code.
3. Piracy and armed robbery: the EC should adopt a firm response and contribute to safer shipping in the dangerous areas. Europe should play a role in the development and stabilisation of the countries from where such attacks come from. In that regard, the most urgent priority is to protect seafarers, fishermen and passengers on ships sailing off the coast of Somalia, in the Gulf of Aden or in any other region of the world that could become problematic in the future.
4. Global security: Moreover, the stability of the world seaborne transport system requires protecting international shipping lanes against any acts that might disrupt the flow of traffic through them.
5. Resilience plans: the EC should establish resilience plans, including early alert systems, joint monitoring of events and protection plans. Such mechanisms should benefit from the full use of LRIT and other appropriate satellite surveillance systems, as well as, reinforced coordination of the responsible authorities in the MS.



6. ISPS: the EC should work to ensure adequate improvements to the International Ship and Port Facility Security Code (ISPS); a programme of technical assistance for port and maritime administrations should be considered.

#### *Maritime Surveillance*

Capacities of the EU's maritime transport system should be strengthened by putting in place an integrated information management system to allow the identification, monitoring, tracking and reporting of all vessels at sea and on inland waterways to and from European ports and in transit through or in close proximity to EU waters.

This system should be part of the e-Maritime Initiative and develop into an integrated EU system providing web services at the different levels of the transport chain. In that view, the system should be able to interface with the e-Freight, e-Customs and ITS, allowing the users to track and trace the cargo not only during the waterborne part of the journey, but across all transport modes accordingly to co-modality objectives.

#### *Maritime transport and energy security*

Maritime transport is key to Europe's energy security and therefore is an important instrument of the European energy policy. Seaborne transport is to be seen as part of the EU strategy of diversification of routes and of energy sources. More particularly, LNG facilities are essential for increasing flexibility in gas supplies in the internal energy market.

### **8.5 Towards a European maritime transport space without barriers**

In 2006, DG Mare published an important Green Paper on maritime transport. This Green Paper under the title "Towards a future Maritime Policy for the Union: A European vision for the oceans and the seas" had adopted a holistic approach to sustainable maritime development within the premises of the Lisbon Treaty and addressed the issues under four main headings:

1. How Europe can retain its leadership in sustainable maritime development;
2. How the quality of life in coastal regions can be maximized;
3. How to manage the relations with the oceans by using spatial planning; and
4. How to use maritime governance in a number of fields.

True to its link with the Lisbon Treaty the Green Paper had emphasized the importance of staying competitive and, also, staying sustainable. However it was discovered that Europe has been, and still is, in bad need for integrated policies which would feature simple, common rules. This requirement, self evident to anyone accustomed to dealing with multiple rules on the same subject, has been the fundament on which a Common European Maritime Space was suggested.

In order to simplify the administrative formalities applicable to intra-EU maritime transport, the Communication proposes to:

- Simplify customs formalities for vessels transporting goods between EU ports by introducing a presumption that goods on board vessels sailing between ports in the European Union have the customs status of Community goods, through an amendment to the Regulation laying down certain provisions on applying the Community Customs Code.
- Draw up guidelines including best practice from specific ports in order that checks on animal products are faster and more efficient whilst safe-guarding public health.

- Replace Directive 2002/6/EC on reporting formalities with a Directive clarifying the use of the International Maritime Organization's (IMO) FAL harmonised forms. This Proposal provides for information to be transmitted electronically by 2013.
- Simplify administrative procedures for vessels sailing between EU ports, but having a call in a third country or a free zone.
- Make electronic data transmission more efficient by creating "e-maritime" systems. These systems must be compatible with the electronic customs systems ("e-Customs") introduced by Decision 70/2008/EC and will ease administrative and customs procedures in ports.
- Establish "national single windows" to reduce the number of intervening parties at ports and thus ensure more efficient and less costly goods handling, whilst increasing the system's overall reliability.
- Rationalise the regulations applicable to the intermodal transport of dangerous goods, where maritime and land regulations overlap.

### 8.6 Revised MARPOL Annex VI

MARPOL Annex VI, first adopted in 1997, limits the main air pollutants contained in ships exhaust gas, including sulphur oxides (SO<sub>x</sub>) and nitrous oxides (NO<sub>x</sub>), and prohibits deliberate emissions of ozone depleting substances. MARPOL Annex VI also regulates shipboard incineration, and the emissions of volatile organic compounds from tankers. Following entry into force of MARPOL Annex VI on 19 May 2005, the Marine Environment Protection Committee (MEPC) at its 53rd session (July 2005), agreed to revise MARPOL Annex VI with the aim of significantly strengthening the emission limits in light of technological improvements and implementation experience. As a result of three years examination, MEPC 58 (October 2008) adopted the revised MARPOL Annex VI and the associated NO<sub>x</sub> Technical Code 2008, which entered into force on 1 July 2010. The main changes to MARPOL Annex VI are a progressive reduction globally in emissions of SO<sub>x</sub>, NO<sub>x</sub> and particulate matter (PM) and the introduction of emission control areas (ECAs) to reduce emissions of those air pollutants further in designated sea areas.

Under the revised MARPOL Annex VI, the global sulphur cap is reduced initially to 3.50% (from the current 4.50%), effective from 1 January 2012; then progressively to 0.50 %, effective from 1 January 2020, subject to a feasibility review to be completed no later than 2018. The limits applicable in ECAs for SO<sub>x</sub> and particulate matter were reduced to 1.00%, beginning on 1 July 2010 (from the original 1.50%); being further reduced to 0.10 %, effective from 1 January 2015.

Progressive reductions in NO<sub>x</sub> emissions from marine diesel engines installed on ships are also included, with a "Tier II" emission limit for engines installed on or after 1 January 2011; then with a more stringent "Tier III" emission limit for engines installed on or after 1 January 2016 operating in ECAs. Marine diesel engines installed on or after 1 January 1990 but prior to 1 January 2000 are required to comply with "Tier I" emission limits, if an approved method for that engine has been certified by an Administration. The revised NO<sub>x</sub> Technical Code 2008 includes a new chapter based on the agreed approach for regulation of existing (pre-2000) engines established in MARPOL Annex VI, provisions for a direct measurement and monitoring method, a certification procedure for existing engines, and test cycles to be applied to Tier II and Tier III engines. Revisions to the regulations for ozone-depleting substances, volatile organic compounds, shipboard incineration, reception facilities, and fuel oil quality have been made with regulations on fuel oil availability added.

The revised measures are expected to have a significant beneficial impact on the atmospheric environment and on human health, particularly for those people living in port cities and coastal communities.

There is however an important side-effect of this legislation that has to be taken into account for green corridors in particular. Concerns have been voiced by industry circles that higher prices of low-S bunkers may render short sea shipping less competitive and induce cargo shifts to other surface modes, mostly road. Such concerns have been voiced mainly by ECSA, the European Community Shipowners Association and Ro/ro ferry circles mainly in the Baltic. Their concern is surely on economic grounds, but the environmental dimension is that by shifting cargo to road transport, overall CO<sub>2</sub> would be increased.

A similar concern is that producing low-S fuels would entail more CO<sub>2</sub> in the refinery process. It is thus clear that a holistic process is necessary to evaluate the possible impacts of such legislation.

### **8.7 Possible introduction of Market-based Measures**

The full title of the document is “*Full report of the work undertaken by the Expert Group on Feasibility Study and Impact Assessment of possible Market-based Measures.*” It contains the report of the Expert Group on Feasibility Study and Impact Assessment of possible Market-based Measures, established by the IMO Secretary-General as requested by IMO’s Marine Environment Protection Committee (MEPC) at its 60<sup>th</sup> session in March 2010 (MEPC 60). The document was approved by MEPC 61 (Sept. 2010).

MEPC 60 decided to undertake a feasibility study and impact assessment of the market-based measure (MBM) proposals submitted in accordance with the work plan for further consideration of such measures. In order to undertake this study, the Secretary-General of the IMO established an Expert Group on Feasibility Study and Impact Assessment of Possible Market-Based Measures (the Expert Group). The Expert Group was made up of experts nominated by Member Governments and organisations, but each expert served in their own personal capacity<sup>9</sup>.

Consistent with the terms of reference given by the Committee, the experts were to evaluate the various proposals with the aim of assessing the extent to which they could assist in reducing GHG emissions from international shipping. To guide its analysis, the Expert Group was given nine criteria: (1) environmental effectiveness, (2) cost effectiveness, (3) incentives to technological change and innovation, (4) practical feasibility, (5) need for technology transfer to Least Developing Countries and Small Island Developing States, (6) relation to other relevant conventions, (7) potential administrative burden for national administrations, (8) additional workload to ships and (9) compatibility with existing regulatory framework.

The following MBM proposals were evaluated:

1. An International Fund for Greenhouse Gas emissions from ships (GHG Fund) proposed by Cyprus, Denmark, the Marshall Islands, Nigeria and IPTA (MEPC 60/4/8).
2. Leveraged Incentive Scheme (LIS) to improve the energy efficiency of ships based on the International GHG Fund proposed by Japan (MEPC 60/4/37).

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<sup>9</sup> The Project Manager of SuperGreen is a member of this Expert Group.

3. Achieving reduction in greenhouse gas emissions from ships through Port State arrangements utilizing the ship traffic, energy and environment model, STEEM (PSL) proposal by Jamaica (MEPC 60/4/40).
4. The United States proposal to reduce greenhouse gas emissions from international shipping, the Ship Efficiency and Credit Trading (SECT) (MEPC 60/4/12).
5. Vessel Efficiency System (VES) proposal by World Shipping Council (MEPC 60/4/39).
6. The Global Emission Trading System (ETS) for international shipping proposal by Norway (MEPC 61/4/22).
7. Global Emissions Trading System (ETS) for international shipping proposal by the United Kingdom (MEPC 60/4/26).
8. Further elements for the development of an Emissions Trading System (ETS) for International Shipping proposal by France (MEPC 60/4/41).
9. Market-Based Instruments: a penalty on trade and development proposal by the Bahamas (MEPC 60/4/10).

There was no explicit recommendation by the Expert Group on which, among the above 9 MBM proposals should be selected, leaving this for the next phase of the process. An intersessional working group met in March 2011 in order to continue the analysis and hopefully submit a recommendation for MEPC 62 (July 2011). However, no concrete recommendation on which MBM should be chosen was reached, or not even on a possible short list of MBMs to be further pursued. The same was the case at MEPC 62 itself, in which discussion on GHGs was exclusively devoted on the EEDI index (for which see next section). Thus, discussion on MBMs at the IMO level is on hold and will resume at MEPC 63 (March 2012). Industry circles like the International Chamber of Shipping (ICS) have recently expressed their support for a bunker levy as an MBM.

A market based measure for shipping can be very relevant to green corridor development to the extent it will help internalise the external costs of GHG emissions by ships. In the short run, such a measure could induce slow steaming which would reduce emissions. In the long run, it could provide economic incentives to ship owners to build ships that are more energy efficient and have lower GHG emissions. However, utmost care should be exercised on the choice of the instrument and on its implementation scheme, so as to avoid carbon leakage, evasion/fraud and cargo shifts to land-based modes that could produce more GHGs. Another effect of an MBM system would be to raise money to purchase offsets for other sectors, i.e. invest in wind farms, photovoltaic parks, or other technologies that would reduce GHG emissions elsewhere.

The European Commission is following the IMO developments on GHG emissions from ships very closely, and has stated clearly that although its support for IMO measures is granted, it intends to adopt measures of its own if the IMO process does not proceed fast enough. The relevant deadline is Dec. 31, 2011, by which the Commission has stated that if no relevant decision by the EU-27 has been reached on IMO legislation to curb GHG emissions from ships, it intends to propose relevant legislation of its own. Even after adoption of EEDI by the IMO, Commission circles have stated that this measure is not enough and more measures are needed. The Commission has not stated what these measures might be but is in the process of conducting studies and soliciting stakeholder input on the subject<sup>10</sup>.

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<sup>10</sup> The Project Manager of SuperGreen participates as an expert in a Working Group on GHG for ships established by DG-Clima in 2011.

## 8.8 The adoption of EEDI and SEEMP

After years of discussion and intensive and sometimes highly political debate between developed and developing countries, the finalization of the regulatory text on the Energy Efficiency Design Index (EEDI) for new ships and on the Ship Energy Efficiency Management Plan (SEEMP) was agreed upon at the 62<sup>nd</sup> session of IMO's Marine Environment Protection Committee - MEPC 62 in July 2011.

IMO's drive to reduce GHG emissions from ships has followed thus far two quasi-parallel tracks. One track has been the discussion on EEDI. The other track concerns Market Based Measures (MBMs), of which more in the previous section.

The IMO Energy Efficiency Design Index is a benchmarking scheme and aims to provide an indication of a merchant ship's CO<sub>2</sub> output in relation to its value for society. Adoption of EEDI is the first step of IMO's drive to reduce CO<sub>2</sub> emissions from shipping. The EEDI compares theoretical CO<sub>2</sub> emissions and transport work of a vessel and will eventually be benchmarked against an IMO-set requirement.

The EEDI index is provided by a complex formula, of which the numerator is a function of all power generated by the ship (main engine and auxiliaries), and the denominator is a product of the ship's deadweight (or payload) and the ship's 'reference speed', appropriately defined as the speed corresponding to 75% of MCR, the Maximum Continuous Rating of the ship's main engine. The units of EEDI are grams of CO<sub>2</sub> per tonne mile. The EEDI of a new ship is to be compared with the so-called "EEDI (reference line)," which is defined as  $EEDI(\text{reference line}) = aDWT^{-c}$ , where DWT is the deadweight of the ship and a and c are positive coefficients determined by regression from the world fleet database, per major ship category. If a ship's EEDI is above the equivalent baseline, the ship would not be allowed to operate until and unless measures to fix the problem are taken.

The attained EEDI shall be specific to each ship and shall indicate the estimated performance of the ship in terms of energy efficiency, and be accompanied by the technical file that contains the information necessary for the calculation of the attained EEDI and that shows the process of calculation. The attained EEDI shall be verified, based on the technical file, either by the Administration or by any organisation duly authorised by it. The attained EEDI shall be calculated taking into account guidelines developed by the IMO.

This attained EEDI value should be equal or less than the required EEDI value which is provided by the following formula.

$$\text{Attained EEDI} \leq \text{Required EEDI} = (1-X/100) \times \text{Reference line value}$$

where X is the reduction factor (provided by the IMO) specified for the required EEDI compared to the EEDI Reference line. For each new and existing ship that has undergone a major conversion which is so extensive that the ship is regarded by the Administration as a newly constructed ship, the attained EEDI shall be calculated and meet the previous requirement with the reduction factor applicable corresponding to the ship type and size of the converted ship at the date of the contract of the conversion, or in the absence of a contract, the commencement date of the conversion. The Reference line parameters a and c ( $a \times DWT^{-c}$ ), per ship type which have been finalised after a long debate within the IMO are presented in Table 6 below, although they are subject to revision.

**Table 6. Parameters for determination of reference values for the different ship types**

Ship type defined in regulation 2	a	b	c
2.25 Bulk carrier	961.79	DWT of the ship	0.477
2.26 Gas carrier	1120.00	DWT of the ship	0.456
2.27 Tanker	1218.80	DWT of the ship	0.488
2.28 Container ship	174.22	DWT of the ship	0.201
2.29 General cargo ship	107.48	DWT of the ship	0.216
2.30 Refrigerated cargo carrier	227.01	DWT of the ship	0.244
2.31 Combination carrier	1219.00	DWT of the ship	0.488

It is interesting to note that Ro/ro vessels are thus far excluded from EEDI, because no adequate regression coefficients have been obtained for this class of vessels. This is an open subject that the IMO hopes to close in the foreseeable future.

The EEDI regulations will apply to all ships of 400 gross tonnage and above and are expected to enter into force on 1 January 2013. However, under Regulation 19, the Administration may waive the requirement for new ships of 400 gross tonnage and above from complying with the EEDI requirements. This waiver may not be applied to ships above 400 gross tonnage for which the building contract is placed four years after the entry into force date of Chapter 4; the keel of which is laid or which is at a similar stage of construction four years and six months after the entry into force; the delivery of which is after six years and six months after the entry into force; or in cases of the major conversion of a new or existing ship, four years after the entry into force date.

The Ship Energy Efficiency Management Plan (SEEMP) aims to establish a mechanism for a shipping company and/or a ship to improve the energy efficiency of ship operations. The SEEMP provides an approach for monitoring ship and fleet efficiency performance over time using the Energy Efficiency Operational Indicator<sup>11</sup> (EEOI) as a monitoring tool and serves as a benchmark tool.

Important as this milestone can be, we think the usefulness of the EEDI index in the context of green corridors is limited. This is so both because the index is defined on an individual ship basis and because some of the concerns that have been raised on the index, to the effect that it could lead to underpowered ships. Market-based measures (described in the previous section) seem far more relevant.

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<sup>11</sup> EEOI is a similar to EEDI index concerning the operation of all ships, new and existing.

## 9 Inland waterway transport

The main initiative launched by the EC for the promotion of inland waterway transport is the NAIADES (Navigation and Inland waterway Action and Development in Europe) action programme. The programme includes recommendations for action to be taken between 2006 and 2013 by the EC, the Member States and other parties concerned. The implementation of the programme is being carried out in close co-operation with national and regional authorities, River Commissions, as well as the European inland waterway transport sector. The Mid-Term Progress Report on the implementation of NAIADES was published while the present report was being revised. Since this document contains a comprehensive review of all legislative (and policy) actions taken in the sector in the period from 2006 up to now, it was decided to be included in this revision.

The documents examined in this section are:

- the “Mid-term progress report on the implementation of the NAIADES Action Programme for the promotion of inland waterway transport” [SEC(2011) 453],
- the final Report of the “Study on Administrative and Regulatory Barriers in the field of Inland Waterway Transport” and
- the Commission staff working document summarising the “Report on the impact assessment of proposals aiming to modernise and reinforce the organisational framework for inland waterway transport in Europe” [SEC(2008) 24].

### 9.1 Progress on implementing the NAIADES Action Programme

SEC(2011) 453 is the second progress report on the implementation of the NAIADES programme. It covers the period from 2006 to 2011. The report gives an overview of the achievements reached so far, the measures still underway or to be tackled and outlines the next steps until 2013. It is structured along the five action fields of the NAIADES programme, which are basic for the development of inland waterway transport in the EU: improving market conditions, modernising the fleet, developing human resources, raising image and awareness, as well as enhancing infrastructure. The following paragraphs present the legislative initiatives that correspond to each one of the above action fields.

#### *Action field: MARKET*

The proposal for a Directive on Intermodal Loading Units which aimed at standardising containers and swap bodies for inland transport on rail road and inland waterways due to the lack of support from the Member States was withdrawn on 23 March 2009.

The single transport document for all carriage of goods, irrespective of mode, is one of the measures that have been taken up in the Logistics Action Plan of 2007 [COM (2007) 607] with the aim to facilitate multimodal transport including IWT. However, since the introduction of the International Carriage of Goods Wholly or Partly by Sea (also known as "Rotterdam Rules"), the EC position is that all possible measures must be considered in conjunction with these rules.

#### *Action field: FLEET*

The second focus area of the NAIADES programme concerns the modernisation of the fleet. In order to maintain its status of an efficient, safe and environmentally friendly mode of transport, the sector must constantly adapt to the latest technological developments and market requirements. The following measures have been taken during the period covered by the progress report (2006 – 2011):

- Directive 2006/87/EC, laying down technical requirements for inland waterway vessels and repealing the 25-year old Directive 82/714/EEC, was adopted on 12 December 2006. It aims at the harmonisation of technical standards of vessels and is designed to lay down a high level of safety on EU inland waterways and to establish equivalency with the corresponding standards on the Rhine. The Directive including its various technical annexes has been transposed by the Member States into national law by 30 December 2008.
- Directive 2008/68/EC on transport of dangerous goods seeks compliance with international safety standards and establishes a common regime for all aspects of transport of dangerous goods, by road, rail, and inland waterways. It aligns with the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN), which sets out the conditions under which dangerous goods can be transported. On this basis, the single hull vessels in inland waterway transport shall gradually be replaced until 2019 by double hull vessels and, thus further increase the safety and environmental protection of inland waterway transport.
- Directive 2004/26/EC relates to measures against the emission of gaseous and particulate pollutants from internal combustion engines installed in non-road mobile machinery (NRMM). In line with the EU environmental policy, it aims at progressively reducing emissions and phasing out polluting equipment. The Directive's scope, which sets gradually more stringent limits for exhaust emissions, includes engines for inland vessels. Currently, a revision of the Directive is underway, aiming at introducing by 2012 emission stage IV, which will also apply to inland vessels. The different emission stages regulate the type approval of engines according to power output and swept volume.
- Directive 2009/30/EC introduces a mechanism to monitor and reduce GHG emissions. In this connection, Council Directive 1999/32/EC was amended as regards the specification of fuels used by inland waterway vessels. These fuels have to meet certain criteria concerning GHG emissions. In addition, as from 1 January 2011, diesel for inland vessels has to meet the same criteria on low sulphur as road diesel (EN 590). This means that the amount of sulphur in ships diesel will be limited to 10 mg/kg.

*Action field: JOBS AND SKILLS*

In this action field a proposal for an Amendment of Directive 96/50/EC on Boatmaster certificates has been made. This legislative initiative aims at the harmonisation and simplification of the legal framework for the issuance and recognition of boatmasters' certificates across the European Union. Currently, national boatmasters certificates issued pursuant to EU law are not recognised as valid for the navigation on the Rhine. The harmonisation with the Rhine system would therefore facilitate the free movement of boat masters across Europe. The proposal for amending Directive 96/50/EC in this sense is currently subject to an impact assessment.

*Action field: IMAGE & AWARENESS*

Regulation (EC) No 1365/2006 on statistics of goods transport by inland waterways repealed Directive 80/1119/EEC which presented a number of shortcomings with regard to reporting and monitoring of this transport mode. The Regulation addresses the shortcomings and defines a set of common rules for inland waterways transport statistics. Its objective is to provide the Commission, other EU institutions, national governments and the general public with comparable, reliable, harmonised, regular, and comprehensive



statistical data on the development of goods transport on inland waterways in the European Union. It applies in the 13 Member States with significant inland waterway transport.

*Action field: INFRASTRUCTURE*

The shape and quality of inland waterway infrastructure is characterised by the reviewed document as the decisive factor for the performance of IWT. The efficiency and competitiveness of IWT depend largely on the conditions of the waterway network and ports. River Information Services (RIS) is considered as the most important of the initiatives taken in this respect. RIS is an innovative concept for enhanced traffic and transport management in inland shipping facilitating electronic in-advance and real-time data transfer. The legal basis, the RIS Directive and the technical specifications, provide a European-wide framework for the harmonised implementation of the RIS concept. The report states that the RIS data exchange and communication need to be harmonised on a European level in order to facilitate the interoperability of the overall system. The RIS concept and legal framework foresee also the interoperability with other modal and in particular maritime traffic management systems.

Table 7 below summarises the status of the legislative instruments for the IWT sector.

**Table 7. The status of the legislative instruments for the IWT sector**

<b>Instrument</b>	<b>Status – Comments</b>
Harmonisation of: <ul style="list-style-type: none"> <li>▪ technical requirements for vessels</li> <li>▪ intermodal loading units (ILU)</li> <li>▪ statistics of goods transport by inland waterways</li> </ul>	<ul style="list-style-type: none"> <li>▪ Directive 2006/87 et al.</li> <li>▪ withdrawn</li> <li>▪ Regulation 1365/2006</li> </ul>
<ul style="list-style-type: none"> <li>▪ State aid guidelines for support schemes</li> <li>▪ De minimis rules for IWT</li> </ul>	<ul style="list-style-type: none"> <li>▪ postponed</li> <li>▪ Regulation 1998/2006/2008</li> </ul>
Harmonisation of: <ul style="list-style-type: none"> <li>▪ boatmasters certificates</li> <li>▪ intermodal liability</li> <li>▪ manning requirements</li> <li>▪ waste disposal</li> <li>▪ education and training standards</li> <li>▪ intermodal documentation</li> <li>▪ infrastructure charging</li> <li>▪ fuel quality</li> </ul>	<ul style="list-style-type: none"> <li>▪ Proposal in preparation</li> <li>▪ Subject to assessment/ratification</li> <li>▪ IA negative – secondary priority</li> <li>▪ postponed</li> <li>▪ to be developed into STCIN</li> <li>▪ subject to assessment/ratification of Rotterdam rules</li> <li>▪ subject to ongoing White paper process</li> <li>▪ Directive 2009/30</li> </ul>
Harmonisation of: <ul style="list-style-type: none"> <li>▪ transport of dangerous goods</li> <li>▪ engine emissions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Directive 2008/68</li> <li>▪ Stage IV planned 2012</li> </ul>
Reinforced position and normative framework of IWT	Impact Assessment 2008: no initiative

## **9.2 Administrative and regulatory barriers in inland waterway transport**

The 2008 “Study on Administrative and Regulatory Barriers in the field of Inland Waterway Transport” includes a comprehensive assessment of administrative and regulatory barriers that currently exist in the European Inland Waterway Transport industry and obstruct the proper functioning of the market and the market entry of new businesses. More specifically the study aims to:

- detect and identify the main regulatory, administrative and other constraints which restrain companies active or planning to become active in the fields of inland waterway transport, from developing their activities;
- analyse the barriers which have been identified and make an assessment with regard to the reason, justification and necessity; and
- propose general directions for solutions and future actions, as appropriate, of the EC, the Member States and regional/local authorities to remove/mitigate the detected barriers.

The study concluded that despite the substantial reduction of several barriers as a consequence of freeing the market in the 1990s, there are many new types of barriers that have emerged again. In particular, the category of problems related to various developments in society (increased environmental, food safety, security concerns etc) has increased in the past few years. Amongst others, ten new barriers encompass quality systems, waste transport requirements, dangerous goods treatment etc. In many cases the rules/administrative requirements in this new category are to a large extent of a commercial nature.

Problems mentioned with respect to financing are amongst others: lack of harmonisation of financing and insurance conditions between countries, problems with convincing banks of profitability prospects, limited experience of banks on IWT industry, lack of support by authorities (e.g. with regard to taxes, to subventions, to state guarantees etc.).

In relation to inland ship certification, it was found that in a number of countries companies are not satisfied with the performance of the inspection authorities. Instances of long delays in obtaining certificates, mistakes etc. were noted in various countries, and are considered to be a significant barrier.

The lack of standard/harmonised job profiles corresponding to manning/crew requirements is also seen as a barrier in some countries. Also related to this type of barriers, the problem of non-compliance with regulation on resting and sailing times was mentioned in a number of countries. This is a barrier that renders the competition among companies unfair.

Although many barriers were mentioned in relation to infrastructure, few qualified as regulatory or administrative. The most important among them pertain to local or port authorities: port dues, limiting opening times of ports or facilities in port, reduced number of facilities (e.g. rest areas in ports) and problems with infrastructure planning processes. Especially on the Danube, many of the reported problems relate to the lack of harmonisation of procedures with non-EU countries, causing amongst others, border crossing delays. Another problem that operators in international transport face is the lack of a common IWT language. In air and sea transport English is used as a common language, but this is not the case in IWT.

### **9.3 Modernisation of the organisational framework for IWT in Europe**

The regulatory actors in the inland sector are the Central Commission for Navigation on the Rhine (CCNR), the Danube Commission (DC), the EU, and the United Nations Economic Commission for Europe (UNECE), who each have a different (but to an extent overlapping) geographical scope, and whose legislation/resolutions do not always set similar requirements. However, the two international river navigation commissions, for the Rhine and for the Danube, which set rules for the transport of goods and passengers in parts of their river basin, are the most important. The EC participates as an observer in both and the relevant Member States are full members. The Rhine Convention is particularly

significant given its overall share of inland waterways traffic and the fact that its rules are binding.

Given that, apart from the EU, none of the involved institutions has either the competence or the means to legitimately act in the area of strategic policy management, the NAIADES Action Programme acknowledged the need to modernise and reinforce the organisational framework of the IWT in Europe. The aim would be to fully integrate the single market in the area of inland navigation, to create a better regulatory and business environment and thereby contribute to growth and enhanced competitiveness in the sector. In this context, the Commission conducted an impact assessment study, which examined the following four options for the structure of IWT in the future:

- Option 1: Increased cooperation but no change in the institutional framework
- Option 2: Adhesion of the Community to the Rhine and the Danube Commissions
- Option 3: Pan-European Convention
- Option 4: European Agency.

The study showed no clear advantage of a particular option in terms of the impacts assessed. Even if the current organisational structure situation may be regarded as “a patchwork of resources and efforts, with a fragmented legitimacy and a system-inherent reduced effectiveness”, the modification of the organisational structure, as such, would apparently not provide a sufficient contribution to dissolving the obstacles for the development of inland waterway transport in Europe.

As a result, it appears that, under the current circumstances, it can be preferable to base the organisational framework on the existing institutional actors, and to improve and modernise their working methods wherever possible.

## 10 Conclusions

The conclusions of Task 6.1 have been grouped below in those referring to the horizontal issues of Sections 2 to 5, and the more specific ones concerning the transport modes of Sections 6 to 9.

### 10.1 Horizontal issues

In general, significant progress has been made by the European Commission during the last decade in creating a legal framework conducive to the needs of a modern European transport system. However, new challenges have been added to the old ones and in today's framework of increasingly scarce monetary and nonmonetary resources, the effort needs to be continued. The remaining regulatory and market issues that are most relevant to green corridor development have been summarised below.

#### *Liberalisation of transport operations*

Following the efficiency gains achieved earlier by the market opening in air transport, the last decade saw further market opening in aviation (Single European Sky), road and partly in rail transport. Nevertheless, some transport market segments are not yet fully and de facto liberalised.

This is the case for the port services market, which in some cases remains in the hands of local monopolies. In road transport, access to the national markets of Member States by hauliers established in another Member State ('cabotage') may only be carried out "on a temporary basis".

Furthermore, in markets which have already been opened up to competition by EU legislation, inherited national regulations and market structure create obstacles to the entrance of new players. This is particularly the case for rail freight transport, which has been open to competition since January 2007. The principal problematic issues in rail stem from the relations between infrastructure managers and operators, which in many cases are still not fully independent, and the effectiveness of the regulatory oversight of market functioning. For instance, new rail freight operators often face discrimination in access to infrastructure or rail related services, due to the historic integration of the providers of such services and infrastructure managers with incumbent operators.

Market functioning is also hampered by a number of regulatory barriers, which have a protectionist effect. For example, relevant national rail authorities are reported to be reluctant to accept rolling stock certificates issued by other Member States, with the effect of hindering the free flow of trains across Europe and increasing red tape linked to the certification process.

In view of these problems, the following actions of the 2011 White Paper are of particular importance:

- Review the market situation of road freight transport with a view to further opening road transport markets; in particular by eliminating remaining restrictions on cabotage.
- Ensure effective and non-discriminatory access to rail infrastructure, including rail related services, in particular through structural separation between infrastructure management and service provision.
- Develop an integrated approach to freight corridor management, including track access charges.

- Achieve a single vehicle type authorisation and a single railway undertaking safety certification by reinforcing the role of the European Railway Agency (ERA).
- Review restrictions on provision for port services.
- Optimise the internal market for inland waterway transport and remove barriers that prevent its increased use.

#### *Internalisation of external costs*

As long as the total costs to society induced by transport activities (including the cost of infrastructure provision and maintenance) are not correctly reflected in the costs borne by transport users, the demand for transport stays above its optimal level and the pricing system fails to steer the customers towards the most efficient and sustainable mobility choices.

The latest initiative of the European Commission in this respect was the 2008 ‘Greening transport package’, which included: (i) a proposal for a Directive that would enable Member States to reduce environmental damage and congestion through more efficient and greener road tolls for lorries, and (ii) a Communication proposing measures to reduce the noise from existing rail freight trains by 50% through, among others, differentiated track access charges.

However, many of the external costs of transport today are still not internalised. Where existent, internalisation schemes are not coordinated between modes and Member States. Many taxes and subsidies directly affecting modal choices have been designed without the internalisation goal in view, rather pursuing traditional fiscal aims: the internalisation part of fuel taxation for instance is not clearly identified against other components of the tax. There are inconsistent taxation rules between transport modes and fuels, between and within Member States. In the worst case, tax systems subsidise environmentally unsustainable choices: for example, the favourable company car taxation rules give incentives for an artificially high car use.

With the recent release of the new White Paper, the European Commission sets year 2020 as the deadline for the full and mandatory internalisation of external costs for all modes with emphasis on road and rail transport. For the maritime sector, the promotion of a European Environmental Management System rewarding efforts towards greener shipping has been suggested, while for inland navigation proposals include the introduction of: (i) a uniform and transparent EU scheme for port dues and canal fees, based on marginal costs pricing principles and, (ii) an EU-wide transparent scheme of low water tariffs.

#### *Creation of a transport network with true European added value*

Transport infrastructure has been historically designed to serve national rather than European goals and cross-border links constitute bottlenecks that are likely to become increasingly costly as the EU economy continues integrating. Cross-border transport is additionally hindered by protectionist regulations, which refuse or restrict access to national markets by foreign operators. As a result, the EU transport system fails to exploit the full network benefits and economies of scale that a completed continent-wide transport grid would offer.

As an effort to create a transport network with true European added value, the Commission has introduced the concept of a dual layer planning approach with a “core network” as the top layer. While maintaining the fairly dense rail, road, inland waterways, ports and airports networks, which constitute the “comprehensive network” as the basic layer of the TEN-T and are, in large part, derived from the corresponding national networks, the “core network” would overlay the “comprehensive” network and give expression to a genuine European planning perspective focused on bringing about a systemic improvement in the

transport system's resource efficiency and a significant overall reduction of GHG emissions from transport.

Particularly important for green corridor development is the fact that the 'corridor approach' is seen as the basic instrument for core network implementation, on the grounds that the consolidation of large volumes for transfer over long distances is key to efficient intra-EU freight transport. These long-hauls along specially developed freight corridors can be optimised in terms of energy use and emissions, and become attractive to operators for their reliability, limited congestion and low operating and administrative costs.

Furthermore, these corridors could be accompanied by a multi-annual corridor development plan that identifies the major investments needed and facilitates long term availability of public funding. In this respect, consideration is given to setting up an integrated European funding framework to coordinate EU instruments for transport, such as the TEN-T programme and the TEN-T related contributions of the Cohesion and Structural Funds.

Beyond these development objectives, the corridors could also address wider transport policy objectives and facilitate modal integration and co-modal operations. Shippers and transport operators can be involved and commit themselves to reducing their carbon and environmental footprint on operations using the corridor.

#### *Interoperability and co-modality*

Market integration both within and between transport modes is still far from being achieved. Intermodal infrastructure – multimodal transshipment platforms for freight – is not sufficiently developed. Exchanging data between the modes is difficult because of the co-existence of non-compatible modal ICT systems.

Besides, the lack of universally approved standards on vehicle weights and dimensions, power supplies and educational requirements for transport workers are further obstacles to international traffic. For example in the rail sector, the most striking evidence of such barriers is different track gauges, electricity supply and signalling systems. The deployment of ERTMS, the European signalling system, is progressing slowly; so far, only discontinued sections of lines are equipped, and locomotives still need to be additionally equipped with national systems. Also, the length and weight of trains is not harmonised across Europe whereas the weights and dimensions of road vehicles could be optimised, reflecting the progress in ITS and infrastructure design and considering opportunities for reducing GHG emissions of heavy duty vehicles.

Increasing levels of congestion, on the other hand, already places mounting pressure on the mobility services, particularly in the larger urban areas. It is of paramount importance to develop comprehensive, integrated service concepts and business models that complement existing modes, and for which the dominant factor will be extensive cooperation between the various actors in the chain. Such new models and service solutions need to support innovative business practices, route planning regimes and efficient transshipment of goods (in particular, over the 'last mile') between modes and networks. ICT and a better knowledge of transport demand will play a major role in these developments, as will the trend towards extended standardisation for freight carriers in terms of dimensions and modularisation.

The new White Paper acknowledges these needs and includes a number of actions addressing them:

- Ensure the full interoperability between ICT systems in the waterborne sectors, integrate the use of monitoring tools by all relevant authorities, guarantee the

monitoring of vessels and freight (Blue Belt) and set up appropriate port facilities (“Blue Lanes”).

- Adapt the legislation on weight and dimension to new circumstances, technologies and needs (e.g. weight of batteries, better aerodynamic performance), and to make sure it facilitates intermodal transport and the reduction of overall energy consumption and emissions.
- Put in practice the concepts of ‘single window’ and ‘one-stop administrative shop’; by creating and deploying a single transport document in electronic form (electronic waybill), and creating the appropriate framework for the deployment of tracking and tracing technologies, RFID etc.).
- Ensure that liability regimes promote rail, waterborne and intermodal transport.
- Streamline the rules for the intermodal transport of dangerous goods to ensure interoperability between the different modes.
- Enhance joint European efforts in the development and deployment of:
  - Integrated transport management and information systems, facilitating smart mobility services, traffic management for improved use of infrastructure and vehicles, and real-time information systems to track and trace freight and to manage freight flows.
  - Intelligent infrastructure (both land and space-based) to ensure maximum monitoring and inter-operability of the different forms of transport and communication between infrastructure and vehicles.
- Create in the context of the ‘core network’ multimodal freight corridor structures to synchronise investments and infrastructure works and support efficient, innovative and multimodal transport services, including rail services over medium and long distances.
- Support multimodal transport and single wagon load business, stimulate the integration of inland waterways into the transport system and promote eco-innovation in freight transport. Support the deployment of new vehicles and vessels and retrofitting.

## 10.2 Modal issues

The section presents the conclusions that refer to specific transport modes. Those concerning multi-modality have been presented in the previous section.

### *Road transport*

Among the vast EU legislation pertaining directly or indirectly to road transport, the pieces of highest interest in relation to green corridor development concern the introduction of emission standards for Large Goods Vehicles, the deployment of ITS and, the improvement of road safety.

The success of the EURO standards on conventional pollutants demonstrates that, in the presence of market failures, technological standards can be an effective way of accelerating the introduction of cleaner vehicles, by providing fixed targets for the industry and avoiding ‘wait and see’ strategies of manufacturers. Minimum standards can thus be instrumental in maintaining Europe’s position as a global trend-setter.

The EU has put in place a regulation on CO<sub>2</sub> emission standards for new passenger cars, setting binding targets for 2012/2015 and 2020. However, such standards are currently non-existent for other vehicle categories. A reliable and realistic method is needed to certify the fuel consumption and CO<sub>2</sub> emissions of complete heavy duty vehicles as well as trailers and semitrailers. The Commission has started work on the development of such a method.

Reliance on advanced ITS technology has an essential role to play in the greening of transport:

- ITS tools constitute a core enabler for the management of logistic chains, notably in maintaining a paperless information trail in the management of the physical flow of goods (e-Freight).
- Real-time Traffic and Travel Information (RTTI) services, more and more combined with satellite navigation, are now being offered from both public and private sources to facilitate mobility.
- Navigation and tracking and tracing systems can help in providing remote in-route monitoring of vehicles and cargo.

The Commission's *Action plan for the deployment of Intelligent Transport Systems in Europe* was adopted in late 2008 to create the momentum necessary to speed up market penetration of rather mature ITS applications and services in Europe. Traffic management, congestion relief on freight corridors and in cities, promotion of co-modality, in-vehicle safety systems, real time traffic and travel information and an open in-vehicle platform to integrate applications were among the priority issues identified. The role of ITS in ensuring a modern European transport system is reaffirmed by the new White Paper.

Road safety is a major societal issue and a great concern to citizens and governments all across Europe. Although significant improvements have been reached in the framework of the third European action programme for road safety up to 2010, much still needs to be done. As a contribution to the ambitious goal of zero fatalities in road transport by 2050, the Commission proposes to halve the overall number of road deaths in the European Union by 2020 starting from the results reached in 2010. To this end, the new White Paper includes the following actions:

- Harmonise and deploy road safety technology – such as driver assistance systems, (smart) speed limiters, seat-belt reminders, eCall, cooperative systems and vehicle-infrastructure interfaces – as well as improved road worthiness tests including for alternative propulsion systems.
- Develop a comprehensive strategy of action on road injuries and emergency services, including common definitions and standard classifications of injuries and fatalities, in view of adopting an injuries reduction target.
- Focus on training and education of all users; promote the use of safety equipment (seatbelts, protective clothes, anti-tampering).
- Pay particular attention to vulnerable users such as pedestrians, cyclists and motorcyclists, including through safer infrastructure and vehicle technologies.

#### *Rail transport*

Smooth and efficient rail operation in Europe is hampered by the patchwork of different rail systems that exist. Differences range across a wide spectrum, including rail gauges (at least 4 different widths), electricity systems (at least 4 different systems), signalling systems (at least a dozen different systems), various clearance profiles, various technical specifications of locomotives and other rolling stock, and many other differences, not the least of which is that trains in some countries run on the left and in some other countries on the right. Such differences make the goal of rail interoperability very difficult to achieve unless specific, systematic and methodical action is taken.

Directive 2008/57/EC of 17 June 2008 aims to establish the conditions so as to achieve interoperability within the Community rail system. These conditions concern the design, construction, placing in service, upgrading, renewal, operation and maintenance of the



parts of this system as well as the professional qualifications and health and safety conditions of the staff who contribute to its operation and maintenance.

One of the main characteristics of rail interoperability in Europe is ERTMS ("European Rail Traffic Management System"). One component of ERTMS, the European Train Control System (ETCS), guarantees a common standard that enables trains to cross national borders and enhances safety.

In 2005, the European Commission and the rail industry signed a memorandum of understanding on the deployment of ERTMS on a key part of the European network with an emphasis on six freight corridors. On 22 July 2009 the Commission adopted a European Deployment Plan for ERTMS which provides for the progressive deployment of ERTMS along the main European rail routes. This will reduce running costs and improve the system's efficiency on long cross-border distances.

In addition to technical problems, the competitiveness of rail freight is also hampered by operational barriers to inter-state traffic (particularly the establishment of new freight flows) and a tendency to prioritise passenger services.

The aim of Regulation 913/2010 was to establish a European rail network where sufficient priority is given to international freight trains. Of particular importance to SuperGreen is:

- the defining criterion (crossing by the freight corridor of the territory of at least three Member States, or of two Member States if the distance between the terminals served by the freight corridor is greater than 500 km);
- the capacity allocation procedure aiming at increased freight transport;
- the governance rules emphasising the necessary coordination of all parties involved;
- the requirement to meet technical specifications related to interoperability; and
- the performance monitoring provisions, with emphasis placed on journey time, reliability and user satisfaction.

Regarding rail's environmental performance, EU rules limit the emissions of CO, hydrocarbons and NOx combined, and particulates that can be emitted from new locomotive engines. Moreover, the Commission has proposed: (i) tighter restrictions for the sulphur content of gas oils intended for use by non-road mobile machinery (which includes locomotives engines) and, (ii) measures at source (vehicles and tracks) that aim at reducing the noise emission of new and existing freight wagons by about 50%.

In terms of safety, even though Europe's railways are among the safest in the world, the EU is looking to maintain high standards and to harmonise safety requirements EU-wide basically through enhancing the role of the European Railway Agency (ERA).

#### *Maritime transport*

It appears that the most significant issues concerning the maritime industry relate to the creation of a European maritime transport space without barriers as well as improvements in its environmental performance, safety, security and surveillance.

A real internal market for maritime transport in Europe does not yet exist. This means that a vessel travelling between two EU ports is subject to more complex and time-consuming procedures than a truck would be. In order to unlock the full potential of Europe's shipping industry and support the development of green corridors, this disadvantage of maritime transport compared with the other modes must be eliminated through the simplification of administrative and customs formalities for intra-EU maritime services.

This is acknowledged by the new White Paper, which proposes further developing the 'European maritime transport space without barriers' into a 'Blue Belt' of free maritime

movement in and around Europe so as to use waterborne transport to its full potential. Furthermore, the e-Maritime initiative is seen as an important tool to reduce administrative costs by promoting interoperability between the systems of all maritime transport stakeholders and, thus, eliminating waste of time and data errors. Such a system should be able to interface with the e-Freight, e-Customs and ITS, allowing the users to track and trace the cargo not only during the waterborne part of the journey, but across all transport modes accordingly to co-modality objectives.

In terms of environmental performance, the Commission is following the IMO developments on GHG emissions from ships very closely, and has stated clearly that although its support for IMO measures is granted, it intends to adopt measures of its own if the IMO process does not proceed fast enough.

After years of discussions and sometimes highly political debate between developed and developing countries, the Energy Efficiency Design Index (EEDI) for new ships was adopted during the 62<sup>nd</sup> session of IMO's Marine Environment Protection Committee in July 2011. EEDI is a benchmarking scheme that aims to provide an indication of a merchant ship's CO<sub>2</sub> output in relation to its transport work.

In addition to EEDI, both IMO and the Commission are considering the adoption of a market based measure that would internalise the external costs of GHG emissions by ships. However, utmost care should be exercised on the choice of the instrument and on its implementation scheme, so as to avoid carbon leakage, evasion/fraud and cargo shifts to land-based modes that could produce more GHGs.

In the area of safety, following adoption and further implementation of the 3rd Maritime Safety Package, the EU now has one of the world's most advanced regulatory frameworks for the maritime sector. Further work is needed to develop SafeSeaNet into the core system for all relevant maritime information tools necessary to support maritime safety and security and the protection of the marine environment from ship-source pollution.

In terms of security, the Joint Security Assessments covering all modes of transport and the pursue of international cooperation in the fight against terrorism and other criminal activities like piracy are considered crucial for increasing the level of security along the supply chain without impeding the free flow of trade.

Furthermore, the 2011 White Paper considers the Motorways of the Sea concept as an important instrument in greening EU's maritime transport. Corridors are a natural follow-up of the quest for efficiency in transport and, their relative attractiveness vis-à-vis other forms of organisation lies in their suitability for exploiting scale economies and their inherent nature to connect transport nodes. In absence of properly designed Common Maritime Space in the EU, the role of the corridors becomes considerably more important for the provision of optimised transport solutions and seamless door-to-door services.

The existence of properly designed terminals which function efficiently 365 days a year can, to some extent, counterbalance the inefficiencies introduced by the fragmented nature of EU national waters and their implications on customs procedures. Central to this type of reasoning is the dual usefulness of the concept of a transshipment platform, i.e. as physical facilitators of intermodal cargo movement, but also as virtual systems of information distribution to multiple users featuring interoperability, efficiency and interconnectivity (collectively referred to as co-modality).

#### *Inland waterway transport*

The IWT review was based on the NAIDES Action Programme which is the main targeted initiative launched in Europe for the provision of favourable framework conditions for the

IWT sector. The PLATINA (FP7 project), provides support to the NAIADES action plan and seeks ways to accelerate the goals set by this plan. The PLATINA has already produced some studies which are very useful for the SuperGreen objectives.

An important output of the review is that although there has been a reduction of regulatory barriers subject to the freeing of markets during the 90s, there are many new types of barriers that have emerged again due to safety, security, and environmental concerns. The entrance of these new types of barriers is also depicted in the most recent regulatory IWT measures taken at the European level.

EU regulatory initiatives considered important for the development of the sector include the RIS Directive and the Directive for the technical requirements for inland waterway vessels.

There is a continuous effort to harmonise and standardise the IWT procedures in European level, which however is not always successful. The proposal for a Directive on Intermodal Loading Units, which aimed at standardising containers and swap bodies for inland transport on rail, road and inland waterways, was withdrawn on 23 March 2009 due to the lack of support from the Member States.

The existence of different regulatory actors in the IWT sector, who each have a different (but to an extent overlapping) geographical scope, and whose legislation/resolutions do not always set similar requirements has been identified as a problem. However, a recent study concluded that a potential pan-European Convention for the IWT would add another regulatory layer and possibly would further complicate the process of regulatory harmonisation. Instead, it was suggested to base the organisational framework on the existing institutional actors, and reach the goal of market integration by strengthening EU's cooperation mainly with the Danube and Rhine Commissions.

The NAIADES mid-term progress report concludes that even if inland waterway transport has a good environmental record, efforts will be needed to maintain and further improve its environmental performance, also with a view to climate change and mitigation strategies such as decarbonisation. As with the other transport modes, these efforts can be of a technical and/or operational nature.

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