

Safe and Sustainable Freight Transport



*Our common
challenge!*

T&E project | Freight from Road to Rail

June 1999 | May 2002 | First project period

F I N A L R E P O R T



Europe's voice for sustainable transport

T&E 02/3 July 2002

Safe and Sustainable Freight Transport

Our common challenge!

T&E project | Freight from Road to Rail

June 1999 | May 2002 | First project period

F I N A L R E P O R T

A u t h o r | Markus Liechti

Safe and Sustainable Freight Transport – Our common challenge

© 2002 T&E, European Federation for Transport and Environment

Bd de Waterloo 34, B-1000, Brussels, Belgium

Tel: +32-2-502 9909 | Fax: +32-2-502 9908 | info@t-e.nu | <http://www.t-e.nu>

This publication was prepared by Markus Liechti at the T&E Secretariat in Brussels

YOU WILL FIND FACT SHEETS IN FOUR LANGUAGES, PUBLICATIONS AND POSITION PAPERS ON THE ISSUES DEALT WITH IN THIS PUBLICATION ON T&E'S WEBSITE, www.t-e.nu, OR YOU CAN ORDER PRINT COPIES FROM THE T&E SECRETARIAT.

CONTENTS

0	Executive summary	4
1	Background	5
2	Growth in freight transport	6
2.1	Transport development in the European Union	6
2.2	Comparison between transport modes	6
2.3	Comparison between countries	7
2.4	Forecasts: How will freight transport develop?	8
3	Environmental impacts of freight transport	9
3.1	Situation and developments with regard to environmental impacts	10
3.2	Environmental challenges for railways	11
3.3	Impacts of freight transport in sensitive areas	12
4	Why is current freight transport not sustainable	14
4.1	What is sustainability?	14
4.2	The lack of sustainability in the current transport system	15
4.3	Conclusion: Freight transport is presently unsustainable	16
5	Reasons for the development	17
5.1	Wrong price incentives	17
5.2	Liberalisation of transport markets in Europe	18
5.3	Investments in transport infrastructure	20
5.4	Developments in transport infrastructure	21
5.5	Legislative framework on social and safety issues	21
5.6	Structural changes to means of production	22
5.7	Conclusions	22
6	Instruments needed for sustainable transport	23
6.1	Fair and efficient transport prices	23
6.2	The basis for fair competition between transport modes	24
7	The conclusions of the project	28

FIGURES

Figure 1	Transport Growth EU 15 (European Commission 2001a)	6
Figure 2	Performance by transport mode (European Commission 2001a)	6
Figure 3	Road transport development (tkm) in selected European countries (European Commission 2001a)	7
Figure 4	Rail transport development (tkm) in selected European Countries (European Commission 2001a)	9
Figure 5	Modal split in European Countries 1999 (European Commission 2001a)	9
Figure 6	CO ₂ emissions per transport mode (freight and passenger) in Mio tons (European Commission 2001a)	10
Figure 7	Energy efficiency in freight transport for rail (left) and road (EEA 2001b)	11
Figure 8	Freight transport through the Alps between Fréjus and Brenner (UVEK 2001b)	13
Figure 9	Existing freight transport and rail capacities through the Alps considering the whole chain between Ventimiglia and Semmering (source: UVEK 2001b and own calculations)	13
Figure 10	Map of the Alps (UVEK 2001b)	14
Figure 11	Development of freight costs in the Netherlands (left) and of diesel prices in EU (EEA 2001b)	17
Figure 12	External costs per transport mode in Euros / 1000 tkm (Source: INFRAS/TWW 2000)	18
Figure 13	Infrastructure investments and development of transport networks (EEA 2001b)	20

0 Executive summary

CURRENT FREIGHT TRANSPORT IS NOT SUSTAINABLE

Freight transport, mainly road freight, has grown at a persistently high rate over the last thirty years. As a result, the current situation is not sustainable for the:

- **Environment:** freight transport has huge negative impacts on the global climate, local air quality, natural habitats and the biodiversity. Road is particularly bad.
- **Society:** working conditions for road transport employees are unfair, certain people without access to certain transport means cannot access basic goods and services, and very many citizens are exposed to transport emissions which damage their health;
- **Economy:** road transport system is often congested, existing transport infrastructure is not efficiently used and transport prices are too low for the users compared to other factor costs (e.g. for labour). So scarce resources are used badly.

PRICE INCENTIVES IN FREIGHT TRANSPORT ARE WRONG

Transport prices have decreased over the last 30 years compared to other prices. Transport users do not pay the real costs which they cause. A huge number of external costs exist in the road sector. Thus, there are two distortions, which lead to non-efficient decisions with regard to the use of freight transport:

- Transport costs in general are too low compared to other factor prices, so transport is replacing capital and labour. Thus transport prices in general make the economy inefficient and less competitive.
- Road transport costs are artificially low compared to costs of other transport modes. This is because external costs in road transport are higher than in other transport modes.

THE PLAYING FIELD IS NOT LEVEL

Currently, there is no level playing field between transport modes. In addition to the distortion caused by external costs, road freight transport also benefits from the following:

- A fully open market in the European Union. Rail freight on the other hand is nationally-based and only at the beginning of liberalisation.
- Infrastructure investments which have strongly biased towards road transport over the last 30 years.
- An increasing road network while rail network decreasing.
- Weak regulations in the field of working time and driving hours, driver training and technical requirements for road freight.
- Insufficient enforcement of existing regulations in the road freight sector.

SAFE AND SUSTAINABLE FREIGHT TRANSPORT: WHAT IS NEEDED TO ACHIEVE IT

A safe and sustainable freight transport system requires a fair and efficient pricing system and a level playing field between transport modes. Central to this are:

- Kilometre charging for all commercial vehicles, taking all costs into account (infrastructure, environment, accidents, congestion), and applicable on all roads
- Internal market in the rail freight sector
- Reliable, customer oriented rail freight services
- Infrastructure investments oriented towards less environmental damaging modes and focussed on interoperability and intermodality
- Improvement of legal framework in road freight transport

SAFE AND SUSTAINABLE FREIGHT: A CHALLENGE FOR ALL STAKEHOLDERS

Safe and sustainable freight transport is a challenge for all stakeholders, and they will all have to contribute:

- Decision makers at the European level need to create the necessary legal framework
- Decision makers at national level need to support proposals for a common and sustainable transport policy framework and to accelerate their implementation

- Traditional rail freight operators must accelerate the reform of the rail system and to offer more reliable, customer-oriented and competitive freight services
- New rail freight operators are needed to offer innovative services to the customers
- The transport industry should improve the environmental performance and safety of trucks, locomotives, wagons it produces
- Industry, shippers and forwarders must be encouraged to further integrate environmental considerations
- NGOs will continue fighting for a safe and sustainable freight transport system on European and national level.

RECOMMENDATIONS

The following measures must be taken over the course of the coming years if a sustainable goods transport system is to be attained:

- Introduce a fair and efficient pricing system for all transport users, and particularly a kilometre charge for road haulage
- Implement liberalisation in rail freight transport by guaranteeing non-discriminatory access to rail infrastructure
- Create an interoperable rail network
- Develop rail freight services into a reliable, customer-oriented alternative to road haulage
- Promote infrastructure projects for environmentally less damaging transport modes as well as projects which serve intermodality and interoperability
- Consistently apply integrated assessment methods to evaluate the economic, environmental and social consequences of proposed infrastructure projects, before they are started
- Improve and harmonise social, environmental and safety regulations across the different transport modes to encourage a level playing field between transport modes; as well as to protect transport users, broader society and the environment.

1 Background

Road freight transport has increased in the 15 member states of the European Union by more than a factor of three since 1970. Over the same period, railways have lost market share and transported a decreasing number of tonne-kilometres in the majority of the member states. Due to the increasing environmental, social and economic impacts caused by freight transport, public and political opinion is clearly in favour of shifting freight transport from road to rail, yet this has not happened so far.

In 1999, the European Federation for Transport and Environment (T&E) began a three-year project 'Freight: From Road to Rail' to investigate the reasons for the decline in rail freight transport. Another aim of the project has been to contribute to awareness-raising and intervene in the decision-making processes to create a legal framework which will allow for fair competition between different modes of transport. The 'Freight: From Road to Rail' project is supported by the Swiss Ministry for Transport, the Catalanian and Basque governments, the Swedish rail-infrastructure administration, and several Swiss NGOs.

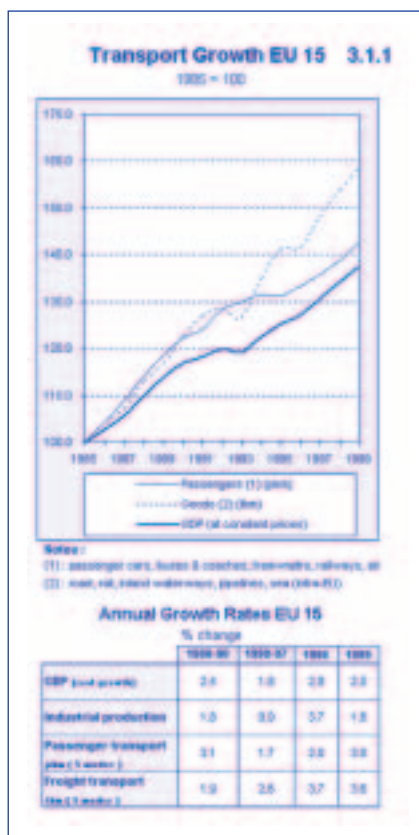
The project has shown that a modal shift is not enough and that more progress needs to be made to make freight transport sustainable. Therefore T&E will start a second project covering 2002-05 called 'Safe and Sustainable Freight Transport' to continue the basic work done in the past three years. This report also gives an overview of the questions and main challenges that remain for the near future.

This publication summarises the main findings of the project. It is intended to give all stakeholders and decision-makers in the field of freight transport an overview of the current situation and the relevant problems relating to freight transport, and to offer some possibilities on how to make freight transport more sustainable.

In the first part, this report analyses the development of freight transport in Europe over the last 30 years, particularly within the European Union. In the second part, it investigates the environmental impacts of the ongoing increase in transport. Next, it describes why this development is not sustainable and also explains the concept and characteristics of sustainable freight transport. The main parts deal with the questions of why this development has happened and what conclusions need to be drawn to change the traditional patterns of freight transport.

2 Growth in freight transport

2.1 TRANSPORT DEVELOPMENT IN THE EUROPEAN UNION



Freight transport has grown dramatically during the past three decades within the EU. Since 1970 freight transport has increased by 122%. The growth has been especially high during the last decade with an average annual growth rate of almost 3%. Thus by 1999 the total amount of freight transport in the 15 member states of the European Union had reached 2970 billion tonne-kilometres. For each EU citizen, the amount of goods transported each year amounts to 7979 tonne-kilometres.

In the 1990s freight transport grew considerably faster compared with passenger transport, and also compared with economic growth. While GDP has increased by less than 40% since 1985, passenger transport has risen by slightly over 40% while freight transport has gone up by almost 60% over the same period.

This development means that there has been a significant decoupling of economic growth and freight transport growth since the mid-1980s. It also means the economy has become less productive in recent years. The production of a given amount of goods needs about 20% more transport input now compared to 15 years ago.

The average distance of a transported tonne is increasing by around 1% per year. This means the increase in tonne-kilometres is made up of two factors: an increase in the distance transported, and an increase in goods to be transported. The average distance of one transported tonne was 150 kilometres in 1995. Less than 20% of goods are taken more than 150 kilometres, but these 20% of goods account for about 70% of the total number of tonne-kilometres (EC 1999a).

← Figure 1: Transport Growth EU 15 (European Commission 2001a)

2.2 COMPARISON BETWEEN TRANSPORT MODES

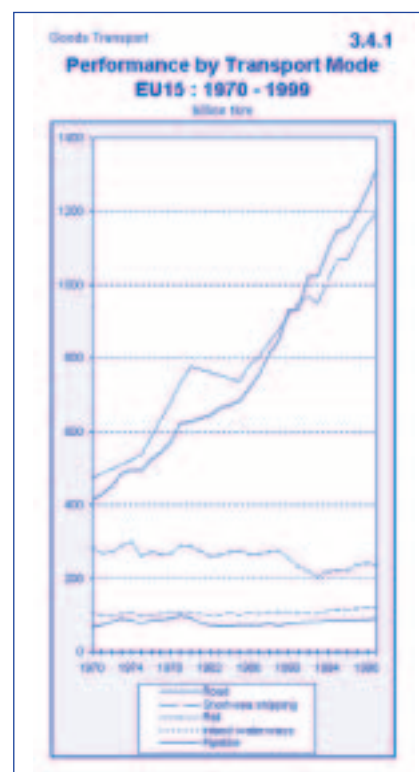
The growth in freight transport in the European Union has shown a very unbalanced breakdown among the different transport modes. The increase has concentrated on road transport, which has had the largest annual growth of 3.9%, with short sea shipping showing an average annual growth of 2.6%. By contrast, inland waterways have remained stagnant, while the railways have seen a decrease in tonne-kilometres.

The increase in road transport has been particularly high in the 1990s (+41%). From 1970 to 1999, road freight transport has more than tripled from 400 billion to 1300 billion tonne-kilometres per year. In the same time, rail has lost 46 billion tonne-kilometres or 16%, falling from 283 to 237 billion tonne-kilometres per year.

The uneven development between transport modes has inevitably influenced the modal split. From 1970 to 1999, rail's share of freight fell from 21% to 8%, while road's share increased from 31% to 44%. Short sea shipping increased its share also from 35% to 40%.¹

In addition, the average distances claimed by each mode increased in the passed in line with transported distances. The average distance for one transported tonne nowadays is 100 kilometres by road, more than 300 kilometres by rail, and 800 kilometres by short sea shipping.

Figure 2: Performance by transport mode (European Commission 2001a) ➤



2.3 COMPARISON BETWEEN COUNTRIES

The freight transport sector has seen different developments in the various European countries. Nevertheless, there is one common factor: road freight transport has increased substantially in all western European countries over the last 30 years.² There are big differences between each country. While road freight transport more than tripled in Europe overall, some countries have only seen an increase of 50% while others have had seen road freight rise by more than 400% since 1970.

The lowest increase in road freight transport was registered in Ireland with only 52% over 30 years. Sweden has also a quite moderate increase with 118%³, and Austria is relatively low with 147% since 1970. At the other extreme are the big European countries Germany and France where road freight transport has quadrupled. Spain and Switzerland are also near the top of the list with an increase of around 400% since 1970.

A closer look at the pattern over the past three decades shows that the increase in the 1990s was in general higher than in the two decades before. This is obviously the case for Germany and Switzerland, which until 1990 had growth rates around the average for Europe, but in the last 10 years their growth was considerably above average.

It is very difficult to find reasons for the different developments in each country. Traditional transit countries such as Germany, France and Switzerland have seen a big increase. By contrast, Austria is another important transit country but had a comparatively small increase. This may have something to do with Austria being closer to non-EU countries, which had a lower increase in transport over the 30 years. However, transit traffic is not the main driving force for transport developments in an entire country as it accounts on average for less than 10% of tonne-kilometres. And it is not just transit countries which have posted increases in freight traffic which differ from the norm - some countries on the periphery of Europe are very different. For example, Sweden and Ireland have comparably low increases in freight transport, but over the last 30 years Spain has continuously had an increase above the EU average, even in the time before it became member of the EU (in 1986).

Finally, there are also inconsistencies with regard to freight transport and economic growth. Highly developed countries such as Germany and France reported a high increase in road transport in the 1980s. However, their GDP per capita decreased - in Germany from 115% to 107%, and in France from 112% to 101% - compared to the average GDP per capita of all member states of the EU. Austria and Sweden also had a GDP of more than 100% in the 1980s compared to the EU average, yet both of them reported a comparatively low increase in road transport. While Austria's GDP continued to increase compared to the EU average, GDP level per capita in Sweden decreased from 114% to 101%, i.e. almost to the EU average. On the other hand, countries with a low GDP level 30 years ago, such as Ireland and Spain, have increased their economic power. GDP per capita in Spain, where road transport growth has been well above average, increased from 73% to 82%. Ireland, with very low road transport growth,

increased its GDP per capita from the bottom of the scale when it had 68% in the 1980s to the top of the scale with 112% compared to the EU average in 1999. In addition, the population in Ireland also grew by 8% between 1990 and 1999, that is more than the EU average of 3%. The message here is that there is not only no simple consistent correlation between a potential cause and the growth in freight transport, but there is also no consistent correlation between economic growth and transport growth in the different countries of the European Union.

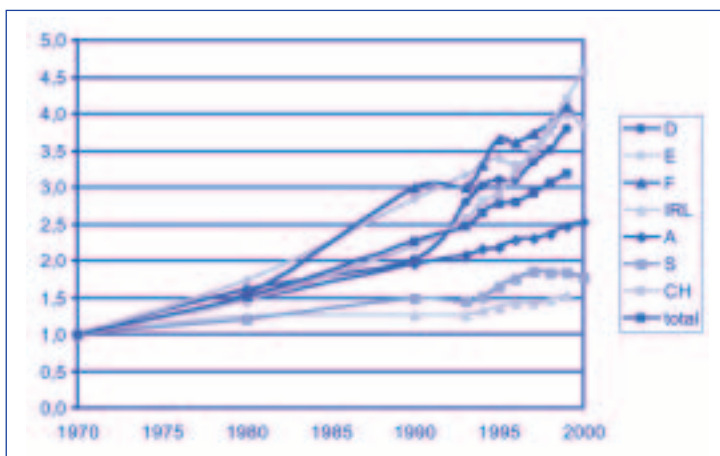


Figure 3: Road transport development (tkm) in selected European countries (European Commission 2001a)

The situation regarding developments in rail freight transport is more divergent than it is for road freight transport. Tonne-kilometres by rail have decreased by an average of 16% in Europe

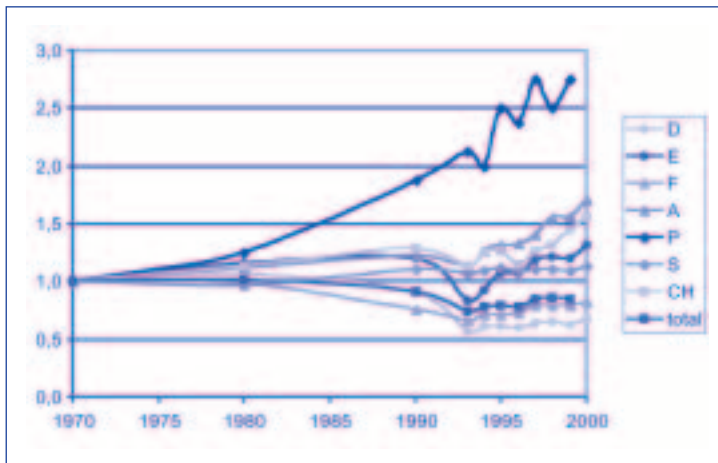


Figure 4: Rail transport development (tkm) in selected European Countries (European Commission 2001a)

exception, but some countries such as Austria and Switzerland can at least show an increase of about 50% in rail freight. Also Spain and Sweden have had a small increase in rail freight transport since 1970. On the other hand, rail freight lost tonne-kilometres in several countries, among them Germany and France where the reduction since 1970 has been almost 50%.

There is a wide range of modal splits in the different countries. If we exclude short sea shipping, rail's share across Europe was about 13% in 1999, yet in many countries rail is below 10%. In Greece for example it is less than 2% and in the Netherlands under 4%. However, there are some countries with a very high amount of rail freight - Austria and Sweden both have nearly 37% and Switzerland has 32%.

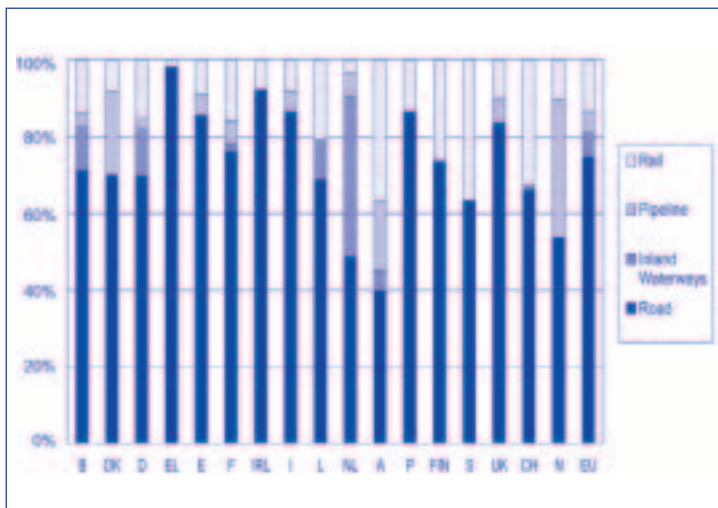


Figure 5: Modal split in European Countries 1999 (European Commission 2001a)

since 1970. Most of this decrease happened between 1980 and 1993. That latter year seems to represent the turning point in rail freight transport. In most countries, the decrease stopped in 1993 and in some cases a slight increase has even been reported. This changing situation is also reflected in the European average where an increase of 8% in rail freight has been registered since 1993. One possible reason for this mild reversal in the trend might be the reforms in the rail sector carried out in the early 1990s after the European Community's first attempt to revitalise the railways in 1991.⁴

The decline in rail freight has not happened in all European countries. Portugal for example has seen huge progress in rail freight transport with an increase of 275% since 1970. This is certainly an

A small share for rail does not automatically mean a high share for road. In the Netherlands, road has a share of less than 49% which is relatively low. The average in the European Union is 74.4% (again excluding short sea shipping). The reason for the modest share for road freight in the Netherlands is that inland waterways are very important, claiming almost 42% of freight transport. Inland waterways also play an important role in Germany, Belgium and Luxembourg with more than 10% in each country.

Austria has the lowest share of road transport with about 40%. After the Netherlands there are only four countries with less than 70% (Sweden, Switzerland, Luxembourg and Germany). In Ireland and Greece, more than 90% of freight is transported by road.

2.4 FORECASTS: HOW WILL FREIGHT TRANSPORT DEVELOP?

In its white paper on the common transport policy⁵, the European Commission predicts the increase in tonne-kilometres between 1998 and 2010 will be 38%. The predicted increase in GDP for the same period is about 43%. The white paper sets a target of stabilising the modal split at the shares each mode had in 1998. This can only be achieved if the rail freight sector undergoes a considerable reversal in fortunes in the next few years.

According to the CTP white paper, freight transport growth remains strongly coupled to economic growth, and no significant change is expected by 2010. A recent study from Prognos⁶ confirms this trend.

In western European countries, it forecasts growth rates for freight transport which are greater than GDP growth. It expects an increase of 42% between 2000 and 2015 and of 29% up to 2010. By 2015, road transport will have almost doubled compared to 1991. A small increase in rail's market share up to 2015 seems possible if current efforts to reform Europe's railways prove effective. Yet even a small increase in market share by 2015 will require a 50% increase in rail freight transport compared with 2000.

3 Environmental impacts of freight transport

The growth of freight transport, primarily in the road sector, has increasingly become a threat for the environment and the health of citizens. The growth over the last 30 years detailed above has made the transport sector the fastest growing consumer of energy and producer of greenhouse gases in the EU. There are other impacts from transport on the environment as well, for example land-take and habitat loss, noise and air pollution, and the increase in freight transport is inevitably contributing considerably to these. Among the most notable negative impacts are:

- **CO₂ emissions:** carbon dioxide emissions from freight transport are increasing in line with the increase in tonne-kilometres. In contrast to passenger transport, there is very little technological potential to reduce energy consumption - and thus to reduce CO₂ emissions - from freight transport. However, there is still some potential to reduce energy consumption through driving techniques that are more fuel-efficient. CO₂ is the main greenhouse gas contributing to climate change. In the medium term it represents a danger for the entire eco-system and it has the potential substantially change living conditions on earth.
- **Air pollution:** despite technological developments reducing some air pollutants from trucks, air pollution remains a major threat for the environment and human health. In addition to nitrogen oxides, other toxic substances are emitted as benzene or particles (PM10). A large proportion of European citizens are constantly exposed to pollutants, posing a serious threat to their health. These effects can involve damage to the heart, lungs, reproductive organs, and skin.
- **Noise:** noise from transport is primarily an irritant for urban residents, but it is also a threat to health as permanent exposure to noise of more than 65dB can be detrimental to the body. Noise caused by cars and trucks is a problem in most urban areas. In sensitive areas, noise is mainly caused by trucks. Railways are also a source of noise but affecting far fewer people.
- **Accidents:** Road accidents are responsible for a large number of injuries and deaths. More than 40 000 people are killed every year on Europe's roads. Accident costs account for about 2.3% of GDP and represent the largest external cost of transport (INFRAS/TWW, 2000). Passenger cars cause the majority of them, but the consequences of accidents involving trucks are more severe, and higher damages and costs result than from accidents involving only cars.⁷ Trucks are a major threat for the weakest transport users: pedestrians and cyclists. They are a particular danger in road tunnels where an accident can have a horrendous impact due to the very high temperature a truck can reach when it catches fire.
- **Land-take:** increasing transport adds to the pressure to expand transport infrastructure. This destroys natural habitats and threatens rare species. It also puts pressure on the use of scarce spaces in urban areas and in valleys.

The increasing impact of transport on the environment and the need to integrate environmental considerations into transport policy led the Environment Council to set up the Transport and Environment Mechanism (TERM) in 1998. In 2000 the European Environment Agency issued the first TERM report, and in 2001 the second TERM⁸ report was published with the aim of providing information to support efforts at environment integration and to monitor progress. The following section shows the development of some TERM indicators particularly relevant for freight transport.

3.1 SITUATION AND DEVELOPMENTS WITH REGARD TO ENVIRONMENTAL IMPACTS

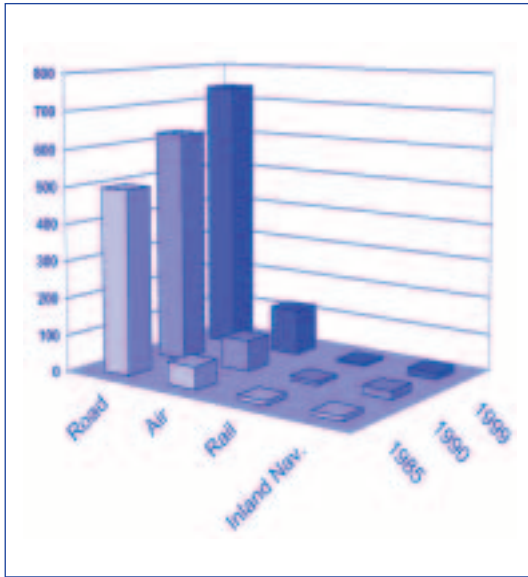


Figure 6: CO₂ emissions per transport mode (freight and passenger) in Mio tons (European Commission 2001a)

CO₂ emissions

CO₂ emissions from transport in the EU increased by 15% between 1990 and 1998.⁹

Road transport is the largest source of CO₂ emissions from transport, followed by aviation. The European Commission's voluntary agreement (ACEA agreement¹⁰) with the car industry to reduce CO₂ emissions from new cars sets a target to slow down the growth in emissions from passenger cars (11% between 1990 and 2010).

CO₂ emissions from road freight are expected to rise substantially: by 33% between 1990 and 2010. The voluntary agreement does not include trucks and so has no effect on these emissions. It is therefore likely that further benefits would result from addressing the road freight sector.

Road freight transport is responsible for about one third of CO₂ emissions from road transport. Freight by road totalled 743 million tonnes in 1999, and this share will increase once the effects resulting from the ACEA agreement become apparent. Road transport is responsible for 84% of the emissions from the entire transport sector, which itself accounts for a quarter of total CO₂ emissions. Railways emit very few CO₂ emissions.

Air pollutants

Emissions of acidifying substances and tropospheric ozone precursors¹¹ from the transport sector fell by 20% and 25% respectively between 1990 and 1998. Reductions in road transport emissions made the largest contributions to the reduction of ozone precursors. This is mainly a result of the introduction of catalytic converters in new petrol-engine cars, and stricter regulations for emissions from diesel vehicles which led to technical changes to reduce emissions.

Projections assuming the implementation of existing and agreed policies and measures suggest a decrease of 66% in NO_x emissions from road transport between 1990 and 2010 and a decrease of 77% in VOC emissions.

Despite these positive developments with regard to air pollution, a large number of people in urban areas are still exposed to high pollution levels exceeding EU limit values. Furthermore, transport is still responsible for more than half the emissions of tropospheric ozone precursors and more than 20% of emissions of acidifying substances. Further emission decreases in all sectors are needed to meet the targets set out in the European Commission's 1999 proposal for a directive on national emission ceilings. These efforts must also be made in the shipping and rail sectors whose contribution is currently comparatively low, but it will become more important once progress is made in the road sector.

Noise

Noise is a serious impact of transport, and it comes from road, rail and aviation. It is estimated that more than 30% of the population is exposed to road and 10% to rail traffic noise levels that can be annoying (above 55 dB) and about 15 % is exposed to noise levels that can be harmful to health according to WHO guidelines.¹²

A recent EU framework directive on reducing noise¹³ harmonises EU noise assessment methodology, and will require countries to make noise maps publicly available as a basis for the development of action plans. The agreement, which resulted from a conciliation process between the European Parliament and the Council of Ministers, asks the Commission to present within four years a proposal to reduce noise emitted by major sources.

Transport is one of the major sources for noise. Thus noise is an important issue for the transport sector and huge efforts to reduce noise emissions from transport must be made in all transport modes.

Energy efficiency of freight transport

The efficiency of energy use in freight transport has not improved much in recent years, but a considerable difference exists between road and rail freight transport. One tonne of freight transported by rail needs between 0.5 and 2.0 MJ per kilometre. The same tonne moved one kilometre by road requires between 2 and 4.5 MJ.

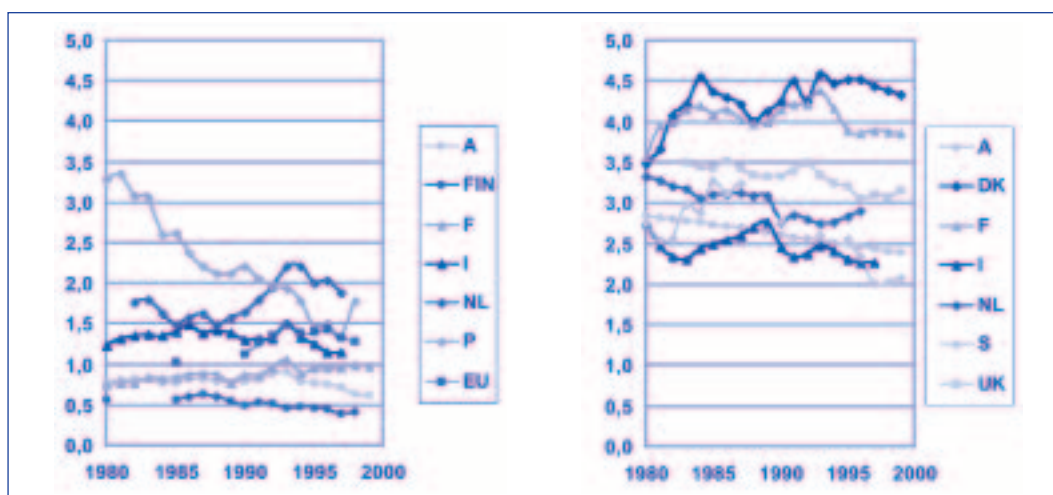


Figure 7: Energy efficiency in freight transport for rail (left) and road in MJ/tkm (EEA 2001b).

Land take

Land is under constant pressure for new transport infrastructure. Road and rail infrastructure takes land mainly from agricultural use and to a lesser extent from built-up areas. Between 1990 and 1998, over 30 000 hectares were taken for motorway construction in the EU, which amounts to about 10 ha every day.

Road and rail infrastructure poses an important threat to biodiversity and conflict with nature conservation policy. Some 1650 special bird areas (SPAs)¹⁴, 66% of the total number, have at least one major transport route within five kilometres of their centres.

Road transport is more land intensive than railways, so it needs more space for the same capacity. Yet land take and the threat to habitats are also increasingly problems for the rail sector.

3.2 ENVIRONMENTAL CHALLENGES FOR RAILWAYS

Railways are in general less environmental damaging than roads, so from an environmental perspective a modal shift of freight from road to rail is a step towards greater sustainability. For a long time the railways regarded their sector as innocent in terms of environmental impact and claimed to be the most environment-friendly means of transport. Such an attitude is dangerous because it neglects the fact that all transport has an impact on the environment and each mode has to provide the most environment-friendly solution possible. Furthermore, the belief that rail transport was environmentally clean mean the railway sector did not pay enough attention to its environmental performance, with the result that the environmental advantage of railways has been less in years than it might have been.

Nowadays the rail sector is becoming increasingly aware of its environmental challenges. The most important environmental issues for rail are:

■ Noise

Noise is a major problem for rail freight transport. Although there are modern brake systems, most of the freight wagons are still equipped with old, noisy technology. The exchange of rail freight wagons throughout Europe reduces the incentives to change the equipment as the own improved wagons may leave the own network and other non-equipped wagons enter and make emit noise.

As a result, the most commonly used anti-noise measure in the rail sector has been noise protection walls along the track, which may reduce the symptoms but does not address the sources of noise.

- **Air pollution from diesel locomotives**

By contrast with the road sector, no agreement has been established with the rail sector to improve technology and reduce emissions from diesel locomotives. And so far there has been insufficient incentive for railway companies to take their own initiatives on this. The life cycle of a locomotive is much longer than for a lorry, so very old locomotives are still in use and it will take a long time to phase them out.

While the road freight sector has made progress in this field, railways have not and have therefore lost some of their environmental advantage. If diesel locomotives are to remain in service in large numbers, their environmental performance will have to improve.

- **Energy efficiency**

The energy efficiency of rail transport has changed little over recent years. Low load factors in passenger transport and the use of high speeds are the main factors which have prevented improvements. With freight, the load factor is particularly important. So-called “piggyback transport”, in which entire trucks are loaded onto trains, can only be a short-term solution and used over short distances - the low net weight of the goods transported by piggyback makes for fairly low energy efficiency.

- **Land take**

Although railways are less land-intensive than roads, the pressure from railways on land and habitats is increasing due to the expansion of the high speed network. The optimal use of existing infrastructure should be as much a priority in the rail sector as with road.

3.3 IMPACTS OF FREIGHT TRANSPORT IN SENSITIVE AREAS

A recent study from the European Environment Agency gives a good illustration of the particular impacts of freight transport in sensitive areas.¹⁵

The Alps are one such sensitive area. Mountains act as natural barriers where only limited space can be used for housing, farming and transport infrastructure. Therefore the population is at its most dense in narrow valleys. Yet large numbers of trucks use unsuitable roads through these valleys. Transalpine goods transport doubled in total and tripled on the roads between 1980 and 1995. The increase through the Pyrenees was even bigger: 330% in just 10 years.

The high numbers of trucks in the main corridors, and their emissions, have a major impact on human health and the ecosystem in sensitive areas. Transit freight traffic is a particular problem in the Alpine region where a large proportion of international freight traffic passes through narrow valleys. The enlargement of the EU is expected to further increase the pressure on the Alps.

The impact of pollutants and noise is exacerbated in mountainous areas because of the specific morphological and meteorological conditions there. The amphitheatre shape of valleys and their narrowness means that emissions from combustion cannot escape, and therefore ambient air pollution in these valleys is often as bad as in urban areas. Studies show that the same traffic load contributes to a concentration of NO_x in the ambient air three times higher in mountainous areas than in lowland areas. These effects are further exacerbated by the need for engines to be stronger to move the trucks up the hills.

Specific meteorological characteristics in Alpine valleys cause inversion of the temperature mostly during the night in winter.¹⁶ Therefore, NO_x concentrations are higher in winter than in summer, and higher at night than during the day - despite lower traffic volumes in both cases. At the heart of the Alpine region, the effects differ considerably depending on the geographical situation (north slopes, south slopes) and the relation of the mountains towards the main wind direction (capacity for air exchange in the particular valley).

Noise also has a significant environmental impact in mountainous areas. The morphological shape of the Alpine valleys means that noise emissions are intensified (an effect comparable to an amphitheatre). In lowland areas noise is dulled through soil and vegetation, which is not the case in mountainous areas where vegetation is sparse). Due to the narrowness of the valleys and to the limited space available for settlements, it is impossible to avoid noise.

The increase in road freight transport has also become hazardous for citizens and other road users. In the three years 1999 - 2001, accidents caused by trucks killed 39 people in Mont Blanc (F), 12 people in Tauern (A) and 11 people in Gotthard (CH) road tunnel. The Gotthard and Mont Blanc, which are important international transit routes, were closed for long periods: the Gotthard for two months, Mont Blanc for three years.

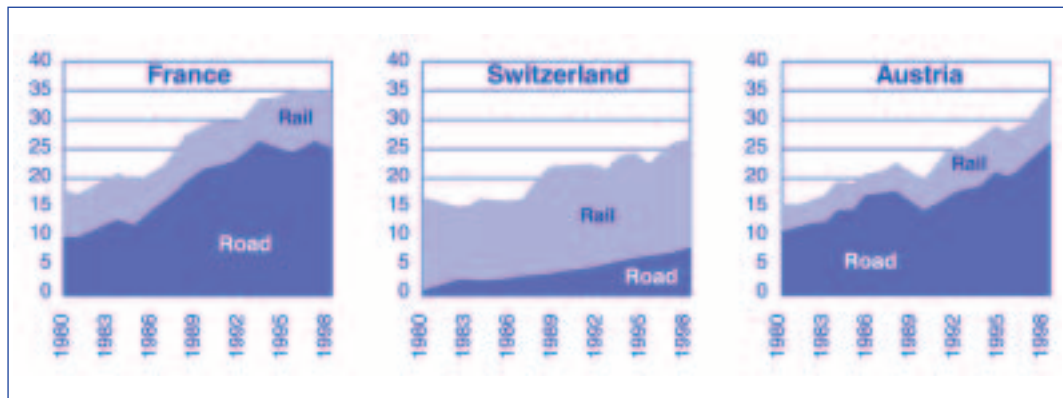
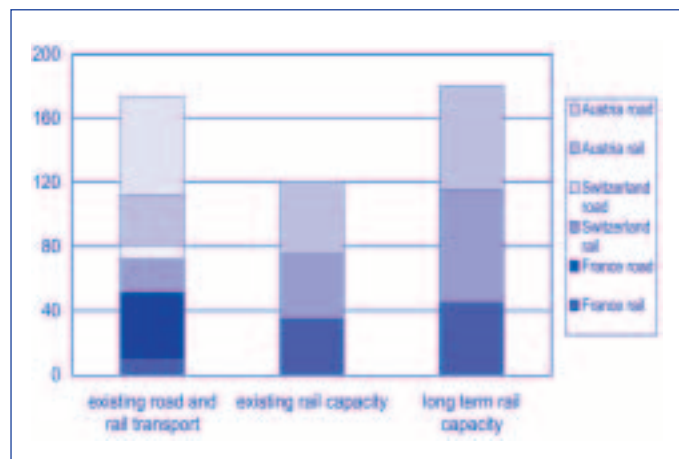


Figure 8: Freight transport through the Alps between Fréjus and Brenner (UVEK 2001b).

63% of transalpine freight transport currently uses roads¹⁷. This dependency on road transport is also a threat for the economy, basically in Italy because the Alps separate Italy entirely from the rest of Europe. However, alternatives to road transport exist through the Alps. In Switzerland, almost 70% of transalpine freight transport uses rail.¹⁸ A study based on the conservative assumption that every double-track rail link through the Alps has a potential capacity of 20 million tonnes shows that the existing rail infrastructure could accommodate more than 70% of transalpine freight transport. With some investment and the planned rail tunnels through the Swiss Alps, the existing level of transalpine freight transport could be taken over entirely by rail by 2012.

Figure 9: Existing freight transport and rail capacities through the Alps considering the whole chain between Ventimiglia and Semmering (source: UVEK 2001b and own calculations). ➤



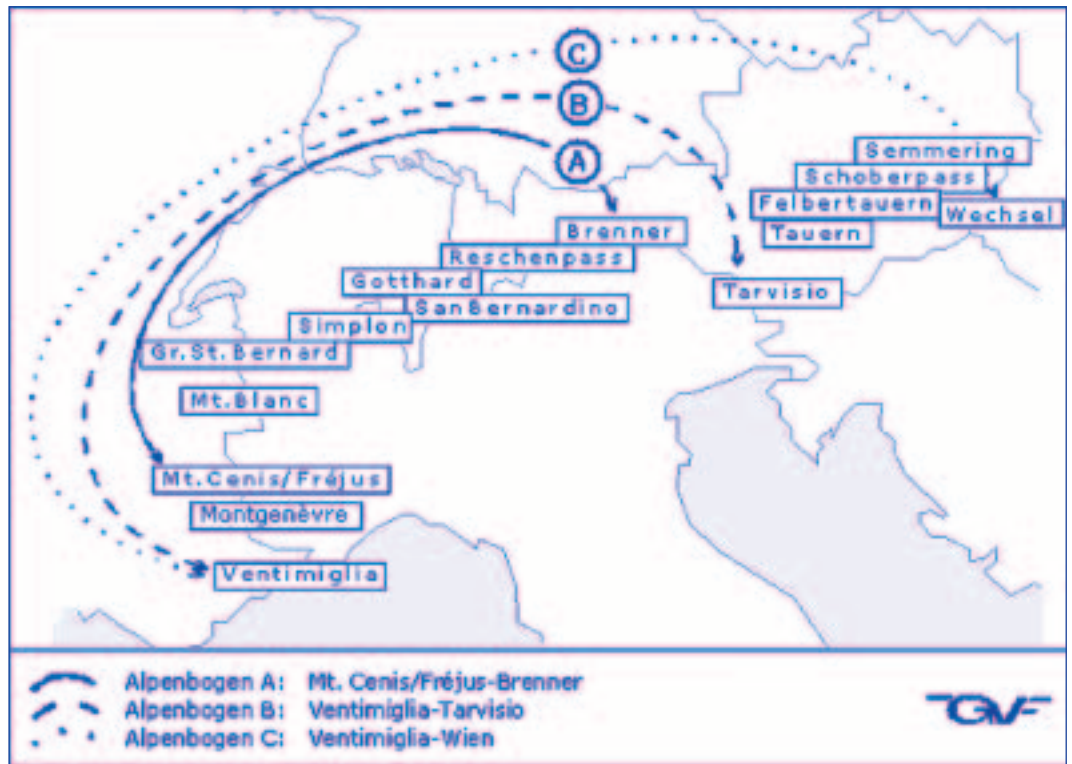


Figure 10: Map of the Alps (UVEK 2001b)

4 Why is current freight transport not sustainable

4.1 WHAT IS SUSTAINABILITY?

The Brundtland Report defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”¹⁹

Since the late 1980s, sustainable development has been an integral part of political discussion, and it gained in importance following the Earth Summit in Rio in 1992. However, the concept of sustainability is much older - it stems originally from forestry where sustainability is understood as the use of the forest in a way that no more trees are cut down than can be replaced by new trees to ensure the long term survival of the forest. Thus the definition in the Brundtland Report is fully in line with the original meaning, and is aimed at ensuring future generations the use of scarce resources.

Sustainability can be broken down into three pillars: environmental, economic and social. These can be described as follows:

- **Environmental pillar:**

A development is environmentally sustainable if it is based on the regeneration potential of nature.

- **Economic pillar:**

A development is economically sustainable if it is sound for the economy and does not threaten the efficient functioning of the economy.

- **Social pillar**

A development is socially sustainable if it is just and fair for all people.

Through the Amsterdam Treaty, sustainability has gained central significance within the EU. The treaty makes the integration of environmental and sustainable concerns in transport policy and related areas a mandatory requirement. At their Gothenburg summit in June 2001, the 15 EU heads of gov-

ernment singled out the transport sector as one of the four priority areas where sustainable policy development has to be put on a faster track.²⁰

4.2 THE LACK OF SUSTAINABILITY IN THE CURRENT TRANSPORT SYSTEM

An efficient and flexible transport system is essential for our economy and our quality of life. Recent increases in transport have moved the sector away from sustainability. Impacts on the environment and human health have increased and congestion in urban areas has become a daily fact with the result that the current transport system has become a major threat not just for the environment and human health, but also for the economy.

■ **Lack of economic sustainability of freight transport**

An effective transport system is crucial for the efficient functioning of the economy. Nowadays industry is very much dependent on one transport mode and one energy source. The current economy, based on just in time delivery, is very vulnerable to a sudden interruption of the usual road transport supply as happened during the fuel protests in the autumn of 2000. Due to the lack of storage and the dependency on road delivery, some industries run already out of inputs for their productions.

But also on a daily basis, the economy is hampered by the existing transport system and losing money on the congested road network. According to the European Commissions Green paper on fair and efficient pricing, congestion in the transport system is causing costs, which amount to 0.5% of GDP (European Commission 1995).

Thus, the current transport system is not sustainable from an economic point of view.

One of the main objectives of European transport policy must be to make the best use of available transport infrastructure and to reduce transport growth. Incentives which create the conditions for increases in less desirable transport must be abolished (for example the situation in which road transport costs are so cheap that animals are transported long distances to be slaughtered or vegetables are transported from country to country to be washed).

The current competitive situation in the road transport sector is not economically sustainable for the road hauliers. The sector is under a strong pressure to lower prices due to over capacities. This pressure does not always allow the road transport sector to earn sustainable revenues.

■ **Lack of environmental sustainability in freight transport**

Efficient transport is an essential service contributing to competitiveness, economic growth and social cohesion, but growing demand for transport has led to increasing negative impacts on the environment. The TERM report from the European Environment Agency²¹ has shown that transport still represents a threat to the environment and that, despite some improvements, many environmental impacts of transport continue to grow. One of the biggest threats posed by transport at the present time concerns climate change. Whereas all the other sectors have reduced their greenhouse gas emissions in absolute volume, transport emissions continue to rise. A major problem is the ongoing growth of transport, which has outweighed many of the technological improvements made in this sector (e.g. better fuel quality).

The current transport system is not sustainable in an environmental sense as shown in chapter 3:

- it wastes scarce resources
- it threatens the future of our planet by contributing to global warming
- it threatens natural areas and biodiversity
- it threatens human health.

■ **Lack of social sustainability in freight transport**

Transport is seldom an objective in itself: it is an instrument that provides people access to jobs, housing, goods and services. It has therefore an essential function not only for the economy but also for each individual. Freight transport enables people to have access to the goods they buy in the shops or get delivered at home. The dependency on a certain transport mode exclude some people from accessing certain goods and functions in case they do not have the possibility to use this transport mode.

Social sustainability also manifests itself in other ways. It has to fulfil citizens' needs to preserve the natural environment and health, to have access to natural resources, and to enjoy landscapes and biodiversity.

Finally, the increasing competition in the road transport sector increases the pressure on the employees' with regard to low social conditions and comparably high working times. Fair labour conditions in general and especially for people in competing industries should be part of a socially sustainable economy. The transport sector shows that social regulation differs between transport modes, with working conditions typically being better for railway workers than road freight workers

4.3 CONCLUSION: FREIGHT TRANSPORT IS PRESENTLY UNSUSTAINABLE

The contemporary freight transport system is unsustainable on three pillars of sustainability:

Economic

- External costs, which are not met by transport users, make the transport system inefficient. This has negative effects on the efficiency of the economic system as a whole.
- Furthermore, the economy is imperilled by its reliance on one transport system, which is overwhelmingly based on one mode of transport and one source of energy. Increasing congestion continually reduces the effectiveness of the transport system for the economy, and spontaneous campaigns, such as the fuel price protests across Europe in 2000, can temporarily paralyse the transport system and damage the economy.
- This transport system is increasingly unable to serve the needs of citizens and the economy.
- The longer it persists in its present form, the less it is able to meet the needs of future generations.
- It is therefore not sustainable.

Environment

- The transport system is an increasing threat to the environmental balance. Transport's energy use and greenhouse gas emissions continue to rise unabated. Air and noise emissions continue to threaten citizens' health.
- Transport increasingly threatens the basis for survival and well-being of future generations.
- It is therefore not sustainable.

Social

- The nature of the contemporary competitive market in road freight transport threatens the healthy economic development of many businesses and leads to poor working conditions for employees in the sector.
- The present market conditions in road haulage help neither businesses nor individual employees.
- It is therefore not sustainable.

5 Reasons for the development

The development of freight transport over the last 30 years can be summarised as follows:

- Freight transport has grown at a persistently high rate (this growth rate was particularly high in the 1990s, where it even exceeded GDP growth)
- The growth was unevenly distributed across transport modes, with extremely strong growth in road haulage and short sea shipping, while the other modes stagnated, or even contracted.²²

The rest of this chapter examines the most important causes for this unequal development in freight transport.

5.1 WRONG PRICE INCENTIVES

Prices are an important instrument in a market economy. Under ideal conditions they reflect the scarcity of goods, thus contributing to their efficient use and reducing waste.

Prices in the transport sector have decreased over the last 15 years. For example, figure 10 shows developments in the Netherlands, where freight transport prices in all modes have fallen by around 40% since 1985.²³ Similarly, the price of diesel is now noticeably lower than it was in 1985 (Fig. 11). Prices in the transport sector have therefore developed in the opposite direction to prices in general, which have typically shown an annual growth rate of several percentage points.²⁴ In so doing, transport has become cheaper over the years, both in absolute terms and relative to other prices.

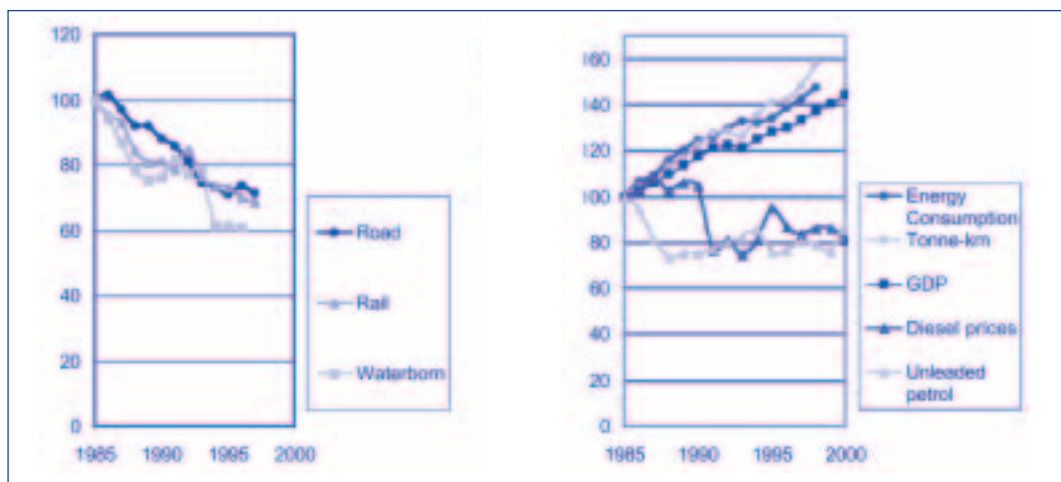


Figure 11: Development of freight costs in the Netherlands (left) and of diesel prices in EU (EEA 2001b).

This change in the relative price of transport has resulted in a change in demand. As a rule, demand for a particular good rises as its comparative price falls²⁵. This is valid for both consumer demand and demand for components in the production of goods. The observed growth in freight transport is therefore simply a logical consequence of falling transport prices, relative to the price of other goods. This is particularly true of the factors of production, capital and labour.

This change in the price structure and the resulting increase in transport demand does not present an economic problem, provided prices continue to accurately reflect the scarcity of consumed resources and the changes are as a result of increased productivity. This is partly the case in the transport field, as a result of market liberalisation and increasing competition, which has led to an increase in productivity.

However, transport prices are not an exact, or even a good, indicator of the scarcity of consumed resources. Transport users pay only part of the costs which they cause. The other part is borne either by society as a whole or by third parties. These costs, which are not included in the price which transport users pay, are called external costs. They include maintenance costs for road infrastructure, environmental costs (air and noise pollution, and greenhouse gas emissions), health effects (directly caused by environmental problems, as well as indirect, such as the effects of a sedentary lifestyle), congestion, and accident costs.

Transport also has external costs which directly affect communities, such as increasing social atomisation through urban partition and maintaining social exclusion, though these are less well documented.²⁶

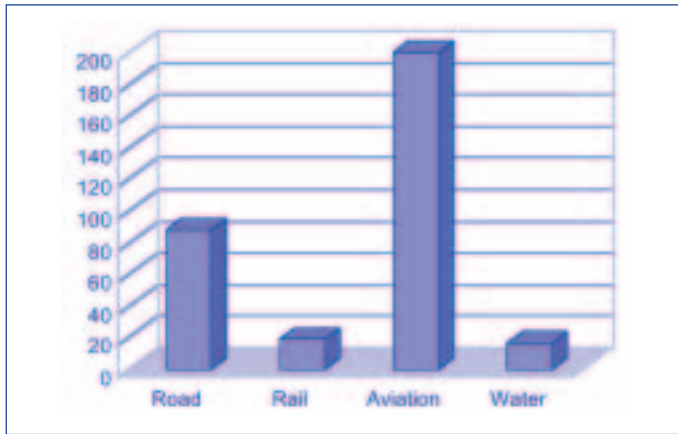


Figure 12: External costs per transport mode in Euros / 1000 tkm (Source: INFRAS/IWW 2000)

There is still a degree of uncertainty as to the exact size of these external costs. However, the costs which are already known amount to several percentage points of Gross Domestic Product. Numerous studies have measured the external costs of transport, and all have come to different conclusions.²⁷ Yet despite their differences, they all say broadly the same thing: there are substantial external costs and the contemporary price structure therefore gives false incentives. These external costs and wrong price signals are particularly marked in road and air transport (see figure 12, INFRAS/IWW 2000).

The presence of external costs in transport causes a distortion in comparative prices. Transport prices are too low in relation to the prices of other goods and pro-

duction components. Transport demand is thus too high, compared with a state of affairs in which price signals were correct, meaning there were no external costs. Such a situation is inefficient, as scarce resources are used or wasted in transport when they could be far better used elsewhere. The conclusion is therefore that the artificially low transport prices are harmful to the overall transport system, as scarce resources are not being used efficiently, which in turn impacts negatively on competitiveness, thus tending to reduce rather than increase the number of jobs available.

There is also a distortion of prices between transport modes. This is because transport is not uniform and the different modes have differing levels of external costs. For example, external costs in road freight transport are higher than those in rail freight transport, meaning that the price of road haulage is too high compared with the price of rail freight.²⁸ As a result, demand for road haulage is comparatively too high and for rail freight services too low.²⁹ Scarce resources used by transport operators are not used efficiently, resulting in unfair competition between modes of transport: there should be a level playing field between competitors in an open market and in transport there is not.

5.2 LIBERALISATION OF TRANSPORT MARKETS IN EUROPE

The Maastricht treaty ushered in the single market for the European Union, with which the free movement of people, goods and services in the EU was declared a guiding principle. This means that any EU citizen can travel to any other EU country, where s/he is then free to work and settle at will. Borders and citizenship are no longer important for such movement.

In the case of road haulage, this has led to complete market liberalisation. For example, an Italian trucker is free to deliver goods to Finland and on the return journey pick up other freight, to deliver in Germany. This is not so in rail freight, where there are still many serious institutional and technical hurdles to be overcome. This imbalance in ease of movement and service provision between road and rail places rail transport at a huge competitive disadvantage. While liberalisation is not a goal in itself, it is a key element in a competitive rail freight system and therefore for sustainable transport in Europe. The hurdles to liberalisation are explored in the following section.

Institutional barriers

Liberalisation in the rail sector began in July 1991, with Directive 91/440.³⁰ Although more than ten years have passed since then, progress has been very slow. While lawmakers intended to open rail infrastructure to international freight transport, the traditional national railway companies have kept their dominant national market position and only very reluctantly opened the network to third parties.

In other words, the internal market has not yet come into being for rail transport, though it has existed for some time in the case of road haulage. This has two crucial effects.

First, competition between the different transport modes is distorted, as international rail freight transport faces enormous hurdles which are costly to overcome. These costs do not exist in international road freight transport, which can offer door-to-door service without being confronted with different rules in different member states. International rail freight transport is therefore more expensive than it could otherwise be, and carries greater costs than international road haulage from the start.

The second result is internal to the rail sector. The national orientation and protection of national railway companies are such that their interests are restricted to the national market. This is the case regardless of how the industry is legally structured, whether companies are privatised or not. Because there is no intra-modal competition - no competition between railway companies - there are few incentives to improve services, or for railways to innovate in meeting customers' needs in international freight transport.

The services which railway operators provide are often unsatisfactory and uncompetitive with road haulage, which can typically offer a better service at a lower price.

A study from road-rail industry group UIRR³¹ shows that only 51% of trains involved in international combined transport in 1999 reached their destination on time. In fact, 24% of trains involved in combined transport were three hours or more late. These delays were typically caused by a lack of train drivers or the locomotives themselves. National rail - and especially national passenger transport - enjoys priority over international transport when there is a shortage of personnel or material. A changed institutional framework, in the form of liberalised international rail freight transport, would permit competition in this area and thus also the significance of international freight transport to the national operators.

A series of studies³² shows that freight transport customers see reliability as the most important factor, after price and speed, when seeking to transport their goods. Because of the abovementioned problems, customers presently see international rail freight transport as a reliable alternative to road haulage only in limited cases.

These barriers cause a significant disadvantage in international freight transport. This disadvantage affects rail transport in a market segment - namely over great distances - in which it actually should have a competitive advantage over road haulage (Ernst Basler + Partner (2000)).

Rail freight market versus road freight market in Europe

While most sectors within the European Union benefit from the internal market, e.g. also road transport, the rail market has still national hurdles to overcome. These hurdles are institutional and technical ones.

Institutional hurdles

While road freight market has been liberalised completely, rail transport is still at the beginning. Although the liberalisation of Europe's railways has already been initiated politically by Directive 91/440 of July 1991, its impacts so far have been rather limited. Despite the legislators' intention to open access to the network, traditional national rail companies still dominate the market in every European country.

This lack of internal market in railways has two impacts. First, there is no level playing field between transport modes. Rail freight operators must overcome institutional obstacles and barriers. Therefore, they are confronted with costs in international transport, which their competitors in other transport modes, who can offer door-to-door services throughout Europe, do not face.

The second impact is internal to the railways, but it is even bigger. The national orientation and protection has limited railways' perspectives to their own domestic market. Consequently, there has been no intra-modal competition within or across national borders, and little or no incentive for improving services in international rail freight transport. These obstacles and barriers are a major disadvantage for long distance rail freight transport, a market where railways in fact should have competitive advantages compared to the road sector.

Technical constraints

The railways were developed in an era of national infrastructure. This national focus has led to a multitude of technical systems in Europe, some of which are incompatible with other systems. There are numerous rail gauges, safety and monitoring systems across Europe, not to mention several different electricity systems; sometimes even within individual countries.

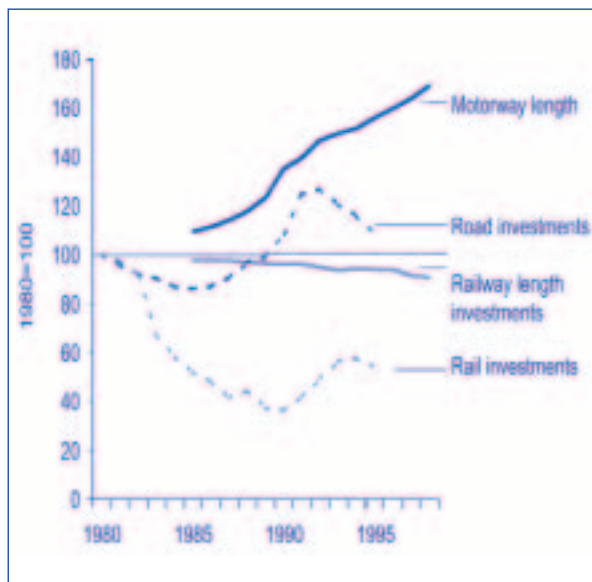
These technical hurdles can generally be overcome with technical fixes (for example, multi-current locomotives, able to deal with different electrical sources). However, these solutions come at costs, causing rail freight transport to become more expensive and therefore less competitive with other transport modes. A lack of technical interoperability causes higher operating costs, in addition to the higher investment costs for interoperable systems. Such costs are most visible when a locomotive has to be changed, and are well expressed in longer waiting times at border crossings.

The unavoidable costs associated with overcoming these technical barriers also provide a real barrier to market entry for new rail transport providers. The lack of interoperability in European rail is thus not only a competitive disadvantage for international freight transport. It is also the real bottleneck in the Trans-European Transport Network (TEN), in the sense that the free movement of goods, as laid out in the internal market, is massively hindered. To this can be added a market distortion against the interests of rail transport.

5.3 INVESTMENTS IN TRANSPORT INFRASTRUCTURE

Public institution's investments in transport infrastructure have shifted somewhat in favour of road transport since 1980 (see figure 13). The majority of all investments, around two-thirds, are now poured into road building. Rail infrastructure receives about a quarter of all investment, which is a greater percentage than rail's market share (EEA 2000, p. 69f).

Decisions on infrastructure investment are still taken predominantly to solve so-called bottlenecks, or congested spots in the network. Integrated cost-benefit and environmental impact studies are only occasionally used, and even then usually too late; and such studies tend to have too little influence on the final decisions.



The European Commission would like to steer investment increasingly towards intermodality, rail and inland waterways. The TEN Guidelines priority projects involve predominantly rail and intermodal corridors. According to the TEN Guidelines, of the €400 billion made available until 2010, at least 55 % is for investment in the rail network and not more than 30% for road infrastructure (European Union 1999b). In reality, infrastructure projects currently being financed by the Commission and international investment banks do not reflect this aspiration.

Rail freight transport receives even less investment than rail transport generally. The lion's share of resources invested in rail are used to fund high speed networks, which are reserved for passenger transport (EEA 2001b, p. 32).

This unequal investment also creates a market distortion which is disadvantageous to rail transport.

Figure 13: Infrastructure investments and development of transport networks (EEA 2001b).

5.4 DEVELOPMENTS IN TRANSPORT INFRASTRUCTURE

Because of the abovementioned differences in investment, the transport modes have developed differently. The motorway network in the EU has grown 70% since 1980; the conventional rail and inland waterway networks have contracted by 9% over the same period (EEA 2001b, p. 32).

The high speed rail network has expanded significantly over the last 20 years. It tripled in length between 1990 and 1999 alone, to nearly 2700km (EEA 2001b, p. 32).

Again, this has resulted in another distortion in competition between the transport modes, with particular relevance to goods transport: while road haulage has been able to profit unreservedly from the extension of the road network, investments in rail have been largely limited to passenger travel, and have therefore been meaningless for rail transport.

5.5 LEGISLATIVE FRAMEWORK ON SOCIAL AND SAFETY ISSUES

Different legislative frameworks

The legal framework for legislation on social and safety issues varies considerably between transport modes. Generally speaking, the rules for road haulage are far weaker than those for rail freight.

Social legislation protects road transport workers far less than it does railway workers. Until recently there was no legal limit to road hauliers' working time (working time directive). Similarly, rules on training for drivers of heavy goods vehicles, who have no limitations on their movement across Europe, have also been very weak.³³

Employees in the rail sector, on the other hand, have strictly limited working times. They also undergo more rigorous training and are generally only allowed to operate in the country in which they received their training. A European internal market for rail workers has not yet been realised.

The reason for this difference in working conditions between road and rail is partly explained by the different levels of power held by the trade unions in the respective sectors. Railway employees are very well organised and the unions are able to ensure strong protection.³⁴ Road transport is not widely unionised and workers in this sector are in a weak position compared with their employers. This explains why few requests on working conditions in the road haulage sector are met.

The great difference in social and working conditions between the two sectors results in distortion in competition between them, inasmuch as they result in higher comparative costs for the rail freight sector. In addition, the weak social protection for road haulage workers endangers road safety (greater risk of accidents due to over-tiredness and lack of training) and thereby leads to very high costs for society.

There is also a great difference in safety regulations between road and rail freight. The rail sector has comprehensive rules governing safety fittings for carriages and locomotives. These are necessary to ensure that rail transport operates at a comparatively high level of safety and that the impact of accidents is limited. Equipment must undergo regular inspection and maintenance. Road haulage has almost no comparable regulations.³⁵ Safety measures raise the cost of rail transport, but the costs in road freight transport have to be borne by wider society, through an increased accident risk.

Different inspection regimes

The already different rules are also differently controlled in the different modes. Rail transport has regular and institutionalised inspections, while road transport is infrequently checked. Only 1% of truck drivers' working days (European Commission 2001f) must be checked to see if they comply with working and resting time regulations. Weight and speed limits are also seldom examined, as is drivers' blood alcohol content.

The fact that the different regulations are differently checked leads to their being differently adhered to.³⁶ It is almost impossible to get away with ignoring the regulations in rail transport. By comparison, the rules are frequently broken in road transport.³⁷ The cost of keeping to the regulations is therefore different for rail and road, with rail costs being far higher. This constitutes another market distortion to rail transport's disadvantage.

5.6 STRUCTURAL CHANGES TO MEANS OF PRODUCTION

Businesses have adapted their means of production and distribution in the course of many years of wrong price signals and market distortion between transport modes. Specifically, they have developed towards a market system which increasingly relies on transport, particularly road transport.

The most obvious example of this development is 'Just-in-time' production. Manufacturers have essentially moved their warehouses from the place of production to the transport chain, particularly the roads. In so doing, businesses have replaced capital investment in stock with transport. This clearly means that businesses find the cost of transport lower than the cost of storing stock on the premises.

However, this cost comparison has been distorted by the wrong price signals, namely the external costs of transport. Businesses, which generally seek to reduce production costs, see high capital costs for storage on the one hand and artificially lower transport costs on the other. Of course they choose transport over storage, and components are shifted out of warehouses onto the roads. Similarly, the division of labour and physical separation of component production sites is excessively encouraged. These structural changes are promoted through market distortions in favour of road transport; and they in turn lead to further growth in road haulage, which is able to react flexibly to the changes. Rail freight transport has so far been unable to successfully adapt to these changes. This is not only because of the relative inflexibility of the system, but also because of railway companies' national bias and lack of customer focus.

5.7 CONCLUSIONS

Existing price signals for transport users do not reflect the burden which transport places on society. The abovementioned external costs - costs which the whole of society bears rather than the individual transport user who causes them - give the wrong price incentives to transport users. The price which the user pays for transport is too low, and the demand correspondingly too high. The price structure for goods and input factors is distorted. Scarce resources are not allocated efficiently. This means that the economy is not functioning optimally, but rather inefficiently. External costs are particularly high in road transport, which gives road transport an artificial competitive advantage and leads to a distortion in competition between the transport modes (INFRAS / IWW 2000). This distortion is widened by differences in liberalisation, investment, transport infrastructure, and rules relating to social conditions and safety; all of which favour road over rail transport. The contemporary transport system is thus characterised by the following two features:

- Distortion between transport and other factors in the economy (goods and production factors): transport is comparatively too cheap. This leads to demand for transport being too high and thus to scarce resources being allocated inefficiently.
- Distortion within the transport system itself: road transport is too cheap, compared with other modes of land transport.³⁸ Competition between transport modes is distorted and thus also inefficient.

These distortions have led to an excessive growth rate in goods transport over the last years, particularly in freight transport by road.

6 Instruments needed for sustainable transport

The present situation in goods transport, characterised as it is by distortions in price and competition, is neither sustainable nor efficient. We urgently need measures to improve the situation. This requires a new direction in transport policy, which should take the following framework into account:

- Turning the present trend in goods transport around and putting it on the path to sustainability is a complex but feasible task (EST/OECD). There is no 'miracle measure': no one single measure can bring about the needed changes. The complexity of the problem requires a package of measures to bring about change in existing patterns.
- The desired goal must be clearly defined and explicitly present in all decision making: freight transport must become more economically, environmentally and socially sustainable. The decisions which are taken on transport, and the instruments and measures employed, must all serve this goal.

A number of instruments need to be employed to right the wrong price signals both within the transport system and in relation to other economic sectors, and to overcome distortion in competition between the transport modes. These instruments should:

- Charge fair and efficient transport prices
- Develop a level playing field between the transport modes.

Charging fair prices is a condition for fair competition between modes. The effect of fair prices goes beyond the reach of the transport sector, however, helping to overcome price distortions between other goods also.³⁹ This therefore serves both the decoupling of transport growth from economic growth and the transfer of goods transport from the road onto railways and inland waterways (modal shift).

Developing a level playing field between transport modes will in the first instance in principle lead to a modal shift although it is not a goal in itself, but is rather a result of sustainable transport. Modal shift by itself does not lead to a decoupling between transport growth and economic growth.

6.1 FAIR AND EFFICIENT TRANSPORT PRICES

What is required for a sustainable transport system?

External costs of transport need to be addressed: the costs must be internalised, meaning that transport users must pay more, in line with the user-pays principle. There is a widespread agreement that the price of goods transport must reflect its social marginal costs.⁴⁰ The best way to ensure this for road transport is through a distance-related charge which takes all the elements causing external costs into account.⁴¹ These include the distance, weight and emissions of the individual vehicle, as well as the time and place of infrastructure use. The level of the charge should be directly related to the social marginal costs, which include maintenance and environment and congestion costs.

Present legislative framework and initiatives

At the European level, charging for heavy goods vehicles - vehicles over 12 tonnes - is presently governed by Directive 1999/62/EC⁴². This permits only limited levying of a kilometre charge, namely only on motorways and at a level which covers infrastructure costs. This is insufficient to shift the burden of external costs onto the transport user. The Commission announced in its White Paper on the Common Transport Policy⁴³ that it would introduce a framework directive on transport infrastructure pricing in general, as well as a reworking of the Eurovignette directive for road transport. This should provide a basis for charging freight transport at levels which truly take external costs into account and which therefore permit application of the polluter pays principle.

There has already been greater progress towards pricing freight transport in some countries. Switzerland introduced a kilometre charge for heavy goods vehicles on 1 January 2001. Trucks with a total laden weight of 3.5 tonnes or higher now pay a variable charge when using Swiss roads, priced according to distance travelled, vehicle weight and emissions class. Germany and Austria are presently preparing to introduce a similar charge, although it will be at a lower level and apply only to motorways. They plan to introduce in 2003.⁴⁴ Germany wants to use the charge to replace the present time-based Eurovignette.

Challenges in the immediate future

The European Commission is expected to adopt a framework directive on infrastructure charging for all transport modes in autumn 2002, as well as a revision of the Eurovignette directive, 1999/62/EC. These legislative proposals must follow the following principles:

- Avoid distortions between the transport modes, particularly those which disadvantage the less environmentally damaging modes.
- Take account of all costs (infrastructure, environment, health risks, accidents, congestion)
- Apply to all commercial vehicles, irrespective of weight
- Apply to the entire road network

The Commission proposals will have to be processed and adopted by the Council and European Parliament before they can enter into force. Subsequently, it will be up to the member states to implement the system.

A lot of discussion is still needed at national and European level if all of this is to actually happen. In particular, the agreement of the Transport Council and the resulting appropriate implementation at national level are still uncertain. NGOs will need to give much attention to this issue at both European and national level.

6.2 THE BASIS FOR FAIR COMPETITION BETWEEN TRANSPORT MODES

Overcoming market hurdles in international rail freight transport

What is needed for a sustainable transport system?

For market hurdles to be overcome, it is essential that freight transport operators have non-discriminatory access to the rail network. Liberalisation of the rail freight network is not a goal in itself, but it is certainly an instrument to improve service provision in international freight transport. Liberalisation is not the same thing as privatisation and does not mean that publicly-owned initiatives cannot continue. The present high social and safety regulations, which protect employees and broader society from accidents, should be kept.

Interoperability of the European railway network must be realised quickly: interoperability in rail transport is a condition for realising non-discriminatory access to the rail network, and is a condition for reliable international goods transport.

Present legislation and initiatives

The first 'rail infrastructure package' went to the Transport Council and Parliament in January 2001. This included three directives⁴⁵ which together set out the legal framework for rail liberalisation and achieving non-discriminatory opening of the railway network for rail freight operators. By 2008 rail freight operators must have non-discriminatory access to the entire European rail network. In order to guarantee non-discriminatory access, there must be a separation of two important functions: allocating capacity and setting the price which railway users must pay for infrastructure use. Member states must transpose the package by 2003 and the Commission will monitor its effectiveness over the coming years. A directive on interoperability in the conventional rail network also went before Council and Parliament in January 2001.

The Commission adopted a second 'rail package' in January 2002.⁴⁶ The emphasis in this package is on safety and interoperability across the rail network. A European rail agency is proposed, to oversee the coordinated implementation of these two important elements. The package also proposes that the opening of the rail freight market should be accelerated.

At the national level, the majority of member states, as well as other European countries, have already taken the first steps by reforming the traditional publicly-owned national railway companies. Sweden took the lead at the end of the 1980s, becoming the first country to initiate reform. Nevertheless, traditional operators generally continue to enjoy a dominant market position and often also strong political support. This continues to provide a barrier to entry for newer rail freight operators, hindering non-discriminatory access.

Challenges in the immediate future

The Transport Council will deal with the second railway package proposals in the second half of 2002, under the Danish presidency. The European Parliament must also consider them.

Member states must transpose the first railway package by March 2003 into their national legislation.

NGOs should continue to follow these developments carefully. In particular, they should press for the speedy liberalisation of the rail freight market and the urgent implementation of interoperability in conventional rail freight. They also need to carefully watch the implementation of these measures in individual countries. Finally, the traditional railway operators need to be encouraged to take a proactive stance towards liberalisation

Improving service provision in rail freight

What is needed for a sustainable transport system?

International rail freight transport needs to become a reliable alternative to road freight transport. Service provision in the rail freight sector needs to be customer-oriented and railway companies need to develop expertise in providing competitively priced services with and for their clients. Railway infrastructure and technology for intermodal transport must continue to be promoted, without allowing traditional rail freight transport and its regional distributional role to fall into neglect. Rail freight's productivity, quality and reliability need to be improved. Traditional railway companies should become increasingly open to cooperation and competition with new companies which offer additional services.

Present legislation and initiatives

The traditional rail sector is increasingly aware of the importance of the problem. Rail sector stakeholders and the European Commission's directorate-general for Research launched a common research strategy in 2001, which will examine the creation of a single rail system by 2020.⁴⁷ The goals of this research programme are:

- Increasing rail freight's market share from 8% to 15% without causing negative environmental effects⁴⁸.
- Achieving 50% improvements in energy efficiency over the life-cycle of rolling stock.
- Reducing emissions by 50% over the life cycle of rolling stock.

Some traditional companies and newer freight operators have already taken a number of initiatives to improve service provision in rail freight. Some examples include cooperation between SBB, the Swiss federal railway, and a private German operator; and formation of new rail operator, rail4chem, in a cooperation between the chemicals industry and logistic operators in Germany, IKEA Rail AB⁴⁹). The European Commission started the Marco Polo project in spring 2002, which will promote combined transport.⁵⁰

Challenges in the immediate future

The two rail packages form the basic incentives for rail operators to improve their services. Progress towards transposition of the first rail package by 2003 in the member states will need to be carefully monitored at both European and national levels, as will the passage of the second rail package through the European legislative process.

Rail freight operators will need to receive constant pressure and encouragement to improve their services and environmental performance.

Infrastructure and investment policies

What is needed for a sustainable transport system?

Infrastructure policy needs to promote the least environmentally damaging transport modes, intermodality between modes and overcoming technical barriers to rail transport. All infrastructure projects must undergo thorough analysis into their likely economic, environmental and social consequences. Existing cost-benefit analysis and environmental impact assessment must be developed further, and the results of such assessments used as decisive factors in decisions on whether or not to proceed with

projects. The European institutions should provide financial support only for those projects which meet these criteria.

Present legislation and initiatives

The directive on Trans-European Networks, TENs, is presently being revised in a so-called 'mini-revision'.⁵¹ The European Parliament completed its first reading of the Commission's proposed revised guidelines in May 2002, and suggested a number of changes which strengthen the role of strategic environmental impact assessment (SEA). The Parliament's decision would make SEAs immediately compulsory for all TEN projects, as well as for the TINA projects which are applicable to candidate countries in central and eastern Europe. Parliament's changes still need to be discussed by the Transport Council, which is against immediate SEA provision. Moreover, it is to be feared that transport ministers will be unable to agree on the priority projects which are appended to the TENs Guideline. The Commission suggests six new priority projects to complement the 14 previously-agreed projects (the so-called Essen projects), of which only three have been completed: High-capacity rail link through the Pyrenees, interoperability between the Iberian and continental rail networks and the Galileo satellite system.⁵² Transport ministers' national interests could result in proposed amendments to the priority projects.

Council and Parliament adopted a directive in January 2001 on the interoperability of the conventional rail network.⁵³ The Commission proposed a new directive⁵⁴ in January 2002, to ensure that interoperability comes about as soon as possible. It also suggests the creation of a European rail agency to oversee safety and interoperability.

Challenges in the immediate future

The present revision of the TENs directive needs to be concluded by Parliament and Council and subsequently transposed by member states. This requires greater awareness of the use of integrated and strategic assessment of projects and plans. This in turn requires explanation, particularly at national level. A further challenge is the improvement of cost-benefit analysis methodology.

The TENs directive will be thoroughly revised in 2004. This must involve a shift in emphasis from large infrastructure projects to intermodality and interoperability. Therefore, investment in rail network interoperability needs to be included as a priority.

Reaching these goals will require ongoing information provision and awareness-raising.

Social, environmental and safety regulations

What is needed for a sustainable transport system?

Rules for protecting workers and the environment, and for increasing safety, must be raised to the highest possible level for all transport modes. Inadequate regulation in these areas puts transport users, society at large and the environment at risk.

Harmonisation of these rules is also necessary for there to be fair competition across all transport modes. However, harmonisation should be a race for the top, not the bottom: it should reflect the rules in the sector which provides greatest protection.

Existing regulations need to be consistently enforced and punishment for breaking them should be effective in discouraging further contravention.

Present legislation and initiatives

The working time directive of 2001 limits the average working time for road transport workers to 48 hours per week, and the maximum working time to 60 hours. However, this directive does not apply to independent operators, which has led to new market distortions within the road freight transport sector. Similarly, the directive continues the inequality between modes: working times in rail transport are markedly lower, with locomotive drivers working only between 22 and 30 hours per week.

New heavy goods vehicles must be equipped with an electronic tachograph from 2004. This instrument will register vehicle and driver information, such as speed and working time over an extended period. It will help to uncover contravention of road rules.

The European Commission has proposed a directive to improve driver training (European Commission 2001d). This must be discussed and approved by the Council and Parliament before it can enter into force.

Challenges in the immediate future

According to the White Paper on the Common Transport Policy the Commission should prepare a proposal for harmonising inspection and penalties (European Commission 2001f, p. 24). This should support the efficient and uniform application of road traffic regulations.

The European Commission has also said it will propose a directive on tunnel safety in 2002, as a reaction to the recent series of accidents in Alpine tunnels (European Commission 2001f, p. 63). These accidents, the constant danger for transport users and broader society, and the high noise and air quality burden which goods transport in the Alps causes shows the need for a coherent policy for freight transport through sensitive areas. It also indicates the need to provide additional protection for sensitive areas through, for example, weekend and night bans.

The Commission has proposed a directive on harmonising freight transport bans (European Commission 2000). It cannot be allowed to lead to a reduction of existing bans through discussions in Parliament and Council. These proposals are a move in the right direction, and pressure is needed on all the decision-makers for them to become EU law. Additional pressure is also needed as regards fitting heavy goods vehicles with safety equipment and reducing diesel locomotives' emissions.

Individual member states need to enforce existing rules strictly and consistently, and to impose meaningful penalties when they are broken. This is less relevant to transport policy than to the law-enforcement authorities. However, it requires awareness raising, particularly at national level. What is needed at the European level is a legal basis for prosecuting offences in trans-boundary transport.

Spatial planning is also important for encouraging sustainable transport, and should therefore be involved. Industrial areas should only be approved if they have a connection to public transport for passengers and to rail infrastructure for goods. This is predominantly a national responsibility. The Commission should nevertheless play a more active role, for example through proposing the minimum standards for access in approving development of industrial areas (for example, requiring a rail connection).

7 The conclusions of the project

- **What is the current situation?**

Freight transport is growing since 1970 continuously and still continues to grow. The main increase has taken place in road transport and short-sea shipping while the other transport modes remained at the same level or even decreased.

- **Why do we have these developments?**

Wrong price incentives and the lack of a level playing field made transport in general and road transport in particular less expensive than other goods. Therefore, the transport sector grew faster than economic growth and road sector faster than other transport sectors.

- **What is needed to change the development?**

Correct price incentives must be given to the users by internalisation of external costs as e.g. with a kilometre charge for heavy vehicles according to the Swiss Heavy Vehicle Fee.

A level playing field must be established and distortions between transport modes abolished. The internal market must be introduced in the railway sector by removing institutional and technical hurdles and so turning the rail network into a really Trans-European one. In the road sector the already established internal market must be finally accompanied by social, technical and environmental legislation which has to be strongly enforced to protect the employees of the sector, road users and the citizens from the negative impact of the current wild west competition.

- **What are the biggest challenges for the future?**

To change the existing transport policy, which is driven by particular interests tremendously into a coherent transport policy serving much more the citizens, the environment and the economy and less the transport sector itself. Interests of particular sectors and regions which may or at least fear to loose must not longer be a reason to obstruct a coherent transport policy.

To improve rail freight system substantially and to make railways a reliable and competitive alternative of road transport also in international transport. The national and public service oriented focus of the railways has to be replaced particularly in international rail freight by a customer oriented approach.



FOOTNOTES

¹ These figures refer to the EU and they include five transport modes. Without short sea shipping rail is at about 14 % and road over 70 %. (DG TREN: Transport in Figures 2001)

² Figures: according to DG TREN Transport in Figures 2001 covering the period 1970 - 1999.

³ Swedish Rail Sector 2001, Banverket 2002

⁴ Directive 91/440/EC on the Development of the Community's Railways.

⁵ White Paper 'European transport policy for 2010: time to decide'. COM(2001)370, Brussels 12/09/01.

⁶ Prognos 2002: European Transport Report 2002

⁷ Figures from Switzerland show that the risk of accidents and injuries is almost the same for cars and trucks, but the risk to be killed in an accident is three times higher if a truck is causing the accident (BFU 2001)

⁸ Transport and Environment Reporting Mechanism: Are we moving in the right direction? Indicators on transport and environment integration in the EU. The 2001 TERM report can be downloaded from <http://reports.eea.eu.int/term2001>

⁹ The figures are from EEA 2000, EEA 2001 and DG TREN Transport in Figures 2001.

¹⁰ ACEA Association des Constructeurs Européens d' Automobiles (European Automobile Manufacturers Association).

¹¹ The most important substances are nitrogen oxide (NOx) and volatile organic compound (VOC).

¹² Guidelines for Community Noise, WHO 1999, p. 48. http://www.who.int/environmental_information/Noise/Comnoise-3.pdf

¹³ European Union 2002.

¹⁴ SPAs are those designated by the EC Birds Directive (European Commission 1979).

¹⁵ EEA 2002: 'Road freight transport and the environment in mountainous areas'. To be downloaded from: http://reports.eea.eu.int/technical_report_2001_68/en/tech_68.pdf. See also Ökoscience 2000.

¹⁶ Inversion means the phenomenon that lower air layers have colder temperatures than higher air levels, which is usually not the case. In such situations, the emissions in the lower and colder layer cannot escape because it is kept by the upper and warmer layer.

¹⁷ In the Pyrennes the road share counts for even more than 90 % of the land transport.

¹⁸ Before the opening of the Gotthard road tunnel in 1981, railways counted for more than 90 % of trans-alpine freight transport

¹⁹ World Commission on Environment and Development (WCED). Our common future. Oxford: Oxford University Press, 1987 p. 43. also known as the Brundtland Report.

²⁰ The other three priority areas are climate change, public health and natural resources (Gothenburg European Council, Presidency Conclusions and European Union Strategy for Sustainable Development, June 2001).

²¹ Transport and Environment Reporting Mechanism: Are we moving in the right direction? Indicators on transport and environment integration in the EU. TERM 2000 represents nowadays the best set of environmental indicators.

²² This publication focuses on surface-based transport and therefore generally ignores aviation, which also has also grown strongly over the last 30 years.

²³ Please note that Figure 10 cannot be used to compare the current prices of freight transport between transport modes but only the developments of these prices over the last years 15 years. It is usually the case that the dominant market partner, in this case the road, act as price setter and the other market partners are forced to follow this development unless they will be pushed out of the market.

²⁴ The Euro-zone inflation rate was 2.4% in April 2002. The figure was expected to be 2% in May. These figures are significantly lower than in previous years, with the exception of some months in 2001 (EUROSTAT) <http://europa.eu.int/comm/eurostat/Public/datashop/print-product/DE?catalogue=Eurostat&product=2-31052002-DE-AP-DE&mode=download>

²⁵ This is the basis of the micro-economic theory on budget and personal income restriction and thus requires no further explanation. This does not apply to so-called 'bads,' which people do not want and for which demand does not increase even when the price is reduced. Transport is, however, not one such 'bad' and it obeys the general rule.

²⁶ The High Level Group on Infrastructure Charging from the European Commission summarised the knowledge on the costs of transport in 1999. (High Level Group on Infrastructure Charging 1999).

²⁷ See e.g. INFRAS/IWW 2000; HERRY 2001; or several research projects from the European Commission on this issue: PETS 2000; UNITE 2001;

²⁸ See e.g. INFRAS/IWW 2000; HERRY 2001.

²⁹ External costs are not the only factor responsible for the distortion in price between road and rail: unequal working conditions and therefore labour costs also play a role. Additionally, the low demand for rail freight services is not only a function of the price, but also of its present poor quality.

³⁰ The first component in Directive 91/440 requires non-discriminatory access to rail infrastructure.

³¹ UIRR (International Union of Combined Road-Rail Operator): 'Developing a Quality Strategy for Combined Transport' in the framework of the PACT project.

³² See e.g. Ernst Basler + Partner (2000) 'Challenges and opportunities for freight transport' S2, in the framework of a Swiss research programme 'Transport and Environment - Interactions Switzerland / Europe'

³³ Currently a proposal is under discussion which intends to improve driver trainings (COM (2001) 56 2001/0033/COD Proposal for a Directive of the European Parliament and the of the Council on the training of professional drivers for the carriage of goods or passengers by road).

³⁴ E.g. 74 % of the employees of the Swiss railways SBB are member of the trade union (SEV 2002 <http://www.sev-online.ch/d/1000.htm>).

³⁵ Currently, a proposal to harmonise the existing social legislation for road transport is discussed (COM(2001) 573 final 2001/0241 (COD) Proposal for a Regulation of the European Parliament and of the Council on the harmonisation of certain social legislation relating to road transport replacing Regulation (EEC) N° 3820/85).

³⁶ The only country where this is not so is Great Britain, where rail transport also has inadequate safety measures and poorly carried out checks.

³⁷ E.g. in Germany 20 % of the controlled heavy goods vehicles in 2001 did not fulfil the current regulations (Bundesamt für Güterverkehr 2002).

³⁸ The same wrong incentives exist in the aviation sector, which is not dealt in this paper.

³⁹ In goods transport, the relationships between the price of the production elements, labour and capital, plays a particularly strong role. See also chapters 5.1 and 5.6.

⁴⁰ See e.g. High Level Group on Infrastructure Charging 1999 or UNITE 2001.

⁴¹ See T&E 1999.

⁴² So-called Eurovignette Directive: Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures.

⁴³ European Commission 2001f, p. 78.

⁴⁴ See for Germany BMW 2002. See for Austria ASFINAG 2002 (trial should start in October 2003).

⁴⁵ Directive 2001/12/EC, Directive 2001/13/EC, Directive 2001/14/EC.

⁴⁶ European Commission 2002a: The communication includes proposals for three directives and one regulation and one Council Decision.

⁴⁷ European Rail Research Advisory Council (ERRAC), press release 26 November 2001: <http://europa.eu.int/comm/research/press/2001/pr2611en.html>, and 'A joint strategy for European Rail Research', p. 6: <http://www.unife.org/docs/jointstrategy.pdf>

⁴⁸ For example, through transport reduction in other transport modes; which shows the necessity for a complete transport policy which encompasses all modes.

⁴⁹ Since 27 June 2002, IKEA operates 5 shuttle trains per week between Almhult (Sweden) and Duisburg (Germany). IKEA specially founded an own rail company IKEA Rail AB which buys services from the infrastructure managers to run its own trains. The objective of IKEA is, to increase the rail share substantially within next 10 years from 18 to 40 % (IKEA 2002).

⁵⁰ Despite the political statements in favour of combined transport, the transport ministers could not agree on the budget for the Marco Polo programme at their meeting in June 2002. They disputed the budget proposed by the Commission, i.e. 115 Mio. Euros for 6 years.

⁵¹ European Commission 2001c COM(2001) 544 final.

⁵² Annex European Commission 2001c COM(2001) 544 final.

⁵³ European Union 2001d. Directive 2001/16/EC.

⁵⁴ European Commission 2002b COM(2002) 22 final.

LIST OF REFERENCES

- ASFINAG (2002):** LKW-Maut Vertrag ist unterschrieben. Autobahnen- und Schnellstrassen- Finanzierungs-Aktiengesellschaft. http://www.asfinag.at/presse/presse_archiv2002/24_06_2002.htm
- BFU (2001):** Bundesamt für Unfallverhütung (Swiss federal office of accident prevention): Statistic 2001. <http://www.bfu.ch/>.
- BMVBW (2002):** Streckenbezogene LKW-Maut sorgt für verursachergerechte Anlastung der Wegekosten. Bundesministerium für Verkehr, Bau- und Wohnungswesen. <http://www.bmvbw.de/>.
- Bundesamt für Güterverkehr (2002):** Straßenkontrollen des BAG im Jahr 2001. Pressemitteilung 02/2002. 20. März 2002. <http://www.bag.bund.de/>
- EEA European Environment Agency (2000):** Are we moving in the right direction? Indicators on transport and environment integration in the EU. TERM 2000.
- EEA European Environment Agency (2001a):** Roadfreight Transport and the Environment in Mountainous Areas. http://reports.eea.eu.int/technical_report_2001_68/en/tech_68.pdf
- EEA European Environment Agency (2001b):** Transport and Environment Reporting Mechanism: TERM 2001 - Indicators on transport and environment integration in the EU.
- Ernst Basler + Partner (2000):** 'Challenges and opportunities for freight transport' Swiss research programme 'Transport and Environment - Interactions Switzerland / Europe' - S2.
- European Commission (1979):** Conservation of the Wild Birds (COM(79)409).
- European Commission (1995):** Green Paper on fair and efficient pricing
- European Commission (1998):** White Paper on fair payment for infrastructure use.
- European Commission (1999a):** Guide to the transport acquis
- European Commission (1999b):** Treaty of Amsterdam.
- European Commission (2000):** Amended proposal for a directive of the European Parliament and of the Council on a transparent system of harmonised rules for restrictions on heavy goods vehicles involved in international transport on designated roads COM(2000) 759 - C5-0679/2000 - 1998/0096(COD)
- European Commission (2001a):** DG TREN Transport in Figures 2001.
- European Commission (2001b):** European Rail Research Advisory Council (ERRAC), press release 26 November 2001.
- European Commission (2001c):** Proposal for a Decision of the European Council and of the Parliament amending Decision No 1692/96/EC on Community guidelines for the development of the trans-European transport network. Brussels, 2.10.2001, COM(2001) 544 final 2001/0229 (COD)
- European Commission (2001d):** Proposal for a Directive of the European Parliament and the of the Council on the training of professional drivers for the carriage of goods or passengers by road. COM (2001) 56 2001/0033/COD.
- European Commission (2001e):** Proposal for a Regulation of the European Parliament and of the Council on the harmonisation of certain social legislation relating to road transport replacing Regulation (EEC) N° 3820/85). COM(2001) 573 final 2001/0241 (COD).
- European Commission (2001f):** White Paper 'European transport policy for 2010: time to decide'. COM(2001)370, Brussels 12/09/01
- European Commission (2002a):** Towards an integrated European railway area. Communication from the Commission to the Council and the European Parliament. Brussels, 23.1.2002 COM(2002)18 final.
- European Commission (2002b):** Proposal for a Directive of the European Parliament and of the Council amending Council Directive 96/48/EC and Directive 2001/16/EC on the interoperability of the trans-European rail system Brussels, 23.1.2002 COM(2002) 22 final 2002/0023 (COD).
- European Council (2001):** European Union Sustainable Development Strategy. Gothenburg Council June 2001.
- European Union (1999a):** Directive 1999/62/EC of the European Parliament and of the Council of 17 June 1999 on the charging of heavy goods vehicles for the use of certain infrastructures.
- European Union (1999b):** Regulation (EC) No 1655/1999 of the European Parliament and of the Council of 19 July 1999 on amending Regulation (EC) No 2236/95 laying down general rules for the granting of Community financial aid in the field of trans-European networks.
- European Union (2001a):** Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001 amending Council Directive 91/440/EEC on the development of the Community's railways.
- European Union (2001b):** Directive 2001/13/EC of the European Parliament and of the Council of 26 February 2001 amending Council Directive 95/18/EC on the licensing of railway undertakings.
- European Union (2001c):** Directive 2001/14/EC of the European Parliament and of the Council of 26 February 2001 on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification
- European Union (2001d):** Directive 2001/16/EC of the European Parliament and of the Council of 19 March 2001 on the interoperability of the trans-European conventional rail system
- European Union (2002):** Directive of the European Parliament and of the Council relating to the assessment and management of environmental noise. Joint text approved by the Conciliation Committee. Brussels, 8 April 2002, 2000/0194 (COD).
- HERRY, Max (2001):** Transportpreise und Transportkosten der verschiedenen Verkehrsträger im Güterverkehr. Arbeiterkammer Wien. Dezember 2001.
- High Level Group on Infrastructure Charging (1999):** Final report on estimating the costs of transport (May 1999).
- IKEA (2002):** IKEA Rail is now on track. Internationale Pressemitteilung 24-06-2002. http://www.ikea.ch/about_ikea/press_room/press_release_int.asp?pr_id=626
- INFRAS / IWW (2000):** External Costs of Transport - Accident, Environmental and Congestion Costs of Transport in Western Europe. Zürich / Karlsruhe March 2000.
- OECD (2001):** Environmentally Sustainable Transport - EST Guidelines. Organisation for Economic Co-operation and Development.
- OECD (2001):** Environmentally Sustainable Transport - EST Synthesis Report. Organisation for Economic Co-operation and Development.
- Ökoscience (2000):** Auswirkungen des Alpentransitverkehrs auf die Luftbelastung in den Alpen.
- PETS (2000):** Summary Report - Pricing European Transport Systems. European Commission 4th Framework Programme RTD Transport. December 2000.

PROGNOS (2002): European Transport Report 2002. Basel 2002

T&E European Federation for Transport and Environment (2001): Electronic Kilometre Charging for Heavy Goods Vehicles in Europe. T&E 99/6.

T&E European Federation for Transport and Environment (2001): T&E Response to the European Commission White Paper on the Common Transport Policy. T&E 01/5.

UIRR (2000): 'Developing a Quality Strategy for Combined Transport' in the framework of the PACT project. International Union of Combined Road-Rail Operator. <http://www.uirr.com/document/presse/P051200-e.pdf>.

UNIFE/ UIC/UIITP/CER (2001): A joint strategy for European Rail Research - 2020 Towards a Single European Railway System.

UNITE (2001): Deliverable 3 - Marginal Cost Theory. European Commission 5th Framework RTD Programme - Competitive and Sustainable Growth Programme. March 2001.

UVEK (2001a): Fair and efficient - The distance related Heavy Vehicle Fee in Switzerland. Federal Department of the Environment, Transport, Energy and Communication.

UVEK (2001b): Alpinfo Güterverkehr 1980 - 2000. Federal Department of the Environment, Transport, Energy and Communication. http://www.admin.ch/gvf/inhalte/publikationen/alpinfo_g.html

WCED (1987): Our common future. World Commission on Environment and Development (WCED) Oxford: Oxford University Press.

WHO (1999): Guidelines for Community Noise, p. 48. http://www.who.int/environmental_information/Noise/Comnoise-3.pdf

Recent T&E Publications

1999

- T&E 99/1 Memorandum to the German Presidency
- T&E 99/2 Road Fuel and Vehicles taxation in Light of EU Enlargement
- T&E 99/3 Response to the Commission report on the implementation of the Trans-European Transport Network Guidelines and Priorities for the Future
- T&E 99/4 Response to the European Commission White Paper on Fair Payment for Infrastructure Use
- T&E 99/5 Response to the Commission Report on the Common Transport Policy - Perspectives for the Future
- T&E 99/6 Electronic Kilometre Charging for Heavy Goods Vehicles in Europe (€15)
- T&E 99/7 Economic Instruments for Reducing Emissions from Sea Transport
- T&E 99/8 Controlling Traffic Pollution and the Auto-Oil Programme (€15)
- T&E 99/9 Getting more for less: An alternative assessment of the NEC Directive
- T&E 99/10 Aviation and its Impact on the Environment (€15)

2000

- T&E 00/1 The Drive for Less Fuel: Will the Motor Industry be able to Honour its Commitment to the European Union? (€5)
- T&E 00/2 Memorandum to the French Presidency
- T&E 00/3 Conference Proceedings: T&E conference on transport, enlargement and the environment
- T&E 00/4 Bringing the Eurovignette into the electronic age: The need to change Directive 1999/62/EC to allow kilometre charging for heavy goods vehicles
- T&E 00/5 Memorandum to the Swedish Presidency
- T&E 00/6 Transport, Infrastructure and the Economy: Why new roads can harm the economy, local employment, and offer bad value to European tax payers. (€20)
- T&E 00/7 Sustainable Freight Transport – Conference report

2001

- T&E 01/1 Transport can drive climate change reductions: Seminar report
- T&E 01/2 Memorandum to the Belgian Presidency
- T&E 01/3 Cleaner Fuels and Lower Sulphur: A position paper on the revision of Directive 98/70/EC.
- T&E 01/4 Conference Proceedings: European conference "Opportunities of the rail infrastructure package for a sustainable freight transport "
- T&E 01/5 Response to the European Commission White Paper on the Common Transport Policy
- T&E 01/6 Memorandum to the Spanish Presidency

2002

- T&E 02/1 Transport and the economy: The myths and the facts
- T&E 02/2 Taking the bull by the horns: Urban transport in Europe
- T&E 02/3 Safe and sustainable freight transport: Our common challenge
- T&E 02/4 Memorandum to the Danish Presidency

T&E also brings out position papers and briefings on a range of related topics. For a full listing by subject see the ---Archive--- page of the T&E website.

HOW TO GET T&E PUBLICATIONS

Electronically

almost all the T&E publications listed above are available to download for free from the T&E web-site, <http://www.t-e.nu>

Physical copies

are available for a price from the T&E Secretariat (€10 unless otherwise indicated).

When ordering, please send the correct amount in Euro to the T&E secretariat, making sure that all bank charges are paid by you. Orders without advance payment will be charged an extra €5. In certain cases a small charge for mailing will be added.

The T&E secretariat's address appears on the inside front cover of this publication.

Send payments to

BANK: Postcheque.

ACCOUNT NUMBER: 000 - 1370751 – 44.

ACCOUNT IN THE NAME OF: T&E.

ADDRESS OF BANK: Postcheque, 1100, Brussels, Belgium

USING T&E PUBLICATIONS

T&E reports may be freely used and reproduced, provided the source is acknowledged and no financial gain is involved.

If you want to use any T&E publication, or part thereof, for a financially gainful purpose, you need to contact T&E in advance to arrange permission.

About this Paper

In 1999, the European Federation for Transport and Environment (T&E) began a three-year project 'Freight: From Road to Rail' to investigate the reasons for the decline in rail freight transport. The project has also aimed to contribute to awareness-rising and intervene in decision-making processes for creating a legal framework which will allow for fair competition between different modes of transport.

The 'Freight: From Road to Rail' project is supported by the Swiss Ministry for Transport, the Catalonian and Basque governments, the Swedish rail-infrastructure administration and several Swiss NGOs.

This publication summarises the main findings of the project, i.e. the development of freight transport over the last 30 years, the environmental impacts of freight transport, the reasons for the increase in freight transport and what measures need to be taken to change traditional patterns. This publication is intended to give all stakeholders and decision-makers in the field of freight transport an overview of the current situation and the relevant problems relating to freight transport, and to offer some possibilities on how to make freight transport more sustainable.

T&E had also produced a fact sheet summarising this publication. It is available in English, French, German and Spanish. It can be downloaded from T&E web-site, or ordered from the T&E secretariat. You will find contact details on the inside front cover.

About T&E

The European Federation for Transport and Environment (T&E) is Europe's principal non-governmental organisation campaigning on a Europe-wide level for an environmentally responsible approach to transport.

The Federation was founded in 1989 as a European umbrella for organisations working in this field. At present T&E has 41 member organisations covering 21 countries. The members are mostly national organisations, including public transport users' groups, environmental organisations and the European environmental transport associations ('Verkehrsclubs'). These organisations in all have several million individual members. Several transnational organisations are associated members.

T&E closely monitors developments in European transport policy and submits responses on all major papers and proposals from the European Commission. T&E frequently publishes reports on important issues in the field of transport and the environment, and also carries out research projects.

The list of T&E publications in the annex provides a picture of recent T&E activities. More information about T&E can be found on the web-site: <http://www.t-e.nu>. This includes a comprehensive list of all publications and position papers, and free access to the T&E Bulletin and news releases.

A full list of T&E's members is also available online, including links to their websites.



Safe and sustainable
freight transport

Bd. de Waterloo 34
1000 Brussels - Belgium
Tel.: +32-2-502 9909
Fax: +32-2-502 9908
E-mail: info@t-e.nu
Site: www.t-e.nu

