

# The next EIRAC Strategic Agenda 2010 - 2030+



ITS Netherlands



EIRAC II is co-funded by the European Commission  
in the scope of the 7th Research Framework Programme





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# 01

## The need for a new Strategic Agenda

In December 2005, the EIRAC (European Intermodal Research Advisory Council) proudly presented its Strategic Intermodal Research Agenda 2020 (SIRA), followed one year later by its Implementation Plan published in December 2006. Over the last five years, EIRAC has contributed to achieve the main goals for intermodal transport, injecting a lot of energy and effort.

Meanwhile, the world has changed: climate change stroke harder, the financial downturn wiped away so-far-considered social cornerstones. The political reply has been timely: decarbonisation of human and industrial activities has come on top of the agendas of leading countries around the world, including the European Union, their recovery plans are centred on sustainable growth. It is a matter of profit, planet and people. It has become apparent that freedom and growth shall come along with sustainable mobility and logistics, which are to be tailored around new paradigms and collaboration schemes enhancing the capabilities of improving and exploiting capacity. Decarbonisation of the supply chain could limit climate

change and reduce its effects; it is now clear that it is not just a matter of intermodality or containerization of transport: innovation and change shall focus on logistics, improving the efficiency of supply chains.

Being an expression of the whole society (i.e., industry, academia, institutions), EIRAC will move along the same line. A rejuvenation of its vision and mission is here presented, along with a new agenda still spread over innovation and change, now emphasizing on sustainable logistics, decarbonisation of the supply chain, optimal use of all transport modalities.

EIRAC has therefore chosen for a shift in focus:

- From intermodality to sustainability;
- From research to initiatives and solutions;
- From closed shop to open network

( logistics and transport providers, shippers and buyers and policy makers ).

# 02

## Framework Strategic Agenda 2030

### 2.1. Trajectory: past versus future

The purpose of the new EIRAC vision is to show its ambition while still being feasible.

#### 2.1.1. VISION EIRAC

Support 40% economic growth at 2050 (PROFIT), reducing emission of GHG by 80% (PLANET), improving the quality of life (PEOPLE).



#### 2.1.2. MISSION EIRAC

Improve European sustainability by decarbonising the supply chain by 80%, supporting an economic growth of 40% by 2050, while improving the quality of life.

- Sustainability is defined by Brundtland as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.
- This definition fits in the 3P’s model: PEOPLE is the focus on the user/client/citizen and quality of life, PLANET is the focus on the environment, security and safety and PROFIT is the focus on economic growth, profitability and prosperity.
- Supply chain is the movement of physical, financial and information flows from their source to the end customer.
- Sustainable addresses social, economic and environmental issues.
- Quality of life addresses daily living enhanced by wholesome food and clean air and water, enjoyment of unfettered open spaces and bodies of water, conservation of wildlife and natural resources, security from crime, and protection from radiation and toxic substances.

Keeping People, Planet and Profit within our business and research models is the main goal.

The new EIRAC view will bring together the different experiences of the players. Sustainability is not only an issue for now, but it will be one of the future and concerning everybody. This new Strategic Agenda will be a reference to all those groups intending to develop research and practical supply chain actions in line with sustainable logistics. The link between intermodality and sustainability is very clear. This is the connection between the previous and the new agenda.

#### 2.1.3. EXISTING STUDIES AND FUTURE BUSINESS SCENARIO

Several studies within the EIRAC scope have received positive attention. These studies are substantially useful as input for the new strategic agenda. Therefore, a brief overview of a few studies and their contributions is provided below:

##### • FREIGHTVISION: Freight Transport Foresight 2050

The FREIGHTVISION Forum published in February 2010 its vision and action plan for a future sustainable European long-distance freight transport system. The targets mentioned in the EIRAC vision are being supported by the FREIGHTVISION report (Freight Transport Foresight 2050, 2010, p.4). Their vision is a definition of quantitative goals for reducing greenhouse gas emission by 80%, until 2050. One of the most effective actions they mention is “vehicle efficiency”; this vehicle efficiency also includes increasing the load factor and reducing empty kilometres (mileage) for all modes.

##### • World Economic Forum: Supply Chain Decarbonisation

The study from the World Economic Forum aims towards assessing the scale and feasibility of potential emission abatement options across the supply chain. Within this study, several opportunities have been formulated, such as clean vehicle technology, low carbon sourcing, low carbon manufacturing and energy efficient buildings, which are outside the scope of EIRAC. However, issues like de-speeding the supply chain, optimized networks, packaging design initiatives, modal switches and training and communication fall perfectly within the scope of EIRAC. The executive summary can be found in the attachments.



- **European Green Car Initiative**

The EGCI roadmap comprises three pillars: electrification of road transport, long distance transport, and logistics and co-modality. These three pillars represent the key areas to achieve energy efficiency improvements, CO2 emissions reductions and reliable logistics and mobility. At the same time, they represent important opportunities for Europe to turn its outstanding knowledge base in the field of clean and energy efficient vehicles and transport solutions into innovation for the benefit of the society, the economy and the environment. The pillar on Logistics and co-modality is made with the input of EIRAC. See annex 2

- **EBS European Business School: Future of Logistics 2030+ and beyond**

EIRAC has continuously supported the foresight research at the Centre for Futures Studies and Knowledge Management at the Supply Chain Management Institute, EBS Business School over the past years. The Centre aims to systematically examine the future in the field of logistics, mobility and supply chain management. Its primary objective is to generate futures knowledge for decision

support in politics, business and academia as well as to develop new methods for effective futures management. An overall premise is the conformity to strict, rigorous scientific standards. Several long-range scenario studies have been conducted on the future of logistics that gave impulses and thoughts for the EIRAC discussions and strategic decisions. Major research reports included:

- Future of Logistics 2025: Global Scenarios (specific focus on the sustainable contributions logistics can make in the future)
- Transportation & Logistics 2030, Vol. 1 and 2 (scenarios series on energy efficiency in supply chains, sustainability, transport infrastructure)

From these studies we incorporated key results in Chapter 3, which in turn was taken as valuable basis for EIRAC's strategic course described in chapter IV.

# 03

## Business Scenario 2030+

The future of the logistics industry will be faced with many obstacles as well as opportunities. Intensifying internationalization, stronger competition, higher customer demands on quality, sustainability and convenience as well as resource scarcity are just a few of the factors that lead to a more turbulent and uncertain environment. Given these facts, there is a considerable need for futures orientation and innovation in logistics. Today's logistics environment requires flexibility, creativity, and readiness to assume risks with respect to international presence, service offers, and the organisation of networks.

On basis of the scenario research performed by the EBS Business School's Centre for Futures Studies and Knowledge Management, the following findings and trends can be concluded:

### 3.1. Megatrends

Megatrends are long-term transformation processes that influence our lives and society in a sustainable and fundamental way. There are numerous megatrends that are dominating our business and social life for the next 10 to 20 years and beyond. Depending on the industry their intensity is differing. The following important trends have to be considered in the context of the EIRAC Strategic Agenda's three dimensionalities:

People: Demographic change, increasing cultural diversity, intensifying urbanization, individualization, education and training / recruitment, consumer change and health care, new work world, digitization, mobility, new world order, knowledge society, artificial intelligence.  
Planet: Sustainability & Corporate Social Responsibility (CSR), climate change, resource scarcity, security risks.  
Profit: Co-modality and integration, sustainable transport, e-logistics, outsourcing, professionalization of logistics processes, safety and security, increase in energy costs, tightening of legal restrictions.

### 3.2. Conclusions

Former scenario research has drawn several conclusions: the logistics industry has to be active in responding to the megatrends and implications that results from them. Sustainability, efficiency, collaboration and innovation are fundamental drivers of the industry's and European long-term future. The following seven essentials can be drawn from the scenario research of the EBS Business School of the last two years, which included consultation of hundreds of policy and strategy experts worldwide:

### **1. ALTERNATIVE ENERGY USAGE WILL INCREASE, BUT A GLOBAL ENERGY TURNAROUND WILL NOT BE ACHIEVED BY 2030.**

Given the primacy of fossil fuels in the current energy mix, experts from International Energy Agency (IEA) anticipate that they will continue to cover more than 85 percent of energy needs until 2030. The current contribution of renewable energy sources is relatively low at approximately 7 percent of the global energy mix. In addition, most experts are expecting the world's extraction of crude oil to peak (peak oil), i.e. for us to reach the half-way point of the oil age, between 2015 and 2020. However, there appears to be little doubt that the importance of alternative energies will increase in coming years. Green or clean energy is heralded by many as a possible engine for economic growth that could help lift the world out of a global recession. Incentives for companies to switch to alternative energy will keep strong.

### **2. REDUCING TRANSPORT EMISSIONS WILL BE A GREATER CHALLENGE FOR TRANSPORT COMPANIES THAN THE SUPPLY OF ENERGY.**

Over the long-term, a shift to energy sources with a low or zero carbon footprint will be imperative. There is a need for strong and urgent action in order to reduce CO2 emissions and other greenhouse gases. A framework for long-term action towards clear, quantified global targets for the stabilization of greenhouse gas in the atmosphere is critical to reaching this goal. Transportation accounts for more than 13 percent of CO2 emissions worldwide, with road freight transport representing the largest – and growing – portion (cf. IPCC). Achieving a substantive global reduction of emissions will therefore necessitate a significant decrease in transport emissions.

### **3. COSTS RELATED TO THE CARBON FOOTPRINT OF LOGISTICS PROCESSES WILL BE ALLOCATED TO THE CAUSER.**

Efficient pricing based on external cost matches supply and demand at its most efficient point, leading to direct economic benefits by reducing externalities (i.e. congestion, pollution) to the optimum level. The costs of mitigating climate change are estimated at around \$600bn - 1.500bn annually and whilst governments will need to contribute, some 80-90 percent will need to be financed from the private sector (cf. Stern Review). Footing the bill will be challenging for, but the consequences of failing to act look to be much grimmer. The transportation and logistics industry will undoubtedly have to play its part in reducing GHG emissions. The first step will be agreeing on limits. Standards for measuring emissions and systems for allocating the impact will then follow (emissions trading, toll systems). The goal of such systems is to ensure that the carbon footprint of logistics processes in supply chains will be taken over by its responsible causer. In addition, transport infrastructure will increasingly be assessed on environmental compatibility. Independent bodies will have to be established that rate transport infrastructure (development) on its eco-friendliness.

### **4. THE MINIMIZATION OF ENERGY CONSUMPTION WILL BECOME A PARAMOUNT CRITERION IN SUPPLY CHAIN DESIGN TOGETHER WITH TOTAL COSTS.**

Historically, minimizing energy consumption has not universally been seen as a paramount criterion in supply chain design. The oil price shocks seen in early 2008 brought the issue into the foreground for many industries; however, questions remain around how best to design a truly energy-efficient supply chain. The future of supply chain design requires rethinking the just-in-time concept in order to balance energy efficiency with the appropriate speed of delivery.

### **5. INTEGRATION AND DIGITIZATION WILL TAKE TRANSPORT INFRASTRUCTURE TO THE NEXT LEVEL.**

Transport infrastructure development should focus more on integrating digital infrastructure, as ICT will be a key enabler for the development of cutting-edge transport infrastructure. The success of transport infrastructure deployment will increasingly be influenced by professional integration of ICT. The stimulation of economic growth by ICT can be observed from several different perspectives. On individual company level, effective ICT infrastructure assists in increasing process efficiency or reducing operating and/or administrative costs. From a governmental perspective, ICT is valued due to its positive potential to improve national productivity, including the positive impact on GDP growth mentioned above.

### **6. CLOSE COLLABORATION OF INDUSTRY, ACADEMIA AND GOVERNMENT IN LOGISTICS CLUSTERS WILL ACTIVATE NEW POTENTIALS IN TRANSPORT INFRASTRUCTURE DEVELOPMENT.**

Modern cluster theory describes clusters as regional concentrations of specialized companies, research institutions and public authorities. Multiple linkages and spill-over effects result in an effective and efficient environment for innovation, the exchange of ideas, knowledge transfer and cooperation. Collaboration across business, academia and the public sector clearly has great potential to spark economic growth, and such partnerships may be critical to the future of the transportation and logistics sector. Logistics companies should aim to join logistics clusters and actively collaborate with transport infrastructure operators, governments and academia.

### **7. HUMAN CAPITAL WILL BECOME INCREASINGLY A SCARCE RESOURCE IN THE FUTURE KNOWLEDGE SOCIETY. THE ACCESS TO QUALIFIED PERSONNEL TURNS THEREFORE INTO ONE OF THE KEY SUSTAINABLE COMPETITIVE FACTORS.**

Products and services are becoming increasingly more knowledge-intensive, which places new demands and skills on employees and their education. The demographic change will make the "war for talents" yet more acute. This will require logistics to work hard to make good the lack of human resource management. Access to international recruitment structures will be just as important as active measures to improve the attractiveness of the sector, branding and retention programs. The sector needs to address this problem and actively lobby in order to compete with other industries for the best employees in the future.

Scenarios are only a starting point for strategies, innovations and risk assessments. Based on expert consultations and futures workshops, multiple opportunities for transportation and logistics 2030 could be identified. Figure 2 shows a selection of the most relevant ones. While mainstream opportunities are likely to affect the entire industry, specialist opportunities will only be relevant for distinct logistics service providers. As with the megatrends in the former section, the highlighted red ones indicate high relevancy and focus in terms of EIRAC's future strategic agenda:



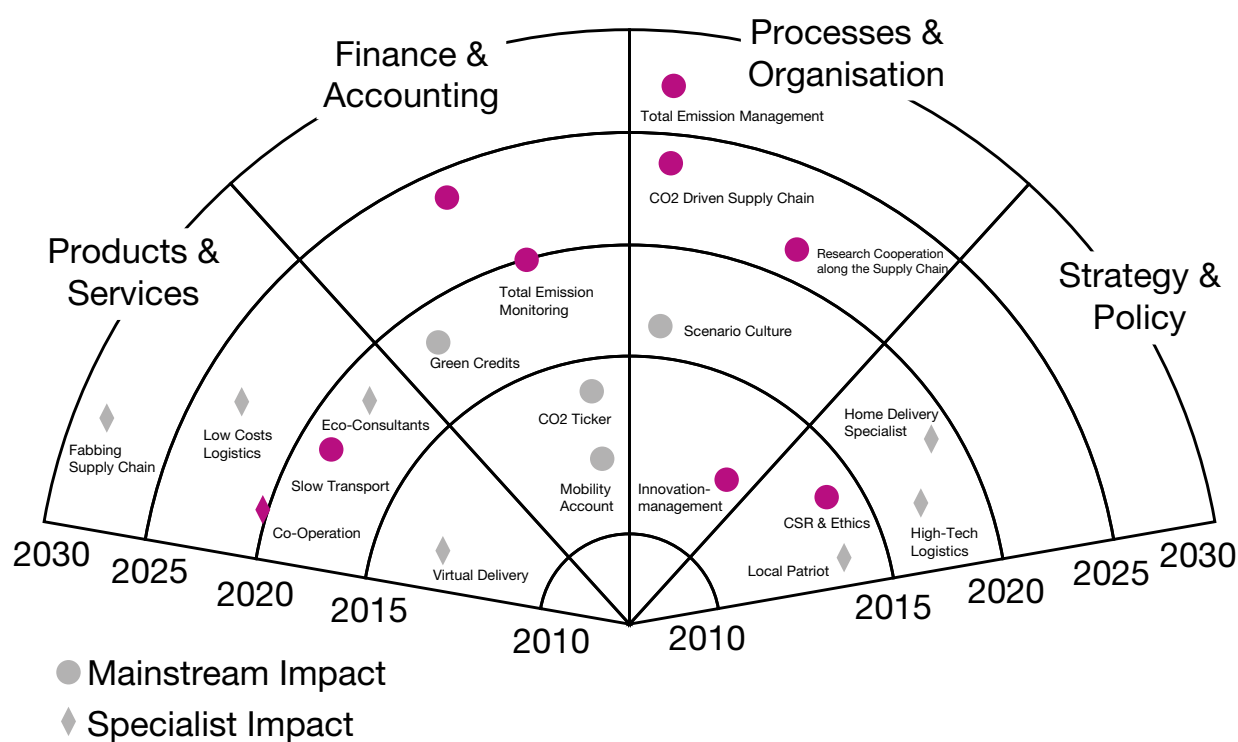


Figure 2 Opportunity radar (Source: SMI/ PwC 2009 Transportation & Logistics 2030 – Volume 1)

# 04

## EIRAC Strategic Agenda

Based on the research, results and initiatives mentioned in Chapter III, seven issues have been formulated. Each of these issues starts with a description followed by research and demonstration purposes. New in the strategic agenda is the focus on mind shift. All of the issues cover the necessary shift in people's minds. Aspects related to "Education & Training", which has already a subject included in the previous agenda, are also an important focus in this new version. Therefore, every topic clarifies what kind of education and training is necessary to deal with the issue.

### 4.1. Energy Efficiency

#### 4.1.1. DESCRIPTION AND ELEMENTS

Increased energy efficiency is a key enabler to meeting the growth and GHG reduction targets set forth in the EIRAC vision. Increasing efficiency is a continuous process building on improvements from the current state. This strategic agenda proposes a systematic approach to address energy efficiency and to develop comprehensive solutions that will enhance European competitiveness and be transferable as "global benchmarks". Technological efficiency<sup>1</sup> (vehicle and terminal "hardware"), logistical efficiency (mode, utilization and load makeup, routing etc.),

and new business models for energy management in the entire logistics chain (transportation, terminals, distribution and consolidation centres, warehouses) are the key drivers of energy efficiency in the future. Opportunities for energy efficiency within intermodal transport include: **(1)** "slow steaming" of ships and barges **(2)** automated terminal operation including the application of smart grids, storage solutions for high power applications, synchronization of equipment operation in terminals **(3)** transportation modes optimized for the route **(4)** minimized repacking in mode changes **(5)** comingling of freight for improved utilization **(6)** alternative fuels and efficient engine technologies<sup>1</sup>, including regeneration of energy **(7)** reducing drag and rolling resistance<sup>1</sup> **(8)** "de-stressing" the supply chain by providing larger time buffers in desired shipment times thereby enabling better utilization of more appropriate modes and equipment.

#### 4.1.2. RESEARCH & DEMONSTRATION

This strategic agenda views research and demonstration projects in four areas as being keys to successful realization of energy efficiency in EU and global logistics networks. These are listed below (together with specific actions that further enable implementation):

**1.** The “de-stressing” of the supply chain, i.e., relaxing the “constraints” on the supply chain to achieve a natural efficiency

- Test efficiency of new technologies and business models (e.g. slow steaming) which enable de-stressing
- Right metrics for energy efficiency will support “de-stressing”. Develop, test, validate, and implement these metrics while building on those already in place.

**2.** Energy usage reduction in terminals, distribution and consolidation centres, and other supply chain nodes

- Innovative business models to support efficient energy management in terminals
- European technology development in intermodal usage to lead global energy efficiency in inter-modal shipment
- Leverage “technology hardware” for port/terminal/cross-dock operations that increases both intermodal capability and energy efficiency

**3.** The development and implementation of optimization models to select modes, plan loads, and establish routes

- Optimization models to select mode, loads, and routes for efficient utilization and energy efficiency.
- Dynamic demand management in the comingling/co-opetition arena to further improve logistics utilization and efficiency

**4.** The capability for effective communication and exchange of information to enhance supply chain decision making and management and also to support the other three areas

- Communication and information exchange infrastructure to enable optimized mode utilization and bundling of freight (long distance and urban delivery)
- Creation of “markets” to enable and facilitate bundling of freight / co-opetition while providing individual company profitability

### 4.1.3. MIND SHIFT

- Help and support companies to “educate” their customers to accept “slower” deliveries
- Increase focus on “reliability” instead of “short lead time” and on the related benefits for both consumers and companies
- Stimulate terminals operators in applying energy-driven planning and equipment operation
- Help logistics companies influence their customers, shippers and cargo owners to accept “greener” services
- Support development of government regulations and standards that are streamlined and consistent across the EU for intermodal freight
- Propose incentives for companies to use transport mode that is optimal for the route and load
- Lobby for governments to dedicate budgets to implement “virtual” infrastructure supporting green intermodal freight (e.g. information sharing portal)
- Lobby for new legislation and contracting for energy management and supply

### 4.1.4. EDUCATION AND TRAINING

- Engineers trained in advanced supply chain and inter-modal management in university programs
- Companies (especially smaller logistics companies) able to apply new technologies using government supported university/consulting training mechanisms

## 4.2. CO2 reduction and sustainability

### 4.2.1. DESCRIPTION AND ELEMENTS

In order to lead to the decarbonisation of supply chains supporting growth in a sustainable way (new EIRAC vision), a clear understanding of the CO2 emission levels, both for shippers and logistics service providers should be made available.

**1.** Therefore, the right tools shall be developed, demonstrated and made available to shippers, logistics service providers and transport operators (all modes) making them able to:

- Quantify the actual carbon emission of given supply chains and transport network
- Test different alternatives and logistics patterns and quantify the potential of emission reduction of any alternative

Such tools shall be able to show the influence of different factors on the carbon emissions levels of the supply chain:

- Influence of the selected transport modes and transport mode combination
- Influence of the distance (geographical routes)
- Influence of the loading factor

**1. Notes:** Already included in ERTRAC. From EIRAC standpoint, these are included more for completeness than for potential specific research or implementation.

- Influence of the speed
- Influence of the selected transport vehicles (different types of technologies)
- Costs of the logistics choices
- Influence of the energy consumption

These tools could be made available to shippers and logistics service providers willing to carry out a self-assessment of their supply chains, and should be “combined” to existing tools such as the EcoPorts self-diagnosis, the EcoTransit calculator (condition and framework to be defined).

Once a set of emission factors has been agreed for individual transport modes, these values can be used to derive composite emission factors for intermodal operations. These composite values need to be weighted by the relative distances travelled on each of the modes in the course of the intermodal journey. Companies often do not know the routing of intermodal consignments and hence the distance split between the modes. One way of obtaining a representative value would be to survey large intermodal operators and ask them to provide average values of the distance splits for different intermodal combinations.

**2.** These assessment frameworks should be also extended not only to carbon emissions (CO2) but also to SOx, NOx, PM, VOC which affect also the environment and human health. A proper market introduction and recognition of such assessment frameworks will be vital to get the proper acceptance and actual use within the transport and logistics industry.

**3.** In a larger extend, this assessment framework shall be used for the setting of a measurable and acknowledged label on Earth Friendly Logistics based on environmental, economical and social criteria, for the implementation of concrete actions within the supply chains of the labelled organisations.

Companies which are able to quantify their carbon emissions along their supply chain and able to demonstrate a commitment towards their reduction, taken into account also social and economic matters could apply to this label. Such label would represent a strong competitive advantage and a higher level of transparency towards their customers. A process of assessment of the candidates shall be settled, with evaluation of the pre-selected criteria. This assessment phase shall be carried out by an independent body.

**4.** Alternative energy sources which could be used for a given supply chain shall be also addressed, by identifying the actual possible alternatives (technological aspects for the vehicles, energy supply).

#### 4.2.2. RESEARCH & DEMONSTRATION

- a.** Refinement of the carbon measurement process
- b.** Development of sector-specific emission factors.
- c.** Development of best practices in terms of transport-related carbon auditing.
- d.** Development of a label on Earth Friendly Logistics.

#### 4.2.3. MIND SHIFT

- e.** Go beyond raising awareness on carbon measurement by providing advice to companies on methods of decarbonising their transport operations.
- f.** Support inter-company collaboration.
- g.** Propose companies to present their methods used to derive their statistics, the underlying assumptions and their choice of emission factors. Rather than only publish the data on transport-related emission.
- h.** Show companies the opportunities for decarbonising their operations.

#### 4.2.4 EDUCATION AND TRAINING

- i.** Teach companies to select the appropriate methods of calculating emissions in their sector.
- j.** Help companies to calculate the cost effectiveness of decarbonisation measures.

### 4.3. Efficient use of infrastructure

#### 4.3.1. DESCRIPTION AND ELEMENTS

To achieve the goal of reducing GHG emissions significantly the efficient use of infrastructure is a key element. Using existing and future resources as transport modes **(a)**, active equipment **(b)**, ICT / ITS **(c)** and especially fuel **(d)** more efficiently is leading automatically to lower GHG emissions at no costs. Issue **(d)** is very important but not dealt with in this part of the agenda as other pillars are taking care of this.

Transport modes **(a)** comprises roads **(1)**, rail **(2)**, waterways **(3)** and air transport **(4)**. Each of these modes has its strengths. The efficient use of resources in this sense means choosing the best mode respectively the best combination of modes to move goods in a sustainable way from A to B. Within the global sourcing and supply strategy of all major companies one mode is generally not capable of delivering a door to door service. Hence, intermodal hubs / facilities **(5)** are needed to change modes. Intermodal hubs comprise maritime terminals, inland terminal and dry ports. Using resources efficiently is leading to the demand of highly productive intermodal hubs which allows for a fast, reliable, seamless, secure, sustainable, accountable, affordable and transparent change from one mode to another. For this task intermodal hubs have to be available and accessible. In addition distribution centres **(6)** and cross docking facilities **(7)** are necessary because goods have to be deconsolidated and consolidated throughout the supply chain.

Within the modes a higher consolidation of goods per equipment move (bundling of freight) has to be achieved **(1, 2, 3, and 4)** to use the resource “active equipment” more efficiently. Equipment **(b)** comprises trucks, trains, ships, airplanes and consumer cars. One good example of inefficiency is the loading factor of 43% for road trucks in Europe – there is room for improvement. Moving goods along the supply chains, changing modes within the intermodal hubs and de/consolidation efforts need advanced communication technology **(8)** and intelligent transport software **(9)** in each mode as well as within the intermodal hubs, distribution centres and cross docking facilities. These ITS solutions should allow for optimal and real time routing of freight, for city logistics and long distance transport (based on current delivery conditions, demand, and traffic conditions).

Modal shift: Physical Interoperability **(10)** between the modes is needed and goes with the interoperability of communication technology and a seamless data flow between the different transport software solutions involved. Remark: The real time information collection efforts underway for security can be leveraged for enhancing load sharing. Another enabler for a fast and seamless modal shift are easy cross docking **(11)** modes (for example the Metrocargo project).

The backbone of a co-modal transport system could be a “software mode finder” **(12)** helping to decide about the most sustainable combination of modes for a given transport demand.

Pricing: Today, one key aspect of choosing modes for a transport demand is the price. But the pricing **(13)** does not really cover GHG emissions or other environmental influences of transport modes. As each mode should pay for its environmental costs legislation efforts are needed for environmental pricing aspects. Only with the appropriate pricing scheme it is possible to decide about the right mode considering environmental aspects.

Transportation: The size of the packing of goods and the goods itself are often bigger than they need to be. A reduction in the packing of goods **(14)** or the goods itself would directly lead to a reduction in transportation efforts. Additionally, more standardization for pallets and packages **(15)** across the industry would lead to a better cube utilization. Spreading the transportation efforts across the whole day **(16)** leads to a reducing of traffic jams and an increase of infrastructure use. Terminals, intermodal hubs and facilities need to open 24 hours to achieve this goal. Furthermore, the combination of passengers and freight flows **(17)** could lead to an increase of efficiency.

#### 4.3.2. RESEARCH & DEMONSTRATION

- a.** Research on best operation practices within intermodal terminals, distribution centres and cross docking facilities (e.g. see Agora for inland terminals)
- b.** Research on intermodal hub equipment and easy cross docking technology to increase productivity and modal shift capability
- c.** Research on best practices and additional possibilities to bundle freight
- d.** ICT development and standardization (e.g. RFID standardization)
- e.** Intelligent transport software for each mode (e.g. better route optimization for trucks to bundle freight)
- f.** Development of intelligent software for intermodal hubs, distribution centres and cross docking facilities
- g.** Definition of standard documentation and standard interface technology within the different modes and intermodal hubs
- h.** Research on a software solution which can choose the best combination of modes for transports in the sense of sustainability
- i.** Definition of pricing schemes which includes GHG emissions (each mode should cover all costs involved)

- j.** Legislative punishment of large packing of goods
- k.** More standardization for pallets and packages
- l.** Research on possibilities to combine freight and passenger transport.

Subjects like “truck convoying – road trains”, longer trucks, dedicated infrastructure (lanes) for freight, EU toll system, rolling highway are left for investigation and research to the relevant ETPs.

#### 4.3.3. MIND SHIFT

- a.** Help and support companies to “educate” their customers to accept multi modal transport chains
- b.** Increase focus on “sustainability” vs. “short lead time” and “easiest modes”
- c.** Encourage thinking of “doing more with less”
- d.** Encourage mind shift towards “green thinking”
- e.** Encourage a consumer thinking of “go slower” to support bundling of freight.
- f.** Encourage shippers to reduce the size of the packing of goods and the goods itself.
- g.** Support for government regulations on pricing and large packing punishment
- h.** Encourage intermodal terminals, distribution centres and cross docking facilities to open 24 hours

#### 4.3.4. EDUCATION AND TRAINING

- a.** Engineers trained in intermodal cooperation, bundling of freight, IT technology and CO3 emissions in university programs.
- b.** Train companies in efficient use of infrastructure and intermodal possibilities.
- c.** Train regulators and legislative officials in the impact of modes concerning CO3 emissions.

## 4.4. Horizontal collaboration

### 4.4.1. DESCRIPTION AND ELEMENTS

A recent study (Feb 2009) from the World Economic Forum estimates that the capacity utilisation of European freight is currently as low as 43%. The EIRAC consensus is that we should set as a priority to increase the capacity utilization to a more ambitious 70%. EIRAC believes a key strategy to achieve this objective is to stimulate and facilitate Horizontal Collaboration between shippers in their systems of Distribution of Goods (in accordance with art. 87 of the EU treaty).

By collaborating within their supply chain, shippers can share transport when their logistic chains are overlapping. Sharing the logistic chain makes it possible to increase the efficiency factor of the container, use other modes of transport f.e. dedicated train and/or waterway connections. Each shipper has its own characteristics in the load factor, therefore on certain lanes the weight may be the limit while volume limit is not yet reached. In a clever combination of shippers a container could be filled to maximum weight and volume. Even the very big shippers do not have enough volume of their own to run a dedicated train connection on certain lanes with a high frequency. By collaborating with others they are able to do so.

The main problems that collaboration actions are facing are a solid and accepted operational and legal framework and governance structure. How to build contracts, split cost and benefits and share protected information between Shippers and Logistic Service Providers?

With Horizontal Collaboration between shippers and Logistic Service providers, the results can be very rewarding, cost savings and GHG emissions are calculated up to 40%.

### 4.4.2. RESEARCH AND DEMONSTRATION

As a result of discussion and study within EIRAC in the last two years, a project consortium called Collaborative Concepts for Co modality (CO3) has been started. CO3 is a simple and very practical action that could, however, have a great impact by chain effect. A small group of lawyers, economists and industry players was chartered to sit down together and prepare a common European conceptual template for Collaborative Transport Agreements among shippers. This template is based on available lessons from past successes and failures, fairly split cost and benefits. It protects participating SMEs, while preserving large industrial player’s economy of scale. The agreements should have clear and transparent termination and entry clauses to enable their evolution without unnecessary stress. In particular, it facilitates scale building by providing the participating parties easier access to Intermodal Transport solution. Logistic Service Providers could be part of the contract, and in any case they should be able to deal with the participating parties as one “consortium” client. A non-operation “trustee” super-structure will be used to combine transport needs in the best and fairest interest of all partners.

An overall consensus exists that collaborations in the supply chain can contribute to the Triple Bottom Line:

- 1.** Profit (Efficiency)
- 2.** People (Effectiveness)
- 3.** Planet (Sustainability)

In 2009/2010 the consortium has developed the first draft of a Legal Framework for CO3. It starts with a horizontal agreement among shippers to collaborate on certain transport lanes for specific lots of cargo with a fair split of cost and benefits and the setup of a “trustee” structure.

### 4.4.3. FURTHER RESEARCH AND ACTIONS

- 1.** Promoting match-making and sharing sustainable collaborative logistics knowledge between manufacturing industries and the transport & distribution sector.
- 2.** Further deepening of the methodology to calculate revenues and benefits, including a legal framework to split costs and benefits in shared transportation.
- 3.** New business models for the entire supply-chain, fully based on the use of co-modality and focusing on the increase of loading factors through new practices, such as company collaboration, customer and product swapping, product sourcing, etc.
- 4.** Application and validation of business models on different configurations (supply chain, modes of transport, shippers, types of goods, etc.).

### 4.4.4. MIND SHIFT

Mind shift is a very important issue in reaching collaboration because it can help to overcome several challenges:

- Most shippers see their own supply chain as a competitive advantage
- Fear of sharing supply chain information with others
- Supply Chain Manager needs to share power and influence with third parties
- How do I work with my own contracted LSP?
- LSP fears to lose business

All these challenges need to be addressed in the new legal and operational frameworks.

#### 4.4.5. EDUCATION AND TRAINING

- In the application of horizontal collaboration new frameworks will apply.
- The role of a trustee is unknown and must be trained
- The translation of the legal framework into the national jurisdictions and regulations.
- Training of Supply Chain Manager in co-modality

### | 4.5. Supply Chain Policy

#### 4.5.1. DESCRIPTION AND ELEMENTS

In order to achieve new EIRAC Vision: “support 40% growth at 2050, reducing emissions of GHG by 80%, safeguarding the competitiveness of Europe” radical steps need to be implemented in the logistics and transportation chain. This bullet point aims to propose an EU Blueprint model, at 2020-2030 and possible vision. The main objective of the blueprint will be to allow GDP growth without increases in GHG emissions by means of improving the performance of public organisations involved in the Supply Chain. Therefore, reducing bureaucracy and debottlenecking the European Supply Chain in optimising the Carbon Footprint. Initial constraints are:

- Current infrastructure and real investment capacity. The objective will be to optimize the use of current infrastructure, identifying bottlenecks in terms of potential reduction of carbon footprint and quantifying the investment required to debottlenecking.
- Current performance of different organisations (customs, port authorities, etc.) involved in the movements of goods. The objective will be to define specific measurable goals with targets for improved performance that should drive public organizations involved in the supply chain.

- Holistic view. The aim of this point is to reduce overall GHG in the Supply Chain Network not only in Europe. Therefore, general view of the logistic chains should be considered.
- Mind shift. To make the implementation of the EU blueprint a success, policy makers, companies and people will have to contribute. In this case mind shift is necessary.

#### 4.5.2. RESEARCH& DEMONSTRATION

**a. Develop strategies enabling current infrastructure migration to an enhanced state** (with limited investment).

The main aim will be identify low cost interventions that can improve the use of the network in terms of GHG emissions, including strategies that provide incentives for transportation users (cargo owners, shippers, etc.) towards GHG “friendly” options. These interventions should support manager decisions to greener transportation alternatives, while maintaining or improving business competitiveness.

**b. Performance Based Organisations.**

Define appropriate “metrics” and indicators to measure the performance of the different public organisations involved in the supply chain and reduction of bureaucracy. These indicators should drive EU policy and support the establishment of measurable targets of the performance of the public organisations involved in the supply chain. On the other hand, performance based orientation will require more flexibility for public organizations in terms of management its personnel, procurement, and other services.

**c. Exploring the Macro Economic development in the different EU regions** (i.e., the 12 new entries) and its consequences for the supply chain and the effects on the TEN-T network development. E.g., do we deliver Eastern Europe through the Northern Range, and then land-shipping to Eastern Europe, or directly to the closest ports of call in the Black Sea or the Adriatic Sea?

#### 4.5.3 MIND SHIFT

- a.** Raise awareness on the current situation among policy makers and companies.
- b.** Increase focus on “sustainability”.
- c.** Help companies to make “green” decisions regarding new Supply Chains or changes in Supply Chain Networks.
- d.** Support for government regulations that are streamlined and consistent across the EU for minimization of transportation.
- e.** Propose incentives for companies to use transport mode that is optimal for the route and load.

#### 4.5.4. EDUCATION AND TRAINING

- a.** Engineers trained in advanced supply chain and inter-modal management in university programs

### | 4.6. Education and training

#### 4.6.1. BACKGROUND

Europe faces new challenges and transformations, not only in the field of innovation, competitiveness and sustainability, but also in the field of society and future labour markets. Demographic change is transforming the EU: longer lives, lower birth rates and inward migration are its key aspects. Nevertheless, an ageing population also raises challenges for our societies and economies, culturally, organisationally and from an economic point of view. The population of the EU as a whole would be slightly larger in 2060 than today, but much older. In 2060, half of the population will be aged 48 years or above. Labour participation rates are likely to increase, but

the number of workers would shrink, caused by the ageing of the population and the negative population growth<sup>1</sup>. By 2020, 16 million more jobs will require high qualifications, while the demand for low skills will drop by 12 million jobs. Achieving longer working lives will also require the possibility to acquire and develop new skills throughout the lifetime<sup>2</sup>.

#### 4.6.2. RATIONALE

Also Europe’s transport and logistics sectors – some more some less - will see demographic changes (i.e. aging, migration, lacking skills) which will result in acute shortages in skilled employees and limited accessibility to qualified working staff in the future. Actions will demand the modernising and strengthening of the education and training systems and services for empowering people to reach high levels of employment and enable labour to cope with future trends (i.e. digital innovations, globalisation, energy efficiency, security, sustainable transport, business collaborations, new skills, job mobility and flexibility).

Today’s younger generation will be the future working society who is interested in a work-life-balance. This demands appropriate communication and education strategies for attracting the young people and next generation for demonstrating the potentials of the co-modal transport and logistics sector and its perspectives regarding employments.

A result of the demographic changes will be the extension of the working life in all European societies. Consequently the fraction of elderly employees of the enterprises will grow increasingly. Thus, the management will be forced to establish efficient working conditions for elderly employees on the one hand and on the other hand to make the companies attractive for younger people. These two different major tasks pose new challenges to the enterprises for the creation of:

<sup>1</sup> 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060), European Commission, Directorate-General for Economic and Financial Affairs, 2009.

<sup>2</sup> Communication from the Commission, Europe 2020, a strategy for smart, sustainable and inclusive growth, COM (2010) 2020 final.

- a. Innovative employment systems which enable the efficient collaboration of younger and elderly workforces and which enable job flexibility (i.e. labour passport for co-modal workers)
- b. Assistance systems to support both the employees of the physical work and brainwork processes
- c. Intelligent systems for the knowledge transfer from experienced workforces to new employees to safe the companies know how
- d. Flexible and adaptive Education and Training systems to the individual requirements of the employees

In order to match skills with labour market needs also upcoming challenges have to be taken into account. In the future the European co-modal sector will have to cope with energy efficiency, sustainability, infrastructure usage, collaboration models, security regulations and other emerging trends, which will entail appropriate employment skills and call for innovative education and training.

For stimulating co-modal transport several conditions have to be achieved. Among many other aspects education and training can contribute to this:

- 1. Image and visibility of co-modality need to be strengthened in the society and working environment,
- 2. Skills and practical exercises on co-modality need to be fostered jointly with the industry sectors,
- 3. Tools and content elements for teaching co-modal subjects need to meet future innovations and technologies.

4.6.3. DESCRIPTION AND ELEMENTS

The transition towards a low-carbon economy will also have an important impact on employment, especially in transport, industry [...]. Education and training can provide greater opportunities for people at all stages of their lives. New skills for new jobs become necessary <sup>3</sup>, but more and more jobs will require highly qualified worker.

Mind shift and Education & Training	2010 (Today)	2015	2020	2030
1) Image of co-modality (Research)	Lacking information about co-modality, bad images (slow, dirty, no-office-work)	Basic knowledge (Co-modality, collaboration...)	Expert know-how and knowledge sharing	Knowledge fusion for co-modal collaboration
2) Co-modal Education and Training (Demonstration)	Lack of co-modal skills and trainings	Co-modal job profiles and guidelines	Co-modal courses and trainings; supported by the industry sectors	Life long co-modal Education and Training
3) Innovative tools and content (Research)	e Learning E&T (mostly mono-modal solutions)	Virtual reality and multimedia elements	Mixed (Augmented) Reality	Merge of physical and virtual learning

Table: Future of co-modal mind shift and education & training

<sup>3</sup> COM (2008) 868 final: New Skills for New Jobs, Anticipating and matching labour market and skills needs.

| 4.7 Supply Chain Security

4.7.1. SECURITY AND EFFICIENCY

Increasing risks and threats make supply chain security an international priority. Governments increase pressure on industries. There is no doubt that the main challenges facing today's international intermodal door-to-door container transport system are **logistics efficiency** and **security**.

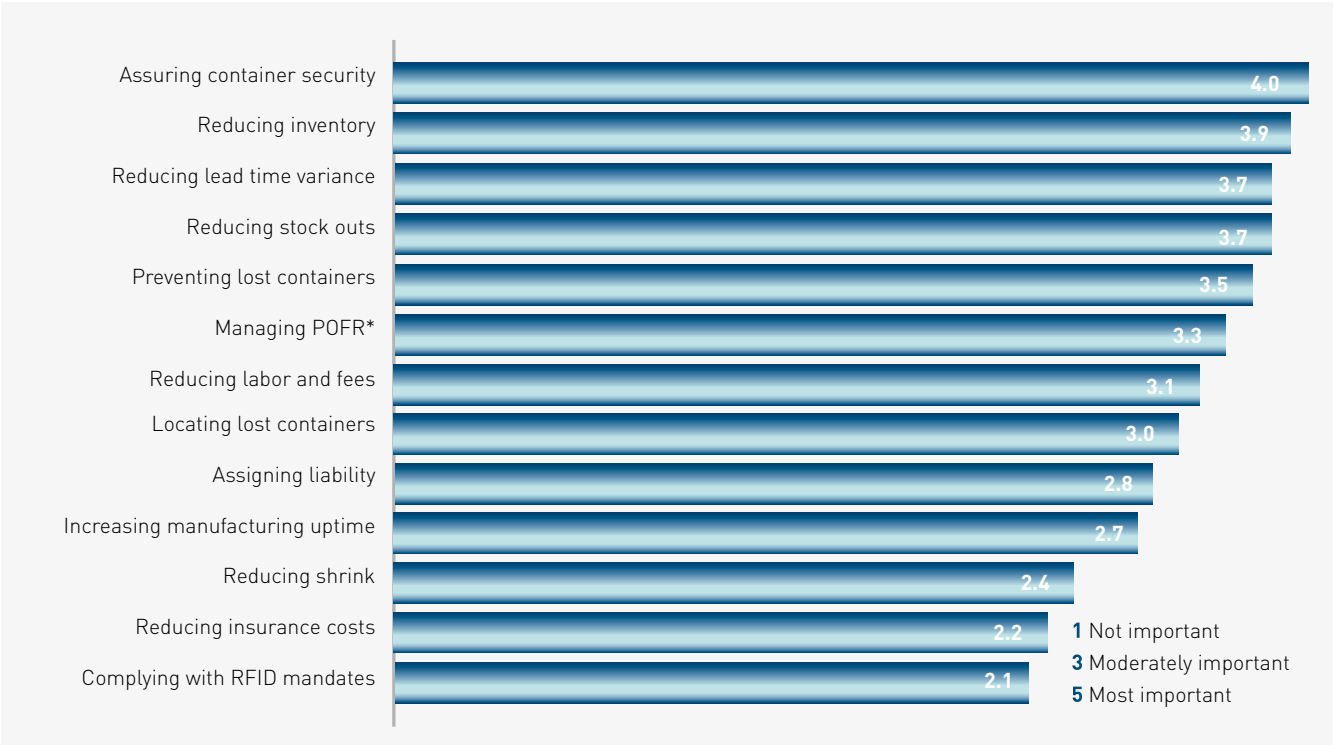
These issues appear at first glance to be aiming at different objectives and therefore often lead to contradictory business strategies. However, it is equally evident that a safe, secure and efficient intermodal transport system is a common goal of all the participants in the supply chain.

Current state-of-the-art logistics door-to-door chains still show a lack of information flows preventing the provision of high efficient and reliable services. A.T. Kearney surveyed

some of the biggest importers and exporters of the US on requirements in supply chains. Their key concerns in the over-ocean supply chain were prioritised and can be found in the following graph:

In respect of security several measures and initiatives to enhance the security are started, such as the ISPS Code for port and maritime operators. However, a real worldwide approach covering the entire supply chain from origin to destination is still missing, notwithstanding some attempts as the US program Operation Safe Commerce (OSC) and SSTL (Smart and Secure Trade Lanes).

The World Customs Organisation (WCO) recommends to push the cargo control to the exporting country rather than performing these checks at the late stage of arriving in the import country. Optimal clearance procedures will start with the container stuffing, e-seal or Container Security Device (CSD), and the use of Authorised Economic Operators (AEO) along the chain. Harmonised procedures between the



POFR stands for perfect order fill rate, a measure of order accuracy, timeliness, quality and completeness  
Source: A.T. Kearney



various Customs Authorities are of equal importance.

Both trade and Customs Authorities are facing challenges for their daily work, mainly caused by the increased number of import containers to be screened and scanned. A big issue is the low quality of information:

- supply chain data is missing or inaccurate, untimely or incomplete making it invaluable for decision making
- arrival notices appear days after the arrival
- check of mechanical seals for tampering are performed only partly
- containers deviate from their assigned routing

Furthermore, customs procedures vary even within Europe: e.g. some countries put all import containers on hold unless they are explicitly released, some others do it the other way round: all containers are released unless they are set on hold. On the other hand, transport and terminal operators as well as authorities are keen getting organised their whole transport chains in the most secure and efficient way.

#### 4.7.2. VISIBILITY

Several European projects, co-funded by the European Commission as part of the Seventh Framework Programme (FP7), now try to cover the lack of information as described. These projects, like INTEGRITY and CASSANDRA, try to create Supply Chain Visibility (SCV) as a basis for securing intermodal container chains ("security tracing") on a door-to-door basis. The concept is aimed at evaluating information from various types of sensors and other sources, partially (pre-)processed by intelligent algorithms. At the same time using a harmonised set of technologies trying to minimise logistics costs.

These projects are embedded into international strategies and initiatives e.g. concepts of the SAFE Framework of Standards of the World Customs Organization (WCO) to push cargo control to the exporting country and the principles of Mutual Recognition; to the EU-China Customs (SSTL) project supported by DG TAXUD, the e-Customs project, the Freight Transport Logistics Action Plan of DG TREN as

well as to intermodal initiatives like EIRAC. It will also be combined with the AEO concept and scanning/monitoring technology and will support the "trust but verify" approach. These concepts raise the standard for door-to-door container chains by providing high quality and integrity information. Its validation and demonstration need to verify the benefits for all current and future, big or small players. From a security perspective, the supply chain data for risk targeting is populated earlier, direct and unique by trusted parties. Enhanced security measures, shared data on cargo, modes of transport and inspection results lead to trade facilitation and pre-arrival clearance from Customs in the importing country.

From a logistics perspective, top performers tend to avoid the use of technologies to create a turbocharged tracking system. Rather, they use visibility systems to drive sustainable improvements in lead times, delivery reliability and inventory reductions. Many of them are now focusing on using visibility information to protect gross margin and capture more market share.

#### 4.7.3. RESEARCH AND DEMONSTRATION

1. Technically bridging the gaps between visibility solutions in supply chains is a first step (interfacing).
2. Tools are needed for integrating risk assessment and screening within businesses and across businesses in the full supply chain.
3. Using information to enable security and integrity of the supply chain
4. Global approach to logistics chain security, including green lanes
5. A step-wise approach on the establishment of the Smart (secure) shipment

#### 4.7.4. MINDSHIFT

1. Creating a code of conduct on supply chain security
2. Definition of a common European security label (certified secure logistic partner)
3. Protected sharing of security related information
4. Development of new business schemes and collaboration paradigm for security-centred logistics
5. Building consensus around security (telling why is it right that all shipments are checked?)

#### 4.7.5. EDUCATION AND TRAINING

1. The Master in logistics security (or security centred logistics)
2. The European passport of Logistics-Security operators and experts
3. Continuous education for security managers (new risks, threats, technologies, mitigation measures)

#### 4.7.6. CONCLUSION

Technically bridging the gaps between visibility solutions in supply chains is a first step (interfacing). Tools are needed for integrating risk assessment and screening within businesses and across businesses in the full supply chain. Finally, providing the platform to discuss and adopt a common risk based approach for business and government supervision, as well as joint arrangements on how to deal with specific risks (consensus building). Government "piggy backing" on visibility data from the entire supply chain is the final result.

# 05

## CO-Tree the new EIRAC

This agenda is adopted by the EIRAC members to continue with their research, practical actions and policy advice to the EU-Commission, eventually under the label of CO-Tree, Earth Friendly Logistics.

### 5.1. MISSION

EIRAC's primary mission is to foster innovation and change in Intermodal Transport and Logistics in order to: enable growth of the European economy through competitive and sustainable logistics. EIRAC will create its follow up under the label of **CO-Tree Earth Friendly Logistics**.

CO-Tree will:

- Place sustainable logistics at the heart of the European door to door supply chain
- Identify key business and research drivers sharing sustainable logistics criteria
- Demonstrate the impact of co-operation cross supply chains
- Promote the results of learning together and sharing knowledge
- Encourage "out of the box" ideas
- Stimulate sustainable logistics thinking at schools and universities

### 5.2. POSITIONING CO-TREE

CO-Tree will:

- Be a broad, pragmatic and open network of stakeholders in the supply chain stemming from manufacturing and logistics industries supported by universities and the knowledge industry
- Focus on promoting match-making and sharing sustainable logistics knowledge
- Network with European Technology Platforms, national governments and institutions to put research programs into practice, propose joint calls on basis of supply chain industry input, and create new industrial ventures for innovative logistics solutions.

To reach the above mentioned goals EIRAC needs to continue its activities within CO-Tree as a renewed setup and legal entity to be able to create its label **for Earth friendly Logistics**, with a new public-private financial structure and broader member base mainly in the industrial and logistics sector. The new organization will be a practical platform that puts innovation into practice based on sustainability and efficiency in the supply chain. With the opportunity to create its own label and certification for sustainability in international logistic chains based upon a generally accepted Code of Practice and measurement, in

cooperation with other organizations

( f.e. ECO SLC (Ecoports), Be-Logic,) and participate actively in demonstration and or research projects from the EC and/or National Governments. **Earth Friendly Logistics will be the leading edge for the partners in the new CO-Tree movement.**



# 06

## Roadmap for Implementation

### Change is a matter of mind shift

The Roadmap for Implementation of the Strategic Agenda consists of the eleven recommendations that will pave the way to sustainable logistics as defined in our vision: creating economic growth, reducing GHG emission and

improving the quality of life. In the following projects we have focused firstly on people's mind shift as education, training and policies. The realisation of the technical projects is heavily depending on people's readiness, their attitudes and the willingness to fully exploit the potential of technologies. The research is focusing on bundling of freight in co-modality.

Strategic issues	Planet	Profit	People
Energy efficiency	<b>6.1.</b> de-stressing the supply chain	<b>6.2</b> optimisation models to select mode & loads <b>6.3</b> communication & information exchange	
Co2 reduction & sustainability	<b>6.4</b> CO2 calculation software <b>6.5</b> Label for "earth friendly logistics"		
Efficient use of infrastructure		<b>6.6</b> easy cross docking technologies	
Horizontal collaboration		<b>6.7</b> horizontal collaboration	
Supply chain policy			<b>6.8</b> performance based organisations
Education & Training			<b>6.9</b> image of co-modality <b>6.10</b> co-modal education & training <b>6.11</b> innovative tools and content

### 6.1. DE-STRESSING THE SUPPLY CHAIN

Suggested title of the research topic	
De-stressing the Supply Chain	
Timing/year	
{Short – Medium – Long} Medium term	
Policy context	
<p><i>Quote EU policies (if known) relevant to the subject</i></p> <ul style="list-style-type: none"> <li>The 7th Framework Programme for Research, Technological Development and Demonstration Activities. ICT and Transport themes. Reducing greenhouse gas emissions by 30 % (before 2020) compared to 1990 levels</li> <li>Communication from the Commission: Freight Transport Logistics Action Plan, Brussels, 18.10.2007, COM (2007) 607 final.</li> <li>European Green Cars Initiative. Roadmap Co-modality &amp; Logistics</li> <li>The Transport White Paper</li> </ul>	
Aim or objective of this topic	
<p><i>Describe, in 20 lines maximum, the objective of the topic</i></p> <p>The aim of the research will be:</p> <ul style="list-style-type: none"> <li>To determine new logistics models of the whole transport chain to comply with production and manufacturing requirements, including those at transshipment and handling point</li> <li>To define new concepts for slow steaming vessels, barges and vehicles, involving size and shape of holds, hulls, bodies, frames and engines</li> <li>To shape new business models, paradigms in line with slow steaming, including the possible new collaboration or cooperation schemes and regimes within the logistics industry</li> <li>To identify and estimate the consequences in terms of sustainability of slow steaming in the overall logistics including efficiency, safety, security aspects,</li> <li>To communicate and divulge to the public the potential of slow steaming in improving sustainability and foster the acceptance of the stakeholders</li> </ul>	

Scope of the research for this topic, including use of closed or running research projects
<p><i>Describe, in 20 lines maximum, the scope addressed by this subject</i></p> <p>Increased energy efficiency is a key enabler to sustainable growth and Green House Gas reduction targets set forth in the EIRAC vision. As a matter of fact, increasing efficiency is a continuous process building on improvements from the current state. The EIRAC agenda proposes a systematic approach to address energy efficiency and to develop comprehensive solutions that will enhance European competitiveness and be transferable as “global benchmarks”. Technological efficiency (vehicle and terminal “hardware”), logistics efficiency (supply chain requirements, mode, utilization and load makeup, routing etc.) and new business models for energy management in the entire logistics chain (transportation, terminals, distribution and consolidation centers, warehouses) are the key drivers of energy efficiency in the future.</p> <p>Opportunities for energy efficiency within intermodal transport include “slow steaming” in freight transport, as the transfer of goods at lower speed between transshipment points, to reduce the energy consumption which is not proportional to speed due to hydro or aerodynamics factors.</p> <p>Scope of the subject is the whole transport and logistics chains, both inland and overseas, long and short hauls</p>
Expected results or impact of the research for this topic, including dissemination
<p><i>Describe, in 5 lines maximum, the expected results or deliverables of the activities</i></p> <p>Along and at the end of this avenue of change, innovation will result in:</p> <ul style="list-style-type: none"> <li>• New logistics models of the whole chain in line with de-stressing target</li> <li>• Specifications for slow steaming vehicles and technologies to fulfil logistics paradigms</li> <li>• New Business models, including collaboration regimes</li> </ul> <p>A profound benefit on sustainability is expected, which should be evaluated by specific accompanying actions like measurement campaigns based on commonly acknowledged analysing methods and data sets.</p>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
<p>CSA and Large Integrating Collaborative research projects would be recommended for this activity, to ensure:</p> <ul style="list-style-type: none"> <li>• proper knowledge of the targets (1st CSA)</li> <li>• wide coverage and representation of stakeholders in the specification of slow steaming technologies (Collaborative Project)</li> <li>• assessment of impacts and continuous monitoring from data collection (2nd CSA)</li> </ul>

### 6.2. OPTIMIZATION MODELS TO SELECT MODE AND PLAN LOADS

<b>Suggested title of the research topic</b>	Integrated Optimisation Models
<b>Timing/year</b>	2011-2013
Policy context	
<ul style="list-style-type: none"> <li>• FP7 program Capability of improving and exploiting capacity</li> <li>• Reduction in GHG emissions</li> <li>• Improve sustainability</li> </ul>	
Aim or objective of this topic	
<p>A recent study (Feb 2009) from the Wold Economic Forum estimates that the capacity utilization of European freight is currently as low as 43%. Neither shippers nor logistics providers consciously seek to have such low utilization levels – one or more factors such as variation in demand, lack of coordination, time pressures and tight shipping windows, packaging limitations, arbitrary mode specifications etc. tend to drive low utilisation. While there are large numbers of methods and techniques based on sophisticated quantitative analysis available for the optimised planning of logistics networks, operational route planning and load makeup, the reality is the result from the study above. So what happens between theory and practice? Is the failure because the theory does not comprehend major constraints in reality? Or is it because shippers and logistics providers do not use the “right set” of techniques and tools?</p> <p>This topic aims to address the “gap” between optimised solutions in theory and large inefficiencies in practice. It will identify the key drivers behind this gap and extend existing optimisation models to incorporate the impacts of these drivers as well as develop a framework for implementation that accounts for factors that cannot be easily “quantified”.</p> <p>Today, most medium and large logistics companies (as well as shippers) use optimisation models for strategic facility location analysis, tactical route and mode planning and day-to-day pick-up and delivery operations. If it is possible to identify the drivers or factors causing poor load utilization and correct for those in these models, then they can be existing platforms to realize the beneficial results of improvements out of this research.</p>	
Scope of the research for this topic, including use of closed or running research projects	
<p>Specifically this research will address the following: <b>(1)</b> Determine the major drivers that cause inefficient capacity utilisation in European freight networks <b>(2)</b> Identify which of these drivers are not adequately captured in existing routing and loading models <b>(3)</b> Separate these major causes into those that are technical and those that are caused by behavioural, legal, or organisational factors <b>(4)</b> Develop extensions of optimisation models to include all major technical drivers not previously captured <b>(5)</b> Develop an integrated strategy to incorporate the enhanced optimisation models in a framework for logistics operations that also addresses the behavioural, legal and organisational factors.</p> <p>It will also develop a strong supporting model framework for the broader research thrusts such as “Horizontal collaboration” and “De-stressing the supply chain”. This model framework will provide the quantitative underpinning in building “the case for action” in other areas.</p> <p>Since the focus of this research is the application of enhanced models to improve business performance in terms of cost and sustainability, a large portion of the effort will involve the implementation of new tools and procedures in participating entities to evaluate the gains in reduced costs and reduced emissions.</p>	

Expected results or impact of the research for this topic, including dissemination
<p>This research develops enhanced location, routing, and load make up models and operating procedures that show significant improvement in capacity utilisation on the European freight network. This improved capacity utilisation directly translates to reduced costs and to reduced emissions.</p> <p>Dissemination will be both through the entities participating in the implementation pilots as well as communication of the results through conferences and seminars.</p>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
<p>Most European companies are constantly trying to increase capacity utilisation to benefit both their bottom line and the environment. On the basis of this experience industry members of EIRAC and academia have formed a workinggroup.</p> <p>They experience great interest in this subject in the market big companies as well as SMEs.</p>

6.3. COMMUNICATION AND INFORMATION EXCHANGE

Suggested title of the research topic	Innovative information and communication services for the optimised use of co-modal freight transport management
Timing / year	2014 – 2016
Policy context	
<ul style="list-style-type: none"> <li>• 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.</li> <li>• Communication from the Commission: Freight Transport Logistics Action Plan, Brussels, 18.10.2007, COM (2007) 607 final.</li> <li>• Communication “A sustainable future for transport: Towards an integrated, technology-led and user friendly sytem” has been adopted by the Commission on 17 June 2009, COM (2009) 279.</li> </ul>	
Aim or objective of this topic	
<p>Co-modal transport and logistics processes can help the freight transport logistics industry towards long-term efficiency and growth by addressing issues such as congestion, pollution and noise, CO2 emissions and dependence on fossil fuels. However, co-modal transport has also to overcome its current image and visibility as complex and difficult transport system, as involving many different actors and their business processes &amp; IT-services.</p> <p>Technological research and innovation is and will be a major contributor to the solution of the transport challenges. New technologies will provide new and more comfortable services to freight transport and will help to reduce environmental impacts. Intelligent Transport Systems (ITS) for road and other means of information and communication technologies (ERTMS, RIS, TAF/TSI, VT MIS...) for the other modes of transport can help to improve the efficiency and reliability of co-modal freight transport management processes.</p> <p><b>Objective:</b></p> <p>Co-modal freight transport management demands for “making co-modal transport as easy to use and efficient as door-to-door truck transport”.</p>	
Scope of the research for this topic, including use of closed or running research projects	
<p><b>Scope:</b></p> <ol style="list-style-type: none"> <li>1. Smart, dynamic, easy-to-use and open transport and logistics services, which address all business processes (planning, monitoring and controlling) of co-modal transport.</li> <li>2. Technological, but also legal framework research work on co-modal transport, logistics and freight e-documents.</li> <li>3. New business models and technologies for integrating traffic information services (road, rail, maritime and inland navigation) into co-modal transport logistics applications.</li> </ol> <p><b>Accompanying measures:</b></p> <ul style="list-style-type: none"> <li>• Past and on-going research projects (FP6, FP7): FREIGHTWISE, e-freight, INTEGRITY, Smart-CM, EURIDICE, RISING, DiSCwise and others.</li> <li>• European initiatives on IT in logistics: e.g. European Conference on ICT for Transport Logistics (ECITL) [2008, 2009, 2010]</li> </ul>	



Expected results or impact of the research for this topic, including dissemination
<p>European electronic co-modal transportation and logistics management services:</p> <ol style="list-style-type: none"> <li>1. Advanced IT-based logistics services for co-modal transport management,</li> <li>2. Harmonised co-modal cargo manifest,</li> <li>3. New approaches to use traffic information services (from infrastructure providers) for planning and monitoring of co-modal transport and logistics processes.</li> <li>4. Education &amp; Training concepts and roll-outs for increasing awareness and acceptance of co-modal transport and its information and communication services.</li> </ol>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
<p>The involvement and integration of commercial users and stakeholders (operators of road, rail, maritime, inland waterway transport, but also ITS, ERTMS, RIS, TAF/TSI, VTMS providers) into this research and innovation project is highly requested; as based on their demand new IT-based co-modal services ought to be developed and implemented in the European transport sectors.</p>

6.4. CO2 CALCULATION SOFTWARE

Suggested title of the research topic	Supply chain carbon footprint monitoring and prediction tools integration
Timing/year	(Short – Medium )
Policy context	
<p><i>Quote EU policies (if known) relevant to the subject</i></p> <ul style="list-style-type: none"> <li>• The 7<sup>th</sup> Framework Programme for Research, Technological Development and Demonstration Activities. ICT and Transport themes. Reducing greenhouse gas emissions by 30 % (before 2020) compared to 1990 levels</li> <li>• Communication from the Commission: Freight Transport Logistics Action Plan, Brussels, 18.10.2007, COM (2007) 607 final.</li> <li>• European Green Cars Initiative. Roadmap Co-modality &amp; Logistics</li> </ul>	
Aim or objective of this topic	
<p>In order to lead decarbonisation of supply chains and supporting growth in a sustainable way, a clear understanding of CO2 emission related to supply chain should be made available to both shippers and logistics service providers. 2030 business scenarios show that reducing transport emissions will be a great challenge for transport companies and that cost related to the carbon footprint of logistics processes will be allocated to the causer, therefore there is a need of consensus tools to measure logistic carbon footprint.</p> <p>Some efforts have already been made by private and public organisations in this direction and many tools to measure supply chain carbon footprint related activities have been developed (EcoPorts self-diagnosis, EcoTransit calculator) or are currently under development (FP7 project on carbon foot print of freight transport). However, there is a need of evaluation of these tools and definition of standard measurement frameworks, identifying gaps and developing the right tools to make them available to shippers, logistics service providers and transport operators (all modes). The main aim of this topic would be to benchmark carbon foot print measurement tools currently available and define standard measurement frameworks. Moreover, define current gaps in supply chain carbon foot print measurement and develop specific tools to cover those gaps and integrate them in a common platform to facilitate decision making.</p>	
Scope of the research for this topic, including use of closed or running research projects	
<p>Evaluation and benchmark of carbon footprint measurement tools and software, identifying gaps and barriers for shippers, logistic service providers and transport operators to:</p> <ul style="list-style-type: none"> <li>• Quantify the actual carbon emission of given supply chains and transport network.</li> <li>• Test different alternatives and logistics patterns and quantify the potential of emission reduction of any alternative.</li> <li>• Integrate carbon foot print in decision making.</li> </ul>	



Develop new tools that met the needs of the identified gaps integration of new and current tools in a common framework that support business and authorities decision making.

Such tool shall be able to show the influence of different factors on the carbon emissions levels of the supply chain:

- Influence of the selected transport modes and transport mode combination.
- Influence of the distance (geographical routes).
- Influence of the loading factor.
- Influence of the speed.
- Influence of the selected transport vehicles (different types of technologies).
- Costs of the logistics choices.
- Influence of the energy consumption

#### Expected results or impact of the research for this topic, including dissemination

- Reduce CO2 emissions due to better quantification.
- Accepted common framework of supply chain carbon foot print measurement.
- Integration of carbon footprint quantification tools in business decision software.
- Broad deployment of carbon foot print quantification in supply chains among shippers, logistic service providers and transport operators.

#### Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)

*Funding scheme: Collaborative Projects small or medium-scale focussed research or Coordination or Support Actions.*

*Open in call: FP7-SUSTAINABLE SURFACE TRANSPORT (SST)*

## 6.5. LABEL FOR “EARTH FRIENDLY LOGISTICS”

<b>Suggested title of the research topic</b>	Label for “Earth Friendly Logistics”, standard measure, certified
<b>Timing/year</b>	Long-term
<b>Policy context</b>	
<i>Quote EU policies (if known) relevant to the subject</i>	
<b>Aim or objective of this topic</b>	
<p>Decarbonisation of human and industrial activities has come on top of the agendas of leading countries around the world, including the European Union, and their recovery plans are centred on sustainable growth.</p> <p>In order to achieve transparency about sustainable logistics processes and activities an assessment framework has to be set in place. Such a framework should be extended not only to carbon emissions (CO2) but also to SOx, NOx, PM, VOC which affect also the environment and human health. An assessment framework shall be used for the setting of a measurable and acknowledged label on Earth Friendly Logistics. Companies which are able to quantify their carbon emissions along their supply chain and able to demonstrate a commitment towards their reduction – taken into account also social and economic matters – could apply to the label. Such label would represent a strong competitive advantage and a higher level of transparency towards their customers.</p> <p>Therefore, the aim of this topic is to develop and establish a common label in the market for Earth Friendly Logistics, comparable to the one on child labour/FSC.</p>	
<b>Scope of the research for this topic, including use of closed or running research projects</b>	
<p>An Earth friendly Logistics label is developed to share among organizations that make their transport earth friendly. The label is needed to create visibility to initiatives that realize a greening of their transport. Participants in co-operative approaches will be invited to run the label. Emerging platforms (such as e.g. CO3) will bring together the ideas, initiatives and good practices and will connect earth friendly logistics in terms of research, know-how and contacts.</p> <p>The scope of the research will be the following:</p> <ul style="list-style-type: none"><li>• Develop the framework criteria that companies have to fulfil in order to achieve the label</li><li>• Clarify the measurement and auditing process for achieving the label</li><li>• Establish the platform organization model that will operate all processes and procedures for label standards, measurement criteria, membership rules, auditing rules, auditing authority etc.</li><li>• Built up the “forerunner” network of initial companies that will drive the project</li><li>• Develop the dissemination and public relation process as well as a roadmap</li></ul>	

Expected results or impact of the research for this topic, including dissemination
Research from this topic shall have a significant contribution to the overall triple-bottom-line in logistics. The logistics industry will have a platform in use where they interchange best practices for sustainability purposes. A label for Earth friendly Logistics will be a significant driver of sustainability in logistics. It will create transparency in the field and will give orientation for customers as well as partners. In a broader sense, the label will stand for the establishment of sustainability standards in logistics.
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
See also ECO SLC label (ECOPorts), Be-Logic project FP7.

6.6. EASY CROSS DOCKING TECHNOLOGIES

Suggested title of the research topic	Easy crossdocking modes
Timing/year	Short-Medium Term
Policy context	
<i>Quote EU policies (if known) relevant to the subject</i> Innovation Union Transport White Paper	
Aim or objective of this topic	
<i>Describe, in 20 lines maximum, the objective of the topic</i>  In order to increase intermodal transport, it is necessary to create an efficient network for containers and swap bodies operating on the current rail infrastructures.  Today, container rail services are usually limited to point-to-point (shuttle) trains, which rarely offer loading and unloading at intermediate stops. Unlike passenger traffic, the concept of “connecting trains” is not deployed for containerised services, thus containers are unloaded only at the final destination of the train they are loaded on – even in the case the train passes along the container destination. The reason for this operational regime is that with the handling facilities operated in current transshipment points, loading and unloading operations are performed vertically on the wagon, in dedicated yards free from the overhead catenary. To operate handling, trains are to be manoeuvred into yards by shunting locomotives, increasing costs and total service time.  With these constraints, it is not surprising that only point to point trains are operated, excluding all transfer and collection of load units along the territory they cross.  The innovation should be to view goods like passengers creating a intermodal network between terminals through fast and cost effective “stop and go” of the trains, served by easy cross docking facilities and handling equipment.  To ensure the competitiveness of connections, “stop and go” must be fast and along to the main line, highly automated and adaptable to any kind of train and container type; a major requirement to be fulfilled is that the operation is executed under the catenary to prevent shunting.	
Scope of the research for this topic, including use of closed or running research projects	
<i>Describe, in 20 lines maximum, the scope addressed by this subject</i>  Innovation priorities have to allow transport more goods on railway. The priorities are to realize new operational methods of logistic network services based on new intermodal (on-line) terminals, with fast stop and go through new technologies.	

Scope:  <ol style="list-style-type: none"><li>1. Smart, dynamic, easy-to-use and open transport and logistics services concepts, which address all business processes (planning, monitoring and controlling).</li><li>2. Industrial production of new technological advances and software tools</li><li>3. Developing of new software to manage the network</li><li>4. Integrate new technologies for real time control for intermodal freight</li><li>5. Integrate new technologies for rolling stock</li></ol>
<b>Expected results or impact of the research for this topic, including dissemination</b>
<i>Describe, in 5 lines maximum, the expected results or deliverables of the activities</i>  <ul style="list-style-type: none"><li>• fast, dynamic and open logistics service</li><li>• low cost service cost competitive than road</li><li>• higher efficiency and safety</li><li>• lower environmental impact</li><li>• optimized use of rolling stock</li></ul>
<b>Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)</b>
Cooperation with ERRAC strategic agenda and working group on rail freight services

6.7. HORIZONTAL COLLABORATION

<b>Suggested title of the research topic</b>	Horizontal collaboration
<b>Timing/year</b>	2011-2013
<b>Policy context</b>	
<ul style="list-style-type: none"><li>• FP7 program Capability of improving and exploiting Capacity</li><li>• Reduction GHG emissions</li><li>• Improve sustainability</li></ul>	
<b>Aim or objective of this topic</b>	
<p>A recent study (Feb 2009) from the World Economic Forum estimates that the capacity utilization of European freight is currently as low as 43%. The EIRAC consensus is that we should set as a priority to increase the capacity utilization to a more ambitious 70%. EIRAC believes a key strategy to achieve this objective is to stimulate and facilitate Horizontal <b>Collaboration</b> between shippers in their systems of Distribution of Goods (in accordance with art. 87 of the EU treaty).</p> <p>In collaborating in their supply chain, shippers can share transport where their logistic chain is overlapping with other logistic chains. By sharing the logistic chain it will be possible to increase the efficiency and load factor of the container, use other modes of transport f.e. dedicated train and or waterway connections. Each shipper has its own characteristics in the load factor of a container, therefore on certain lanes the weight may be the limit while volume limit is not yet reached. In a clever combination of shippers a container could be filled to maximum weight and volume.</p> <p>Even the very big shippers don't have enough volume of their own to run a dedicated train connection on certain lanes with a high frequency, in combination with other shippers they are able to do so.</p> <p>The main problems collaboration actions are facing is a solid and accepted operational and legal framework and governance structure. How to build contracts, split cost and benefits and share protected information between Shippers and Logistic Service Providers?</p> <p>With Horizontal Collaboration between shippers and Logistic Service providers the results can be very rewarding, savings in cost and GHG emissions are calculated up to 40%.</p>	
<b>Scope of the research for this topic, including use of closed or running research projects</b>	
<p>The scope of this topic includes :</p> <ol style="list-style-type: none"><li>1. Promoting match-making and sharing sustainable collaborative logistics knowledge between manufacturing industries and the transport &amp; distribution sector.</li><li>2. Further deepening of the methodology to calculate revenues and benefits, including a legal framework to split costs and benefits in shared transportation. The introduction of a trustee, who values the combination of parties in collaboration, calculates the confidential data and gives stability to the combination.</li><li>3. New business models for the entire supply-chain, fully based on the use of co-modality and focusing on the increase of loading factors through new practices, such as company collaboration, product sourcing, adapting supply chains etc.</li><li>4. Application and validation of business models on different configurations (supply chain, modes of transport, shippers, types of goods, etc.). Through testing and demonstration methods can be improved and parties can be convinced.</li></ol> <p>In 2009/2010 a working group of important European industry partners already developed the first Operational and legal framework including the role of the trustee. In a wider setting of industries they apply for a FP7 research project.</p>	

Expected results or impact of the research for this topic, including dissemination
<ol style="list-style-type: none"> <li>Enhanced Legal framework that applies to the jurisdiction of the different member states</li> <li>Fair and accepted operational framework with clear rules for sharing costs and benefits</li> <li>Clear agreements and rules for a trustee</li> <li>Adaptation of the proposed system by important actors in the logistic industry and shippers</li> </ol>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
<p>In several member states national programs on reducing Carbon Footprint are seeking for solutions on the implementation and stability of collaboration within the logistic chain.</p> <p>Some companies tried and failed because of lack of instruments. On basis of this experience industry members of EIRAC and academia have formed a working group.</p> <p>They experience great interest in this subject in the market from as well big companies as SME's</p>

6.8. PERFORMANCE BASED ORGANISATIONS

Suggested title of the research topic	Performance Based Organisations
Timing/year	Medium-Long Term
Policy context	
Quote EU policies (if known) relevant to the subject	
Aim or objective of this topic	
<p>Logistics services are provided by relatively complex systems, geographically spread, composed of several entities, which kind might be very different from each other, that ideally work together in a coordinated and collaborative way.</p> <p>The effectiveness of the door to door services often required by customers, generally shippers, is the combination of several factors which might become difficult to consider properly in their magnitude and weight. Actually, the logistics chain performs well when each single element of the chain takes on its task accordingly with plans. Sometimes this is not the case, and when this occurs, it is not trivial to determine what was the root cause, or combination of causes, that affected the overall system; this creates in turn a loss of the reputation and credibility of the overall system, as the customer gets the impression of not having control on the chain, nor knowing how to improve performance or prevent that problems occur over again. It is important to note that in transport and logistics, the performance of the chain can be affected by entities or events that apparently have only little relations with the actual chain, or root causes stemming beyond the expected scope of the logistics system. This is often the case for the performance of major logistics nodes like sea-terminals, which might be affected by the behaviour of port services not directly related to cargo handling operation, or even conditions outside their boundaries. Too often, this falls into the use of road transport (as it gives the impression of being better monitored by the shipper) instead of alternative modes.</p> <p>The concept of Performance Based Organisations (PBO) is one policy suitable for application in these cases, to better analyse and keep control over the performance of such complex network of entities. PBO are in used in public administration since late nineties in UK and then in the US, and has proven to be very effective in improving the effectiveness of the work to be done by the agencies in governmental entities. Its application into logistics systems is expected to bring the level of knowledge of the system behaviour needed to increase customers' confidence and overall performance.</p>	
Scope of the research for this topic, including use of closed or running research projects	
<p>To develop further on this subject, investigation on the potential for the application of the PBO concept for Logistics systems is proposed. As a first example, the case of ports is proposed to be addressed, since ports are very complex entities, composed of different bodies or companies which results and performance are strictly related each other.</p> <p>As a matter of fact, the low performance of a port related entity might endanger the whole reputation, thus traffic and earnings of the whole port; moreover, bottlenecks outside of the port fences might cause severe inefficiencies within the port. To better rule the relationships between port entities, it is necessary to establish a common set of rules based on indicators, their measurements, and the compliance with standard performance to be achieved.</p>	

Expected results or impact of the research for this topic, including dissemination
<p>Starting from the experience in other industries and practical cases (US, UK, AUS, and NZ administrations, airborne transport, car manufacturing,) projects shall aim at:</p> <ul style="list-style-type: none"> <li>• setting up a methodology, developing tools, and prepare standards for measuring port performances in view of the establishment of a Code of Conduct or a European Port Performance Based Organisation (EPPBO) standard (CEN/EMSA/IMO)</li> <li>• Performance shall be identified and established on the basis of Sustainability ad a measurement of Efficiency</li> </ul> <p>In this view, Ports (EPPBO) would become the controller of the performances of the actors playing in it and its environs</p>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
<p>Coordination and Support Action. Common call with waterborne</p>

6.9. IMAGE OF INTER-MODALITY

Suggested title of the research topic	Image building “intermodal transport”
Timing/year	Medium – Long term 2010-2030
Policy context	
<ul style="list-style-type: none"> <li>• The 7<sup>th</sup> Framework Programme for Research, Technological Development and Demonstration Activities. Mainly the Cooperation Programme and the People Programme.</li> <li>• The Trans European Transport Network, intermodal transport: combined transport of goods between Member States</li> <li>• The Leonardo da Vinci Programme related to vocational education and learning.</li> </ul>	
Aim or objective of this topic	
<p>The changes in the world of transport are proceeding faster than ever. With the demographic changes mentioned in one of the previous topics, the need for highly skilled workers is a must. Within the European transport agenda, intermodal transport is already on top of the agenda. However, the image of transport and even more logistics are not always that positive. Working in the transport sector is seen as hard and dirty labour and therefore, a men’s world</p> <p>The aim of this topic is to turn this view around. Because intermodal transport is much more than the current image. The sector requires people within the transport and logistics sector to be experts in the technologies and the factors that are involved in organisation, operation and management, as well as the areas of planning, design, finance and use of infrastructure and operations associated with corridors and nodes that make up the intermodal network.</p> <p>An image building campaign of intermodal transport will focus on three groups. First of all the image building is focused on the public opinion. This requires the support of the government. As mentioned before, the government is already aware of the need for intermodal transport. Their role is to support the other two groups, the private industry and the students. The private industry should be approached to act as key players in the intermodal transport sector. Motivate other companies to join forces to create a better and wider image of intermodal transport in Europe. Furthermore, inspire companies to develop, implement and use intermodal transport systems by providing a toolkit for best practises.</p> <p>The private sector should help to bridge the gap between education and business. The education sector is the third group, most importantly the students. Students should come in contact with their future work environment, so they can see the diversity of the transport and logistics sector.</p>	

Scope of the research for this topic, including use of closed or running research projects
<p>The scope of the research should contain:</p> <ul style="list-style-type: none"> <li>• The image of intermodal transport can be linked to the image of transport and logistics. Both can influence the other and should therefore be part of the scope.</li> <li>• The research should concentrate on three groups. First of all the government, since they have put intermodal transport high on the agenda. Together with the private sector they can provide a leading role in the industry. Both parties can attract students towards the intermodal transport sector and positively influence the image of the sector.</li> <li>• Furthermore, academia will be important to design a curriculum for intermodal transport. This should be a program set up on European level, which would require European standards and formats. It is important that the curriculum not only concentrates on transport and logistics but also contains management, finance, organisation design etc. This will make it more attracting for students to enter the world of transport and logistics. Students should be recruited on campus but also companies should open their organisations to show students intermodal transport in real life settings.</li> </ul>
Expected results or impact of the research for this topic, including dissemination
<p>The research should provide an overview of the image of intermodal transport within each member state. The overview will be used to create best practises/toolkit for the image building in Europe. The best practises should be implemented within the member states, using the toolkit. The result will be a wider and a more positive image of intermodal transport. Therefore, the research should work closely with national programmes that focus on creating a more positive image of transport and logistics in general.</p> <p>This positive image should include:</p> <ul style="list-style-type: none"> <li>• Intermodal transport is interesting for people with different backgrounds such as technology, management, organisation, design, finance and planning. Students will not only develop technical skills but also management skills. The latter will force them to look at the business side of implementing intermodal transport systems and not only the technological side.</li> <li>• Intermodal transport requires highly skilled workers.</li> <li>• Intermodal transport has a positive impact on reducing CO2 emissions, costs, and congestion.</li> <li>• An intermodal transport curriculum will be set up to create more overlap between education and business. Students will get to see their future working environment.</li> </ul>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)
<p>This topic is highly related to other topics concerning education and training.</p>

6.10. INTERMODAL EDUCATION AND TRAINING

Suggested title of the research topic	Intermodal Education and Training
Timing/year	2010-2030
Policy context	
<p>This topic for research addresses some of the indications provided in the following documents issued by the European Commission:</p> <ul style="list-style-type: none"> <li>• Logistics Action Plan</li> <li>• Promotion of inland waterway transport NAIADES</li> <li>• 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008-2060), European Commission, Directorate-General for Economic and Financial Affairs, 2009.</li> <li>• Communication from the Commission, Europe 2020, a strategy for smart, sustainable and inclusive growth, COM (2010) 2020 final.</li> <li>• New Skills for New Jobs, Anticipating and matching labour market and skills needs (COM (2008) 868 final)</li> </ul>	
Aim or objective of this topic	
<p>In the coming years, European transport and logistics sectors will see demographic changes (i.e. aging, migration, lacking skills) which will result in acute shortages in skilled employees and limited accessibility to qualified working staff in the future.</p> <p>In addition, the intermodal transport sector, requiring high qualified profiles over different transport modes but also a very good understanding of all the future global trends (i.e. digital innovations, globalization, energy efficiency, security, sustainable transport, business collaborations, mobility, flexibility, etc.) is currently characterised by a huge demand for educated forces, while the sector's profile is too unknown both to the current professionals and the young generations.</p> <p>Therefore, there is a need to develop education and training relevant to intermodal transport and logistics, and to attract highly qualified young people in the intermodal and logistics market to improve its performance.</p> <p>The proposed approach covers selected sub-instruments to boost intermodal education and training including both research and demonstration activities:</p> <ul style="list-style-type: none"> <li>• Harmonise the European Intermodal Education &amp; Training (E&amp;T) framework</li> <li>• Create a harmonised job profile for an intermodal manager/integrator</li> <li>• Attract people to work in the intermodal sector</li> <li>• Develop new methods and solutions of intermodal learning and training</li> <li>• Create awareness in the sector for intermodal training &amp; education</li> <li>• Implementation of new approaches and solutions in the intermodal E&amp;T sector</li> </ul>	

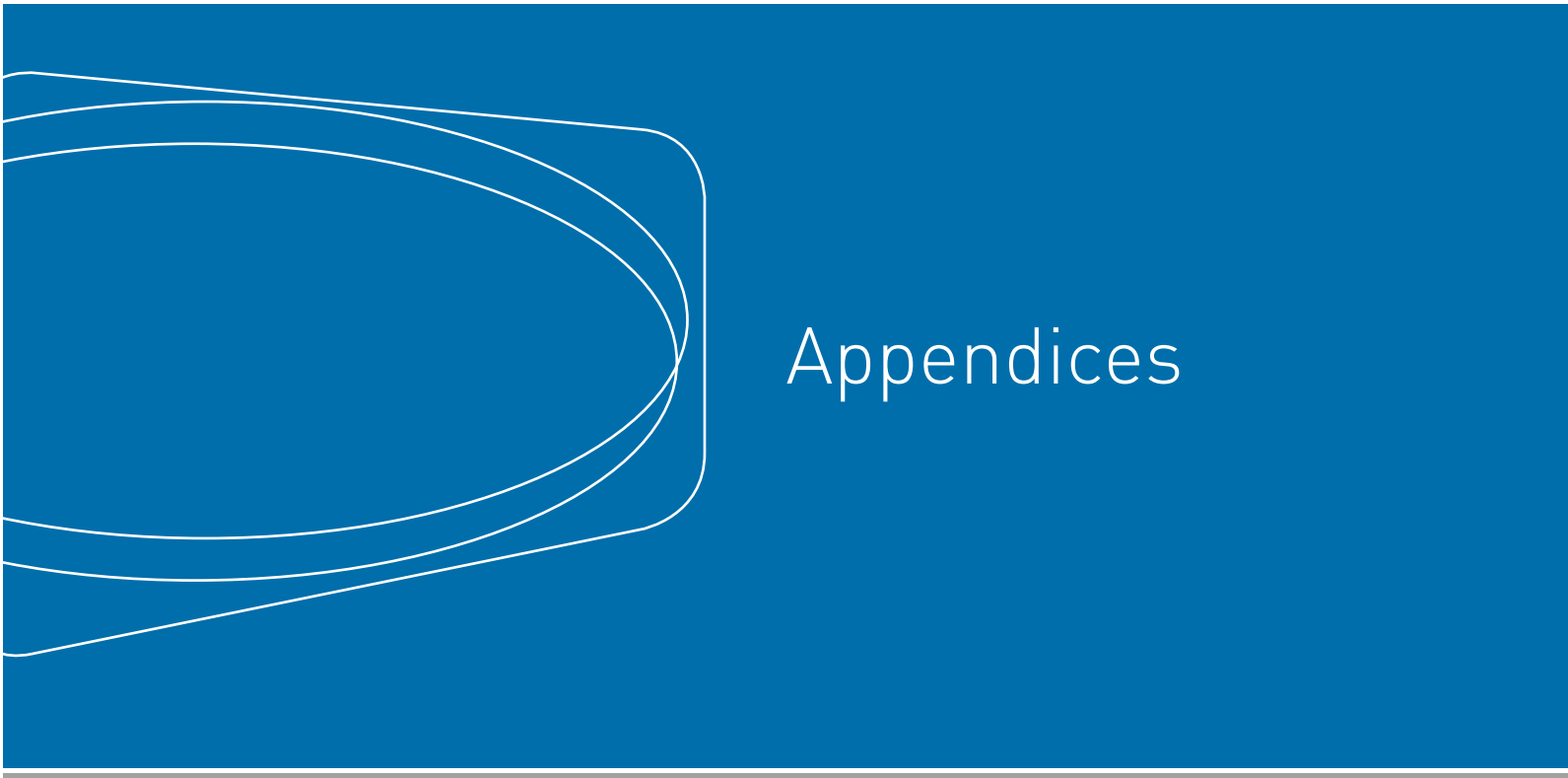


Scope of the research for this topic, including use of closed or running research projects
<p>In the future the European co-modal sector will have to cope with energy efficiency, sustainability, infrastructure usage, collaboration models, security regulations and other emerging trends, which will entail appropriate employment skills and call for innovative education and training.</p> <p>The scope of the research will be the following:</p> <ul style="list-style-type: none"> <li>• Elaboration of an intermodal framework curriculum with definition of didactic requirements (users, levels, methods, etc.)</li> <li>• Analysis of current and future intermodal job profiles and perspectives based on European Qualifications Framework</li> <li>• Identification and development of methods and strategies for making intermodal education and training more attractive</li> <li>• Definition and design of concepts for integrating education and training into operative processes (paper, electronic, mobile). Production and integration of training application and promotional tools. Interaction between human and working environment.</li> <li>• Demonstration activities with existing E&amp;T organisations. Development new intermodal “spin-off” institutions for intermodal E&amp;T.</li> <li>• Road map for further realisations incl. business concepts.</li> </ul> <p>These activities should be linked with the existing projects eWIT&amp;eWITA - European Web Platforms and Training Concepts for Intermodal and Inland Waterway.</p>
Expected results or impact of the research for this topic, including dissemination
<p>The expected results of this activity are the following:</p> <ul style="list-style-type: none"> <li>• Design of a European intermodal Education and Training framework</li> <li>• Description of job profiles and requirements for intermodal integrators</li> <li>• Collection and validation of strategies for attracting future E&amp;T managers/integrators</li> <li>• Development of ICT-based solutions for intermodal education, training, promotion</li> <li>• Promotion strategies and activities in the intermodal E&amp;T sector</li> <li>• Implementation of developed solutions in the intermodal E&amp;T sector</li> </ul>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)

6.11. INNOVATIVE TOOLS AND CONTENT

<b>Suggested title of the research topic</b>	e-Learning in Mixed Reality Sensor Systems
<b>Timing/year</b>	Medium term and long term research
Policy context	
<p><i>Quote EU policies (if known) relevant to the subject</i></p> <p><b>ETP</b> Advanced <b>R</b>esearch &amp; <b>T</b>echnology for <b>E</b>mbodied Intelligence and <b>S</b>ystems (ARTEMIS)  Research topics: embedded systems, ambient intelligence</p>	
Aim or objective of this topic	
<p>Innovative Tools are needed for the support of technology enhanced learning. Technology enhanced learning is focused on the latest technologies on the one hand and uses these technologies for education and Training on the other hand.</p> <p>The objective of this topic is to develop an innovative Education and Training System aiming at the use of sensor technologies in demand-orientated logistics processes including related supply chains. As the use of radio- and image based sensor technology for logistics purposes is further increasing – as well in intra-company as in inter-company logistics processes – the need for systematic understanding of sensor information is growing.</p> <p>The need for educating and training on sensor technologies comprises the large area spread from interpretation of single sensor information to multi sensor information to be used for the design, monitoring and control of logistics processes.</p> <p>Mixed Reality Environments will be used to compare simulated and visualized sensor information with those of real test data. These data can be available from test beds such as the Galileo Test Bed Saxony-Anhalt, where radio- and image based sensor information are available from real logistics processes within the port of Magdeburg.</p> <p>The challenge is to include non cooperative measuring environments into consideration which results in the following impacts on sensor data:</p> <ul style="list-style-type: none"> <li>• uncertainty in identification and localization of logistics assets</li> <li>• quality of service concerning the communication of sensor data</li> <li>• entropy of information in process and pattern recognition</li> <li>• real time availability of sensor information and real time interpretation of single and multi sensor information</li> </ul>	
Scope of the research for this topic, including use of closed or running research projects	
<p>The main scope of this topic is to develop an integrated demonstrator for an Education and Training System using mixed reality environments in logistics processes.</p> <p>Therefore infrastructure must be established to collect real sensor data from radio and imaging systems (such as WLAN, video surveillance) and to adapt virtual reality environments to these data.</p> <p>The research for this topic can be dovetailed with the outcome of the research topic ViERforES (<a href="http://www.vierfores.de">www.vierfores.de</a>) which focussed on the use of virtual and augmented reality environments in different fields of appliance (including logistics).</p> <p>This project is about to be pursued for the time frame of 33 months (2011-2013).</p>	

Expected results or impact of the research for this topic, including dissemination
<ul style="list-style-type: none"> <li>• methods for the interoperability of real test beds and virtual logistics processes based on intelligent sensor systems</li> <li>• demonstrator for a mixed reality sensor system for educational and training purposes</li> <li>• gain of know-how in the field of multi sensor interpretation and the implementation of different operator views in monitoring systems for the control of logistics processes</li> </ul>
Further suggestions regarding this topic (common call with other priority; expected instrument; relation with trans-national research programme)



# Appendices

## APPENDIX 1

Summary World Economic Forum Report “Supply Chain Decarbonization”

### Executive Summary

Significant movement is expected towards reduced supply chain carbon intensity. This will create both opportunities and risks for logistics and transport firms, with changes in supply and demand driven by:

- Regulation of carbon emissions
- Higher and more volatile fuel prices
- Evolving consumer and client demand

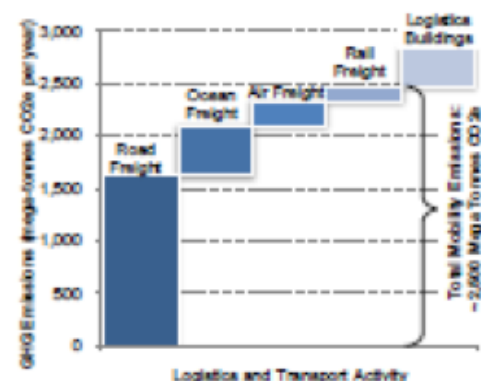
The sector can play an influential role in decarbonization, both in its own operations and through broader supply chain optimisation. This provides direct benefits through reduced costs, managed risks and business growth.

### Findings

Human activity generates annual greenhouse gas emissions of around 50,000 mega-tonnes CO<sub>2</sub>e. We estimate that 2,800 mega-tonnes – or 5.5% of the total – are contributed by the logistics and transport sector.

WORLD ECONOMIC FORUM  
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Supply Chain Decarbonization Opportunities	Potential Abatement Mt CO <sub>2</sub> e	Assessed Index of Feasibility
Clean Vehicle Technologies	175	High
Despediting the Supply Chain	171	High
Enabling Low Carbon Sourcing: Agriculture	178	Medium
Optimised Networks	124	High
Energy Efficient Buildings	93	High
Packaging Design Initiatives	132	High
Enabling Low Carbon Sourcing: Manufacturing	152	Medium
Training and Communication	117	Medium
Modal Switches	115	Medium
Reverse Logistics / Recycling	84	Medium
Nearshoring	5	Medium
Increased Home Delivery	17	Medium
Reducing Congestion	26	Low



Key to supply-chain-wide decarbonization is an understanding of CO<sub>2</sub> emissions across the system. Corporate-level reporting, guided by the widely-used Greenhouse Gas Protocol, is a spreading reality. Product level foot-printing is an important step towards supply chain carbon rationalisation. It has been given a boost by the agreement of the first standards.

#### Supply Chain Decarbonization Opportunities

Commercially viable decarbonization opportunities which could be enabled by the logistics and transport industry are of the order of 1,400 mega-tonnes CO<sub>2</sub>e in the medium term.

#### Recommendations

##### Logistics and Transport Providers

- Adopt new technologies industry-wide
- Improve training and communication industry-wide
- Switch modes where possible
- Develop recycling offerings
- Develop home delivery offerings
- Promote carbon offsetting of shipments

##### Shippers and Buyers

- Understand and reduce carbon impact of manufacturing through alternative sourcing
- Plan to allow slower and better optimised transport
- Reduce packaging materials
- Work on product carbon labelling, standards, auditing tools, and use
- Increase shared loading

##### Policy Makers

- Reflect cost of carbon in energy tariffs
- Support carbon measurement and labelling standards
- Build open carbon trading systems
- Invest in infrastructure and flow management
- Facilitate recycling along the supply chain
- Encourage retrofitting of buildings to better environmental levels

## APPENDIX 2

Summary **EGCI Roadmap Comodality & Logistics**



## European Green Cars Initiative

### ROADMAP CO-MODALITY & LOGISTICS

VERSION 17/09/2010

#### ABSTRACT

For the common European market to function smoothly there is a need for an integrated, green and efficient transport system that allows the free movement of goods and people within, and into and out of, EU territory. This is vital for economic growth and European cohesion and the well-being of its citizens. An integrated transport system clearly calls for harmonisation of rules and interoperability of networks.

In order to reach these goals, research will be needed on innovative infrastructures (e.g. Forever Open Road, energy neutral or energy generating motorways), on new organisational concepts (payload sharing, advanced logistics, supply chain management and e-freight) and methods of working related to their introduction and on innovative vehicle technologies (such as modular vans and lorries, electric and diesel-electric vehicles), .

In addition, further research is needed on the measurement of transport impact on society, especially the development of consensus on the measurement framework for transport and logistics environmental footprint, and on the measurement of transport and logistics performance.

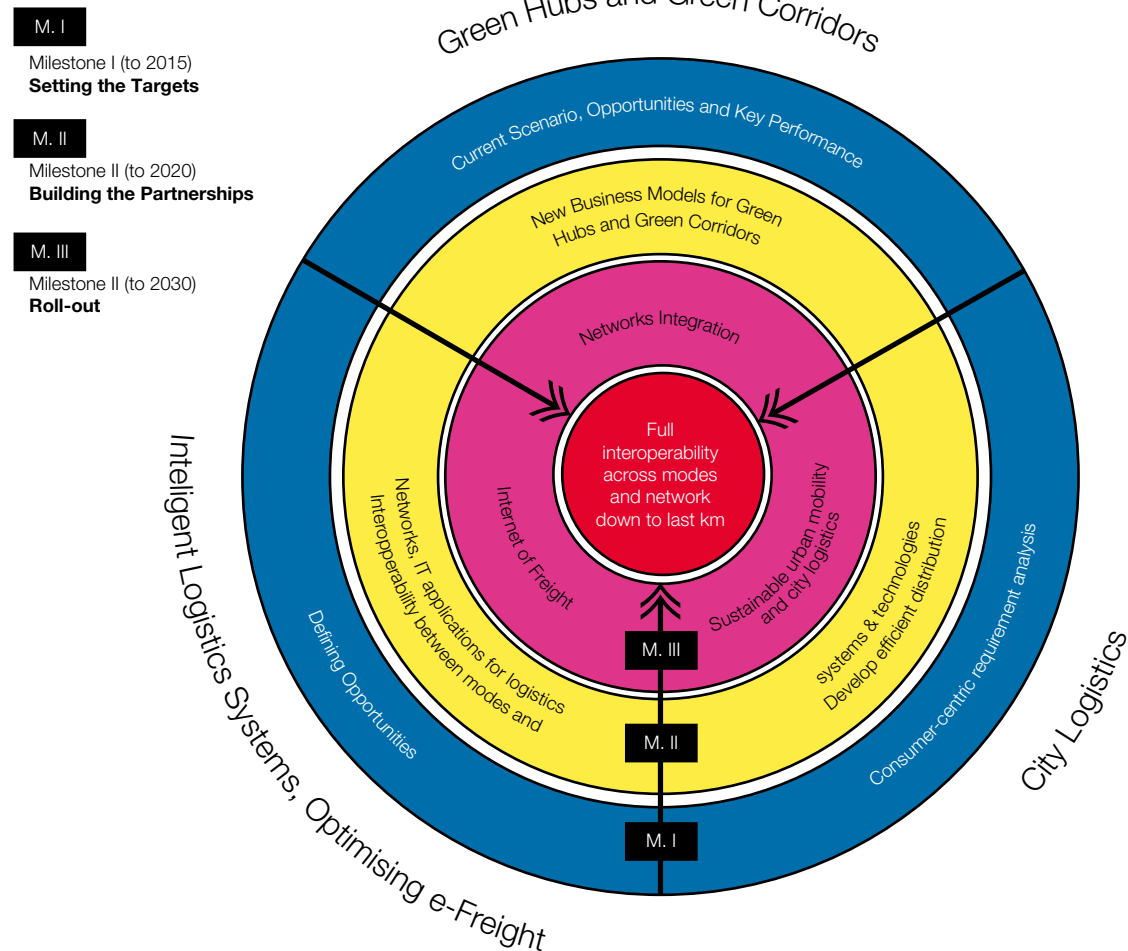
A series of complementary measures, such as financial incentives, creation of public private partnerships and an appropriate regulatory framework, are needed to prepare for market take-up. It is important to not only define these measures, but also understand their potential impact and interaction.

This paper sets out a three pronged approach, focussed on City Mobility, Green Hubs & Green Corridors and improved logistics control in combination with e-freight solutions, with the aim to improve the overall efficiency, and substantially reduce the carbon footprint, of the European transport system.

The benefits and challenges of an approach which is not purely technological but rather of organisational in nature and new ways of doing business are described. Milestones are identified and road maps defined that highlight the steps to be taken to achieve the desired objectives.

This document is based on the consensus among the participants of EIRAC (European Intermodal Research Advisory Council).

Its purpose is to stimulate the debate about the multi-annual implementation of the European Green Cars Initiative from the perspective of the opportunities that co-modality and logistics can offer, also looking at the social and political acceptance by citizens, authorities and the business itself. In particular, new organisational concepts of doing business, i.e. night deliveries through electric vehicles, opening hours of terminals in 'green corridors' where around the clock eco-liners may be used etc. This roadmap can be summarized by means of a figure:



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## ANNEX 1

Summary World Economic Forum Report “Supply Chain Decarbonization”

## ANNEX 2

Summary EGCI Roadmap Comodality & Logistics







EIRAC II is co-funded by the European Commission  
in the scope of the 7th Research Framework Programme

