EU-Project ETTAR
(Environmental **T**echnologies **T**raining and **A**wareness **R**aising**)**

Identification and assessment of training needs, methods and activities for the wider use of environmental technologies in key sectors

Policy Brief 2

Striving for sustainable freight transport

1 Introduction

Transport in Europe, which includes freight and passenger transport, is a growing business that has a strong impact on the environment and on energy demands. Emissions from the transport sector (freight and passenger) represented 28% of total EU-27 CO2 emissions in 2006.[1]

An efficient transport system is of crucial importance for both the competitiveness of the European economy and the mobility of its citizens. As elementary components of the globalisation process, transport and logistics consequently rank amongst the most dynamic economic sectors. As a consequence, environmental impacts are also expected to expand. For instance, transport was the only sector in the EU with increasing CO2-emissions, while all other sectors have reduced their emissions considerably since 1990. Most worryingly, this increase did not come about as a result of increases in production – in fact the volume of goods transported has remained constant – but because the same amount of goods is now being transported over longer distances.

In consideration of these facts there is an increasing pressure to reduce the transport-induced negative impacts on the environment if the transport sector is to react to the threats of climate change and keep the environmental damage at a minimum. Thus, it is a necessary yet demanding challenge to create a much more sustainable transport system where economic growth is decoupled from the increase of environmental, especially climate, impacts.

The ETTAR Project - Identification and assessment of training needs, methods and activities for the wider use of environmental technologies in key sectors

The **ETTAR Project** (ETTAR is an acronym standing for: **E**nvironmental **T**echnologies, **T**raining and **A**wareness **R**aising) has been set up to identify and assess training needs, methods and activities for the wider use of environmental technologies in the transportation sector with a particular focus on freight transport in the EU. The basic question treated in the ETTAR project was the mitigation of freight transport's environmental impacts.

ETTAR focused on activities that could assist the transport sector in contributing to reductions not just of greenhouse gases, but also of other emissions that have significant environmental consequences (for example fine particles, NOx, SOx, noise, etc.). Environmental technologies, such as vehicle or fuel technologies were considered.

The project was intended to raise awareness and build capacities to address the environmental impacts occurring along the supply chain, so that businesses can become more aware of the impacts linked to freight transport. Another major focus of the project is the identification and assessment of training needs to promote the practical adoption or up-take and application of environmental technologies in the transport sector. Therefore, the project ran three workshops and a concluding conference with the objective of raising the awareness of participants and also specified an E-learning tool which, if introduced into a company, would bring environmental issues to the attention of groups of employees that would not normally attend face-to-face events.

[1] European Federation for Transport and Environment, 2008, CO2 emissions from transport in the EU27, p. 8.

1.1 The ETTAR Workshops and Conference

ETTAR is more than just another research project: It constituted an interactive dialogue process intended to come up with applicable solutions and ideas to make freight transport greener in a co-operative way. Three workshops were organised that brought together stakeholders representing the logistics providers and stakeholders responsible for buying transport services.

- Workshop 1, 25-26 October 2007, Gothenburg: Transport and the Environment - **Barriers to the take up of currently available lower carbon technologies**

  The first workshop focused on the practical pros and cons of using best available and environmentally sound vehicle and fuel technology for freight transport of all transport modes (road, rail, air and inland waterways); the barriers to an extended implementation; and best-practice examples outlining how these technologies can be employed at a large scale and without economic setbacks. Clear policy demands have been formulated and policy options devised.

- Workshop 2, 24-25 January 2008, Prague: Transport and the Environment - **Barriers to the take-up of more efficient transport and logistics planning and training and awareness raising methods**

  The second workshop focused on logistics optimisation, planning processes and training methods. The core question was how logistics information and transport technologies (contributing to environmental improvement in the logistics sector) can be promoted, especially how industrial decision makers (especially transport sellers, but also in a network with transport buyers) can be motivated to take up these technologies. A particular focus was laid on the role that awareness raising and training should play in this respect.

- Workshop 3, 17-18 April 2008, Berlin: Transport and the Environment - **The road ahead: training and awareness-raising that will encourage the freight transport sector to improve its environmental performance**

  The third workshop took a broader look at how technology can be used in the wider context of transport and planning in order to achieve environmental improvements. Emissions monitoring is widely seen as a first step to measure environmental impacts from freight transport in order to get better knowledge about one's own environmental footprint (as a precondition to mitigate the environmental impacts). The participants discussed ways of doing this, and the extent to which such methods can be applied across the supply chain. On the economic side, the workshop discussed how the true costs of transport emissions and other external costs can be calculated. An example (prototype) E-learning specification was introduced and debated.

- Dialogue Forum, 9 September 2008, Brussels: Transport and the Environment - **Sustainable Freight Transport Chains. Goal or myth?**

  The Dialogue Forum concluded the ETTAR project discussing all the important aspects of "greening freight transport" with relevant stakeholders of the business. The dialogue forum was an interactive event that depended heavily on the contributions of the participants. High-level representatives from industry, NGOs and political authorities were present giving all participants the opportunity to discuss solutions with them. A dedicated E-learning tool specification prepared within this project for use by transport providers and purchasers was presented.

1.2 The ETTAR Policy Briefs

The findings of the workshops and the project are documented in two policy briefs designed to raise awareness of the potential and uptake of environmental transport technologies.

- The **first ETTAR-Policy Brief** issued in April 2008 covers the results from the first and second workshop and describes practical measures that can be taken up by policy

makers and industry in order to make freight transport more environmentally friendly. It can be downloaded: http://www.ettar.eu/download/Policy_Brief_1.pdf

- The **second ETTAR Policy Brief, i.e. this document,** aims at drawing policy conclusions from the discussions at the ETTAR workshops and the final conference. This policy brief, thus, presents the overall results of the ETTAR-project and will concentrate on

    1. Policy measures to be taken by the European Commission;
    2. Measures to be taken by industry (freight transport customers and providers);
    3. Training and awareness raising needs.

2 Basic results and conclusions of the workshops and the conference

2.1 Technologies exist but are not implemented

The basic assumption on which the workshops started was that there was currently no business case for the take-up of environmental technologies as companies (companies selling and buying transport services) in general do not see any business advantages connected thereto and rather concentrate on minimising prices. There is no doubt that adequate technologies exist that reduce the environmental impact of freight transport; it is now time to ensure that these technologies are implemented. Different levers were considered that could motivate stakeholders in the freight transport business to apply environmental technologies.

The conclusions of the first workshop's final discussion were that each company and the individual responsible for the purchase/development of technologies, public procurement, etc. should and could develop solutions and consider concrete steps to take up environmental transport technologies which fit into the company's portfolio. Even though these steps may be small steps, they are important as they may lead to knowledge and experience that can stimulate new projects and approaches. Furthermore, more contacts should be set up between companies and institutions having a stake in the development, use and spread of environmental technologies. These include companies buying and selling transports, universities, technology developers/sellers, and policy makers, which enable learning networks to be formed, thereby achieving continual improvements.

When discussing the possibilities to foster environmental freight transport technologies, there seems to be a tendency to focus primarily on the transport providers and the supply of transport services. The role of transport buyers as demanders is often neglected. Yet, it is not sufficient to focus on technologies but also the effects of market mechanisms need to be taken into account to ensure that buyers' responsibility for their logistic choices is emphasized.

A thorough analysis can be found in the summary of workshop 1: http://www.ettar.eu/download/Summary_1.pdf .

2.2 Barriers to the uptake of environmentally friendly technologies

The First Policy Brief has already intensively dealt with the different barriers and drivers concerning the uptake of environmental transport technologies:

Amongst the barriers are:

- Strong cost sensitivity of the transport sector
- Lack of price incentives for reducing environmental impacts;
- Costs of the technology employment;
- Long investment periods;
- Inadequate infrastructure;
- Administrative barriers;
- Lacking awareness of customers or the discrepancy between their actions and environmental convictions.

A detailed description of the barriers can be found in the first policy brief: http://www.ettar.eu/download/policy_brief_1.pdf.

2.3 Motivation for implementing environmentally friendly technologies

The ETTAR Project successfully brought together the key stakeholders of the freight transport business to discuss possible approaches to green supply chains and ways to make them more sustainable. In this instance, a basis for the necessary networks between all active parties on the transport market was established. During the workshops one pilot project involving the cooperation of transport sellers and transport buyers outlining "low hanging fruits" of transport improvement was developed. Freight transport customers and providers were confronted with some of the challenges and dilemmas facing the logistics industry. Throughout the workshops, it was made clear that in addition to facing urgent environmental challenges, there are real business opportunities for logistics organizations.

Yet, in order to take advantage of any of the opportunities available, training and the raising of awareness of environmental effects, the quantification of impacts, the calculation of external costs and the eventual internalisation of these external costs are core pieces of information needed to help industry green their business. Overall, there appears to be a conflict in the EU between policies designed to maximise GDP and those designed to reduce environmental impact. What is needed (some of these are already happening or under development) is a mixture of regulation, economic measures and information-sharing to give the companies a clear green light and clear incentives.

2.4 Raising Awareness amongst suppliers and customers

2.4.1 E-Learning Specification

E-learning is a tool that can be used to raise awareness and to stimulate the development of sustainable transport scenarios amongst freight transport suppliers and customers.

The ETTAR project developed an E-learning tutorial whereby freight transport customers and providers are presented with some of the challenges and dilemmas facing the logistics industry. Throughout the tutorial, it is made clear that as well as facing urgent environmental challenges, there are real business opportunities for logistics organizations. The objective of E-learning is to change the mindset rather than to merely give information. The essential message is that businesses need to act to reduce the harmful environmental effects of freight transport, and that if this is not voluntarily done, there will be pressures both from governments and consumers (society) that will bring about changes in ways that may be hardly comfortable for the industry.

2.4.2 Dissemination of information based on the ETTAR project

Ecologic and the ETTAR team linked with policymakers, industry and researchers at relevant gatherings such as the *Conference on Climate Change, Green Logistics, Sustainable Mobility* in March 2008, *the International Transport Forum* in May 2008 and *the Metropolitan Congress* in October 2008.

In anticipation of the time when companies will be held responsible for the green audit of their whole product life cycle and logistics processes will be submitted to substantial changes, those events not only provided the targeted absorbance of ETTAR's findings but also the possibility of increasing the ETTAR network of like-minded companies and organizations.

3 Recent European initiatives with regard to freight transport

The European Commission has launched and attained the approval of a series of policy actions concerning specific aspects of the transport sector in the last ten years. Most of these actions were practical measures addressing distinct problems, such as emission limits for vehicles (cars and lorries, emission curbs for diesel trains); standards of tyres; the quality and features of fuels; the promotion of information and communications technologies (ICT) for freight transport; the strengthening of infrastructure (particularly TEN); the promotion of modal shifts (especially from road to rail and waterways); the intended inclusion of air freight into the Emission Trading System and others.[2]

In January 2008, the European Commission released a comprehensive compilation of existing studies on external costs in the transport sector. This "Handbook on estimation of external costs in the transport sector"[3], jointly prepared by several transport research institutes, summarises the state of the art as regards the valuation of external costs of congestion, accidents, air pollution, noise and climate change (as the most important among others) and offers a concrete basis for the realisation of the internalisation of external costs.

In July 2008 the European Commission published the Communication on a "Strategy for the internalisation of external costs"[4]. The Strategy acknowledges the need for "truer prices"/ price incentives by internalising external costs but also emphasises the need to provide additional alternative infrastructure for more environmental modes, encourage technological innovation and encourage competition policy, as well as to set standards.

[2] For a concise description of the most important measures in the background notes of Workshop 1 and 2 see http://www.ettar.eu/results.html

[3] http://ec.europa.eu/transport/costs/handbook/doc/2008_01_15_handbook_external_cost_en.pdf (6 February 2008).

[4] See in the following: See Communication from the Commission "Strategy for the internalization of external costs, COM(2008)435.

4 Policy recommendations for the EU Commission and Member States

4.1 Obligatory Standard setting

Development of emission standards for freight vehicles

Many participants of the workshops rated the setting of performance-related, legally binding, targets for manufacturers of freight vehicles as far more effective than any voluntary agreements, which have not proven effective, for example with CO_2 emission limits of cars. Any legal requirements should leave manufacturers of vehicles the freedom to choose among different technologies for the construction of vehicles, etc. as long as the required environmental performance (emission limits, fuel consumption, etc.) is achieved. Such obligatory requirements would also thwart the economic strategy of competitors in freight transport, which consists of adopting the cheapest (and thus often the most environmentally unfriendly technology) to lower the transport price. From the discussions in the workshops the EU Commission's approach to regulate the different aspects of transport, especially the EURO norms, are welcomed and encouraged as well as the different actions announced in the Commission Communication "Keep Europe moving"[5].

Development of standards for calculation of emissions and KPIs

In order to measure and calculate total emissions, a standard for a calculation tool of emissions cannot and should not be realised by single companies or networks, The EU (e.g. under the leadership of the European Environmental Agency (EEA)) should support a multi-stakeholder approach for such a standardisation, preferably linked strongly to the development of a calculation tool for external costs.

Furthermore, Key Performance Indicators (KPIs) are a critical basic information, since "what gets measured, gets managed". Determination of best practices and benchmarking are possible only if this data is available and should therefore be included in the standardisation process. (The role of environmental audits e.g. in the frames of ISO14000 is also important.)

Common methodology for the calculation of carbon footprint and a promotion of an "environmental label"

The calculation and communication of the carbon footprints of transport companies was discussed widely in the ETTAR workshops and the concluding conference.

To start with, transport sellers should be induced to "be aware" of their footprint which is *inter alia* conclusive regarding the respective company's efficient use of energy. By this, the company gains knowledge about the environmental effects of their transport and can base any improvement considerations thereon. By communicating information about the carbon footprint of the different transport services to their customers, the customers are better informed about the environmental impacts of their choices and get additional help to base their choices on.

[5] Communication from the Commission to the Council and the European Parliament "Keep Europe moving – Sustainable mobility for our continent" (mid-term review of the European Commission's 2001 Transport White Paper), SEC(2006) 768;http://ec.europa.eu/transport/transport_policy_review/index_en.htm (25 September 2008).

Some (larger) freight transport firms said in the workshops that they were already calculating their firms' carbon footprint on a voluntary basis. The European Commission should consider whether it should opt for an obligation of freight transport industries to calculate and communicate their carbon footprints. To lend coherence and credibility to such a carbon footprint communication, a common methodology should be developed and agreed in a multi-stakeholder approach.

In the longer run, a development of an "environmental label" for freight transport services is conceivable. The label could take the form of a grading, reflecting better performance across a spectrum, or could simply declare the impact, e.g. kg CO2 / t km. This label would distinguish environmentally favourable freight transport options from less favourable ones. The development of such a label and the development of criteria upon which this label could be based, could become a policy objective of the European Commission. The most important parameters regarding the environmental impacts would need to be identified; here co-operation with freight industry stakeholders would be vital. The criteria upon which the award of such a label is based would need to take into account technological progress and would need to be updated regularly (comparable e.g. to the energy label for household appliances, e.g. fridges and washing machines).

4.2 Internalisation of external costs

One major aspect for a more sustainable transport system is the integration of external costs into transport prices. External costs are costs to society and - without policy intervention - are not taken into account by transport users: until now, all transactions in the transport industry are based more or less on "false" prices and are not reflecting the costs for society as a whole. This leads to decision-making processes in the transport services sector (with its strong cost sensitivity) which do not consider environmental and other impacts on society given that there are no related price incentives. Therefore, the most important goal for governments should be to enact market reforms so that transport prices better reflect reality by integrating external costs.

The apportionment of external costs represents a flexible and economically sensible instrument. It could ensure that all those costs which have to date not been covered by other instruments can be charged to the party which generates these costs and thus contributes to fair cost transparency in the transport sector. This creates incentives for using environmentally and socially compatible transport modes. As part of a cross-modal policy, it could also help to strengthen the position of the more environmental friendly modes, including the modal shift to railways (as described in the EU-Commission's paper "Keep Europe moving"[6]).

Some participants in the ETTAR workshops believed that a coherent internalisation of external costs might lead to fewer low-cost products being transported over long distances and contribute to designing a smarter way of transporting goods. The discussion, however, concluded also that the internalisation of external costs will not on its own solve the problem. Its principal benefits would be cleaner transport, less transport of low value goods and some amount of modal shift. The internalisation of external costs would also significantly alter the cost structure of freight transport and will also generate different "business cases" with regard to the use of environmental friendly technologies.

[6] See Communication "Keep Europe Moving", see footnote 5, p. 4.

Calculation of external costs

Instead of developing new tools, it would be worthwhile to use existing approaches to calculate and compare environmental impacts of different modes of transport, e.g. energy consumption, CO2-emissions and exhaust atmospheric emissions) and extend them to external costs. On the one hand, this would avoid generating additional expenses and on the other hand this could be efficiently linked to set up a European standard for these calculations.

Furthermore, such a calculation has to consider the environmental impacts of all the different transport processes. Therefore, a standard for a calculation tool cannot be realized by single providers and customers alone, but rather in a multi-stakeholder approach, preferably supported by the EU. Furthermore, the acceptance by the EU of a certain methodology for upgrading and expanding existing tools (based upon their Handbook) will be an important and necessary precondition. This would help the transport industry to carry out the necessary calculations more accurately, more efficiently and at a lower cost.

Refining the different policy instruments for internalization

Even if different instruments are available, especially as far as CO2 emissions are concerned, the EU and the Member States have not yet created consistent policies which tackle the important challenge of climate change in the transport sector effectively. In practice, the main economic instruments for internalising external costs are taxation, tolls and, in certain circumstances, emissions trading. They are already applied to varying extents depending on the mode of transport. Each external cost has specific characteristics that require the use of the appropriate instruments. In the above-mentioned EU-Strategy for the internalization of external costs, the use of differentiated charging (e.g. according to the associated congestion, air pollution, CO2-emissions, noise and accidents) is deemed to be the best way of taking those variations into account. But it is essential that all measures for internalisation of external costs consider the transport modes individually according to their environmental impacts, especially towards climate protection. Only this approach could lead towards a more sustainable transport system, where all transport modes take responsibility for their real environmental impacts on society.

- **Taxation**: The CO2 reduction targets in the different sectors set by the EU have to be fulfilled by policies and measures which have to be defined by the Member States. An important instrument available to the Member States for regulating CO2 emissions in the transport sector is tax, e.g. on fuel. In contrast to rail and road, both inland shipping and also aviation are still exempt from energy taxes. And although the EU legal framework in principle envisages an option for imposing taxation on energy for the aviation sector (kerosene tax), this seems to be unlikely due to a variety of international sentiments.

  Politically, it is becoming more and more difficult to increase taxes in most Member States, and raising fuel taxes, even on environmental grounds, will be opposed by many citizens as merely a convenient excuse to raise more revenue through taxation. In addition, given the need for unanimity on taxation measures, the huge range of taxes in different Member States and very high tax rates in some countries, the conclusion of an EU-wide agreement on using taxation to regulate CO2 emissions will be extremely difficult. However, policy makers should further pursue their goal to harmonise fuel and energy taxes throughout Europe. They should also ensure equitable energy taxation for all transport modes.

  From the point of view of the final consumer, it was said in the workshops that transport costs generally constitute only a small part of overall costs, depending on the commodity transported, and do not reflect externalities. Rising prices triggered by political measures

such as higher taxation of fuels might in the case of some goods and in markets with strong competition, not completely be shifted to the final consumer.

On the other hand, it has to be noted that a consistent increase of taxes on fuel, etc., contributes to making services more expensive as transport services generally pass these price rises onto consumers. As a result, this might not have too big an effect on how the freight transport sector organises transport. In order to have an effect and avoid treating equally what is not equal, tax policy should differentiate between environmentally friendly transport solutions and favour environmentally friendly transport modes.

Toll Charges: Currently, the proposals for the revision of the directive 1999/62/EC on the charging of heavy goods vehicles exclude CO2 emissions specifically, although climate change is claimed as the most important challenge for EU in the transport sector.

Regarding the difficulties for CO2 taxes, the consequence of the exclusion of CO2 emissions from the revision of the directive 1999/62/EC on the charging of heavy goods vehicles will be that the road sector will be the only transport mode where no market-based instrument is implemented. However, as long as the alternatives are not in place, it would be an important option to allow the Member States to include CO2 costs in the Eurovignette framework.

Especially with the new approach of co-modality it has to be ensured that the use of toll revenues favours the development of more environmentally friendly modes, since the resulting increased modal shift would also lead to more profound benefits in terms of minimising the overall external effects of transport (e.g. targeted investments in the context of co-modality and combinations of road and rail transport, making it possible for both modes to develop their competitive advantages, should be supported).

- **Emission Trading Scheme (ETS):** Emissions trading sets a specific type of financial incentive to reduce CO2 emissions and can, as part of a comprehensive package of measures, play an important part in tackling climate impacts of transport, provided that it is effectively organised. ETS represents an alternative or additional measure to command-and-control measures, as it leaves an important leeway to the manufacturers and users of transport vehicles to reduce their emissions and is based on market mechanisms. As for the air transport sector, the emission trading scheme was favoured by participants as a means to reduce CO2, especially if it could be introduced on a world-wide scale.

  The current provisions governing emissions trading affect the different transport modes to different extents. Road, air and maritime transport emit substantial quantities of CO2 and still they are not (directly or indirectly) affected yet by emissions trading. A first step towards internalising external costs will be the integration of aviation into the European Emission Trading System by 2012. However, the railways are the only transport mode which is effectively included in the emissions trading scheme via the purchase of electricity (owing to their high electricity consumption: at DB AG for example, approx. 90 per cent of total rail traffic performance is provided by electric traction[7], although the railways produce significantly fewer greenhouse gas emissions per transport performance compared to road transport and aviation). Thus, the current form of emissions trading, where only rail is affected by now (and aviation by 2012), has not the favoured effect on the competitive conditions for more environmentally friendly modes (e.g. the environmental and especially climate-related advantage of rail cannot be reflected by railways in the market prices). The opposite is true: emission trading leads to

[7] As a substantial proportion of the costs sustained by the electricity providers owing to emissions trading is passed on to the electricity consumers.

rising energy prices for railways. Thus, the desired steering effect on transport choices and intermodal shift as mentioned above cannot be achieved.

In the interests of climate protection, the way EU emissions trading can achieve a better effect in the transport sector should be thoroughly reviewed. However, the general inclusion of all freight transport modes in the European Emission Trading System was seen critically by participants of the concluding ETTAR conference. Such an emission trading schemes would require additional administrative processes and burden on the one hand. On the other hand, suggested prices of about 5 Eurocent / litre fuel would be a rather weak motivation for industry to change habits.

4.3 Supporting joint projects and awareness raising

Training and awareness raising

The value which people gain by the provision of products and services is considerable, if not irreplaceable. Therefore, priority should be given to designing a system of production and distribution facilitating that all people on this planet are provided for in a sustainable way. Thus, the European Commission should continue raising awareness and conducting networking activities in the European and global transport sectors and seek to support companies engaging in sustainable transport management solutions for greening the supply chain.

Networks and partnerships

To facilitate the change in the transport system, a greater understanding of the connection between the different preconditions and their relation to the different levels of the entire supply chain is necessary. **Networking** between the different parts of the supply chain amongst each other, as well as with policy-makers is a quintessential instrument in the process of making the transport system more sustainable as a whole. Despite certain reluctance, due to competition-related concerns, the sharing of knowledge between logistic companies should be promoted – it is the role of industrial associations, which should not be allowed to remain inert in this process.

As a way of providing best practice and guidance, the creation of Logistics Agencies to counsel enterprises on their logistics operations' adaptation to sustainable solutions, taking into consideration their specific means and circumstances, is recommended. Possible models are the German Energy Agency or the UK Freight Best Practice programme.

Another concrete approach is the build-up of a European platform for discussing best practices of supply chain management through the BestLog[8] project, which is funded by the European Commission, DG Energy and Transport. Business requirements and practices are discussed in annual workshops which focus certain sectors of industry and their specific requirements. BestLog aims to improve logistical practice and education and to achieve a better match between EC policy and business decisions. ETTAR audience and BestLog shared experiences and knowledge during the ETTAR workshop in Prague.

Thirdly voluntarily based green projects and activities are a further tool to trigger the message that business as usual is not sustainable nor might it be profitable in the long term. Voluntary green projects are not rare amongst leading companies.

[8] http://www.bestlog.org/?L=1 (5 December 2008).

ETTAR workshops were only a small part of a whole range of international events where lots of interesting examples of such projects were shown, e.g. the *Conference on Climate Change, Green Logistics, Sustainable Mobility*[9] in March 2008, *the International Transport Forum*[10] in May 2008 and *the Metropolitan Congress*[11] in October 2008 provided good opportunities for benchmarking and sharing knowledge. The International Transport Forum came up with conclusions regarding the freight transport field which were quite similar to ETTAR's conclusions emphasizing the importance of a further consolidation of supply chains though new alliances between forwarders, haulage companies and the shipping industry.[12] This conference also arrived at the conclusion that carbon auditing and benchmarking are convenient measures helping to improve the different companies' environmental image.[13]

As a consequence, it would be an important encouragement for pioneers of green freight transport if the European Commission promoted related activities (involving co-operation between transport provider and transport buyer). For example, during the ETTAR project consultations about a potential small-scale green transportation pilot between an international operating logistics provider and a Finish enterprise developed.

In order to take account of the transport companies' practical needs, the EU Commission should consider supporting green pilot projects which show

- Investment in optimal transportation mix of train, truck, IWWs (parameter: costs, delivery times, emission output, quality of freight transport);
- Economic payback;
- Possible contributions of green transport options to companies' annual sustainability performance and corporate image.

4.4 Resumé

Generally speaking, there is a high potential for environmental improvements within the transport sector: environmentally friendly technologies are available, knowledge is widespread. It has also been shown that a number of barriers prevent the implementation of new technologies and innovative modes of operation, cost sensitivity being the most important followed by customer interest.

Against this background and to practically foster the employment of these technologies, incentives have to be created for sustainable transport solutions. A bundle of political measures could help to facilitate the development towards a more sustainable transport system and fair competition considering strongly also environmental impacts. This includes most importantly **obligatory standard setting** and the setting of **true market prices**.

Developing an agreed methodology for quantifying emissions, as well as the calculation of external costs and the eventual internalisation of these external costs topped up with

[9] http://www.greenlogisticsforum.net/ (5 December 2008).

[10] http://www.internationaltransportforum.org/ (5 December 2008).

[11] http://www.metropoliscongress2008.com/default.asp?PageID=57 (5 December 2008).

[12] http://www.internationaltransportforum.org/Topics/Workshops/WS3Conclusions.pdf (5 December 2008).

[13] http://www.internationaltransportforum.org/Topics/Workshops/WS3Conclusions.pdf (5 December 2008).

supporting green projects and initiatives within the sector and the related training and the awareness raising about environmental effects, are core pieces of a strategy to help industry green their business.

5 Possible voluntary and strategic approaches for the freight transport industry to improve their environmental performance

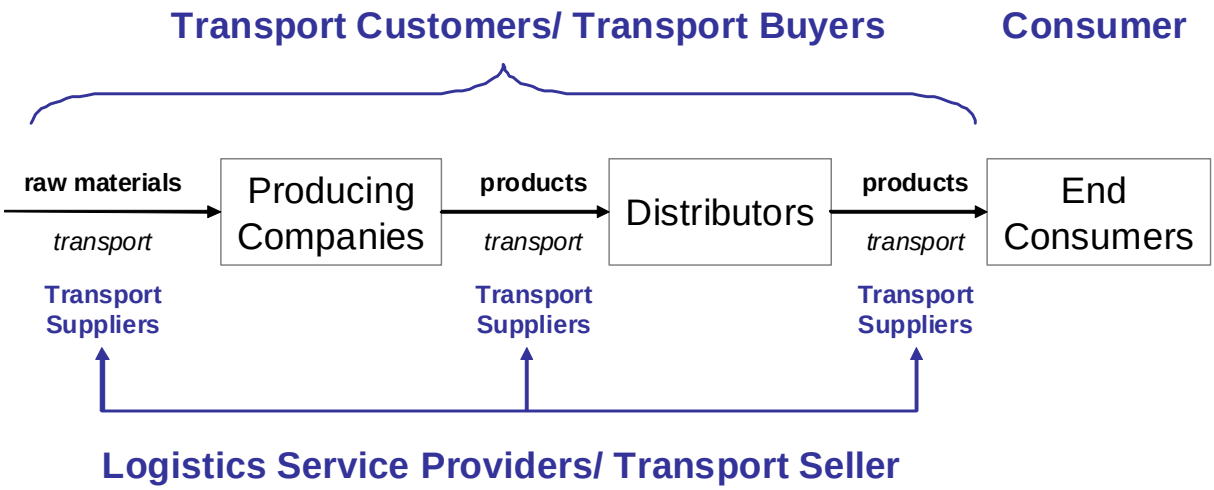

Figure 1: Relationship between customers and providers in the transport sector

5.1 Recommendations for freight transport customers

Some pioneering transport buying companies already identify and quantify the indirect environmental problems caused by the shipments they have ordered. This development might lead to the expectation of new stimuli for sustainable logistics. But concern for the environment alone will not tip the decision in favour of eco-friendly modes of transport. Currently, freight transportation customers are still focused more on affordable prices than ecological sustainability. But they have to be aware that the sustainability performance of transport can become a growing cost and competition factor for customers and suppliers in the transport sector, especially due to scarcer resources. Furthermore, when society's overall acceptance of the burdens imposed by freight transportation will decrease, it is to be expected that a company's sustainability competence with regard to transport will become more and more important and that concern for transport's environmental consequences will increase among consumers – especially considering the growing debate about the impact of traffic emissions on the climate.

5.1.1 Placing the topic in the company's environmental strategy

Environmental considerations in general and transport issues in particular have to be integrated into the long term planning of a company (and into their due corporate responsibility policy). The board of directors needs to be aware of the potentially mounting social pressure – coming from consumers, policy makers and other relevant stakeholders - which could demand that environmental criteria be followed in transport and logistics operations. This social pressure can also contribute to forming a company's reputation and bringing about new legislation. A company's board of directors should also be aware of the

transport policy of competitors in order not to be the last one to act in the field of improving the environmental quality of their transport and logistics policy.

First step: Benchmarking and competition case studies

Therefore the first step would be to collect reliable data about the opportunities and risks for the company related to the decisions related to demanding sustainable transport options from transport providers. **Benchmarking and competition case studies** about sustainable transport options provide these data as a precondition for changes. Furthermore, these instruments are very useful information tools for freight transport customers. They can help to improve the environmental impacts of their products (due to transport) and to keep up with the competitors on their markets.

Second step: inclusion of transport in environmental plans of freight transport

The frequency and the mode of transport of goods should be included in the respective **environmental plans** of freight transport customers. Clear objectives and concrete targets set in companies' environmental plans anticipating their customers' or consumers' expectations and requirements, would raise the company's awareness and knowledge about the effects of "their" transport and promote sustainable transport, provided that the companies comply with their own targets. Environmental audits are suitable tools to develop targeted ways to improve the environmental impact of a specific company in respect to its products.

5.1.2 Information gathering with environmental "balance sheets"

Transport customers should generate (or have generated) their environmental "balance sheets" for their goods and products' transports, where energy consumption and harmful emissions from rail, truck, ship, air and combined transportation are assessed and potentially disclosed to customers, regulators or the public. This should enable them to determine which transport mode (and/ or intermodal combination) in the respective concrete case (i.e. including aspects like backhauling) has the least impact on the environment.

5.1.3 Improving the sustainability of transports

When companies become more aware of their transports' environmental impacts, the next step would be to mitigate these impacts. This could include the possibilities that innovative logistics technologies and inter-modal solutions offer.

The improvement of the overall environmental performance should take into account the whole supply chain of product distribution comprising the relations between producers of goods (raw materials, intermediary products and final products), the transport companies transporting these goods, retailers and final consumers.

Therefore, this process of optimization requires the close co-operation of freight transport customers with the logistics service providers who have to develop intelligent solutions which are adapted to their customers' specific processes.

5.2 Recommendations for logistics services providers

Logistics service providers have to be prepared for sustainability-related demands from their customers. Thus, providing intelligent solutions for sustainable logistics systems will become an important competition aspect. They have to optimize partnerships and communications

with customers and their own suppliers (contractors) concerning the impacts of transport on society with a specific focus on environmental impacts.

5.2.1 Providing reliable data about environmental impacts of their transports

Optimised logistics planning technology includes the employment of Information and Communication Technology (ICT), and technology facilitating modal shifts. Logistics services providers should offer to their customers an overview of the environmental burden of their transports as well as precise calculation of the environmental impacts of different transport options for single routes. Such a calculation has to take into account all relevant environmental impacts, e.g. CO2 emissions, energy consumption, air pollution etc., as well as all involved transport modes (road, rail, air and inland waterways). An overall approach is needed which does not only consider the direct impacts of transports but also the indirect impacts (well to wheel approach/ 3-scope-approach).

At the ETTAR workshops two best-practice examples were presented:

- **EcoTransIT, the Ecological Transport Information Tool**, is a free accessible instrument (www.ecotransit.org) for industry to calculate the energy consumption and emissions of freight transport throughout Europe. It includes all transport modes (lorry, airplane, inland water and sea ship, train as well as combined transport) and allows comparisons between different transport solutions. This enables freight customers to determine which route and means of transport has the least impact on the environment. It is targeted specifically at a modal shift from road to railway-based transport. EcoTransIT helps freight transport customers to assess the environmental impact of their shipments and comply with the requirements of the EU eco-management and audit scheme EMAS II. The tool is managed by a consortium of eight railway operators together with UIC in co-operation with the German IFEU institute. The European Environmental Agency (EEA) has tested the validity of the technology and approved the methodology. The EcoTransIT methodology is also accepted by railways' competitors.

- The **Network for Transport and Environment (NTM** - www.ntm.a.se) is a new development project with the aim to provide a user-friendly IT-tool to be used by transport companies when automatically (i.e. non-manually) assessing the environmental performance of transport operations. The scope of the tool includes the emissions of vehicle, vessel, aircraft and train operations as well as fuel and electricity production and supply. The new approach by NTM includes the possibility of the calculator to be inter-linked via the internet with software systems already in use within transport organisations, e.g. invoice generation, track & trace, production planning and performance etc.

Yet, the awareness of the need for such a system is not at all widespread in Europe, especially not in small and medium enterprises. Distrust of existing calculating tools and methodologies is rampant in logistics companies, which is an important reason why these are not used. It seems that this argument could also often serve as an excuse for many companies to "keep waiting" for the most "excellent" methodology. But in order to offer reliable information as required by the customers, a sector specific standard for the calculation (quality, methodology and data) is needed.

5.2.2 Offering "green transports" and sustainable optimization of transports

Given that sustainable options of freight transport are only beneficial when freight transport customers demand and/or accept them, these "green transports" options have to fulfil certain criteria.

Freight transport customers will appreciate transport optimization according to ecological criteria only if price, speed and reliability are considered simultaneously. Only if these aspects are in some way reconciled, could there be a realistic chance to reduce environmental impacts in a sector known for its sensitivity to price.

Furthermore, transport buyers' decision-makers need information regarding the extent to which the environmental costs are already included in today's transport prices, e.g. via taxes or infrastructure charges. This needs to be complemented by information about potential future cost increases driven by future legislation and regulations aiming at the internalisation of external costs. Logistics service providers should offer information and solutions to their customers which anticipate these developments in order to display the opportunities of a "greening" transport sector.

It is a necessary precondition for greener transport solutions, that logistics service providers set their own targets for reducing the environmental impacts. Logistics service providers often do not own the vehicles/ ships used for transportation but rely on contractors (suppliers). Thus, these transport providers should integrate their suppliers' emissions in their targets and should set them suitable standards.

5.3 Joint recommendations for transport buyers and sellers

Realising greener transport with the integration of more environmental friendly transport modes and technologies is difficult because the modes compete against each other and do not generally co-operate to produce the optimal mix. Amongst the supplier and carrier companies, often one person is responsible for air, and another for land etc. and these people want to "push" their solutions – there are financial rewards for this. It could be helpful to develop interdisciplinary teams to overcome the barriers of current organisational structure.

Furthermore, existing industrial networks including transport buyers and sellers should be encouraged. Pilot projects developed by these networks play an important role in raising awareness and spreading good practice and they help to discuss issues with policy makers. Also any negative lessons learnt should be disseminated.

You can find further ideas, projects and details in the presentations of the workshops:

- Workshop 1: www.ettar.eu/events/workshop1/presentations.html
- Workshop 2: www.ettar.eu/events/workshop2/presentations.html
- Workshop 3: www.ettar.eu/events/workshop3/presentations.html

5.4 Resumé

In sum, the ETTAR project has identified the following possible approaches for **transport buyers** to monitor and attenuate the environmental impacts of "their" transports:

- Inclusion of transport-related aspects in the environmental plans of the companies and improvement of the planning of their transports;
- Assessment of the environmental impacts of "their" transports in environmental balance sheets;
- Close interaction and co-operation with transport providers in finding solutions to improve the environmental performance of the logistics solutions.

Transport sellers, in turn, could contribute in the following ways to improve awareness and provide solutions to improve the environmental performance of freight transport:

- Calculate the environmental impact (footprint) of different transport services;
- Diversify their service portfolio including specifically “environmentally friendly” transport services as specific brand for costumers to select;
- Inform customers on the environmental benefits of different logistics solutions.

In order to use synergies and to orient environmentally intelligent logistics solution towards the real needs of transport buyers, transport sellers and buyers should co-operate in networks and associations.

6 Overall conclusions

The ETTAR project has shown that the logistics industry and their customers still have a long way to go in order to render their transport modes more environmentally friendly and to integrate sustainable options.

In general, business leaders (transport buyers as well as providers) have to be convinced that sustainable solutions are more rational in the long run than business as usual. While it might in the short term be the simplest way to stick to unsustainable solutions, it will be very costly to take up sustainable ones when external costs will need to be internalised. The reason why the process is slow is that business leaders in general do not see any (immediate) benefits from investing in environmental technologies. These benefits and respective incentives have to be developed and implemented, while using comprehensive networks between the different parties in the transport sector, including industry, policy-makers and NGOs.

In order to accelerate these adaptations, the European Commission should accompany this process by contributing to the development of generally accepted methodologies to calculate the company’s carbon footprint with specific regard to transport, to internalise external costs and to tighten environmental standards to foster the use of environmentally sound transport technologies.