



The Voice
of European
Railways

24 April 2009

POSITION PAPER

The Future of Transport - a Railway Perspective

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Executive summary

Post war economies have been based on increasingly cheap transport. But this may change with the price of energy beginning to reflect scarcity and insecurity of supply, the resistance to constructing new roads and airports, congestion increasingly affecting the fastest growing modes and the growing realisation that, whilst transport may be cheap for the individual, it imposes increasing external costs on society which need to be internalised.

Since the 2001 Transport White Paper, two events have occurred which have changed the context of European transport policy. First, climate change has become a far more important issue. The key long term challenge for the transport sector is now to reduce the emissions of greenhouse gases. Given the targets to reduce emissions by 50-80% by 2050 and the high historical rate of growth of transport demand, all possible means must be used: reducing specific emissions, reducing the rate of growth of transport demand in general and shifting traffic to less polluting modes such as rail.

Second, new Member States have joined and they have very different problems. The poor financial architecture for rail in these states has caused rail freight traffic to decline rapidly and this will continue unless action is taken. The goal of EU transport policy is to transfer traffic to rail. However, of the three elements of the 2001 White Paper designed to do this in freight, only one - the introduction of intra-modal competition - has been implemented. The other elements, introducing fair competition between modes and improving rail infrastructure, have not been implemented in all countries. As a result, particularly in Central and Eastern Europe, the targets of the White Paper have not been met.

In passenger transport, given increasing urbanisation, commuter rail will continue to be the main passenger market, in competition with car and bus which are not paying their full costs. The intercity sector will also grow with the expansion of high speed rail. However, as with much transport infrastructure, high speed lines do not fully cover their construction costs. Therefore, state intervention will continue to be required, either to increase the price of alternative modes to reflect external costs, or to provide financial support for investment, or both.

In short, more progress on rail policy must be made if rail is to play its full potential role in the future. The future of rail requires the formulation and effective implementation of a comprehensive European transport strategy and, based on this, policy decisions at EU and national levels.

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1. Introduction

In this paper we set out CER's views on the future of the transport sector taking account of the Commission's document, "Future of Transport" published in February 2009. The focus of the paper is on the rail sector but we also consider the role of rail in the overall transport sector and its potential contribution to reducing the growing environmental effects of transport.

We welcome the opportunity to contribute to this debate.

2. Major Rail Market Trends

A minor revival of rail began in the EU15 in the mid 1990s as freight traffic stopped declining and passenger growth accelerated. In some countries (such as Germany and the UK) modal share also began to grow. In Central and Eastern Europe (CEE), however, rail traffic continued to decline until the mid 2000s.

International rail freight is growing faster than national freight. This reflects globalisation (growth in trade), the additional impact within the EU of the single market and the market response of railway companies, including their formation of international groupings. These changes have allowed rail to exploit their natural advantage in long distance transport.

Intercontinental freight transport will - after the present setback - continue to grow at a rapid pace. High capacity rail access to sea ports and improved rail access to final destinations will be key over the coming decades. There are also signs that intercontinental rail freight market may develop in the future. For example, China is currently considering options for a rail bridge to Europe in order to avoid its congested ports and the long travel times by sea.

The emergence of high speed rail and improved services on conventional rail in some countries has led to a resurgence of passenger rail which may be replicable.

Recently the economic crisis has caused a major drop in rail freight (about 35% between January 2008 and January 2009) and a smaller drop in rail passengers. This has implications for the financial stability of rail companies and on infrastructure funding, especially in CEE, where these issues are already highly problematic.

In 1990 transport in CEE was dominated by rail. However, following massive road building, supported by the EU, and lack of support for rail, the situation with rail is now becoming critical. A coordinated rail offensive is needed with a combination of new infrastructure investment, and technical upgrading of infrastructure and rolling stock.

3. Economic and Energy Security Considerations

Globalisation is likely to continue once the current crisis is over. However, the world economy will look different in the future with a stronger emphasis on sustainable economic growth. The post war economy has been built on low transport prices. If transport costs increase, this may lead to localisation and more short distance trade in some sectors. It is, however, difficult to predict the overall impact of these changes on rail.

The increasing shortage of fossil fuels and energy security are likely to become increasingly important factors in policy formulation and corporate decision making in the energy and transport sectors. Their combined effect will probably push up prices and favour modes which are flexible in their source of energy - rail is the most flexible mode at present as it is the only mode which mainly uses electric power - this can be generated from many sources, including renewable ones.

CER agrees that cost trends are likely to help rail (Future of Transport, para 114) providing that bottlenecks in the rail sector are removed and that the sector is not over-regulated and over-burdened. For example, rail gets no reward for being clean and energy saving. Yet, perversely, the rail sector has to bear the cost of emissions trading and subsidies for "green" electrical energy, whereas road competitors are still free of such burdens.

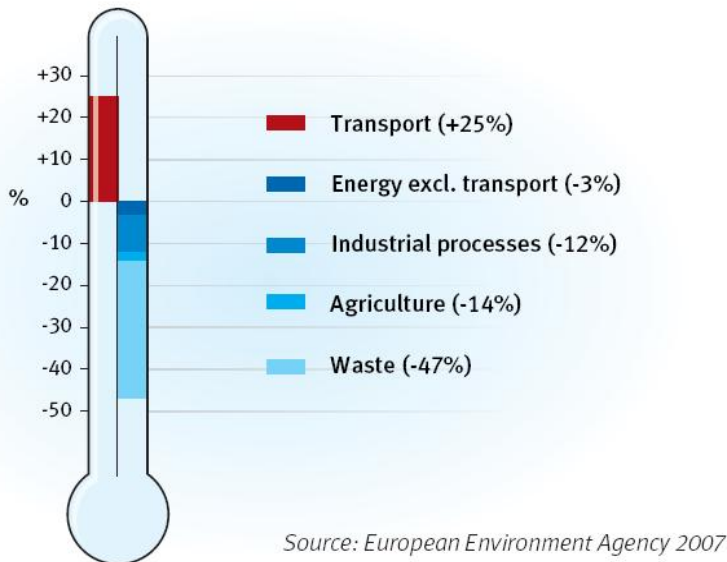
4. Climate Change

It is now seen as critical that the human activities that contribute to climate change be addressed at a political level and this is likely to remain critical for many years. There has to be a full acceptance within the transport sector that far greater priority should be given to mitigating the sector's effect on the environment, in particular on the emissions of CO₂. This attitude was accepted in the recent TEN-T Green Paper, which stated: *"Over and above everything else, the fight against climate change requires Europe-wide measures to underpin Europe's leading role in the world. Transport and transport infrastructure are areas which offer considerable potential for positive contributions."*

The EU's current 20% reduction target for 2020, formally agreed in 2008, is clearly only an interim measure: the EU has offered to increase this to 30% if other industrialised countries agree to a similar target. The President of the European Commission, Manuel Barroso, said in January 2008 that work must begin immediately on a longer-term target for a 50% cut in global emissions by 2050, while the European Parliament, in January 2009, called for emissions reduction of at least 80% by 2050. The UK has already set a country target of 80%.

However, the transport sector continues to increase its emissions of greenhouse gases, while all other sectors are reducing theirs (see Figure 1).

Figure 1: Projected changes in EU15 GHG emissions 1990-2010 with existing policy measures



While technological improvements and better fuel and energy efficiency are helping reduce the intensity of emissions, the growth in transport demand, which is generally facilitated rather than managed by governments, means that the efficiency gains made through technology continue to be outstripped.

The Future of Transport mentions a 50% reduction target for greenhouse gas emissions from transport by 2050. It is not possible to overstate the difficulty of achieving this objective. If nothing is done and current trends continue greenhouse gas emissions from transport would increase by 57% between 2009

and 2050.¹ To reduce emissions by 50%, specific emissions would therefore need to decline by over 80% if traffic continues to grow at historical rates.

It will be difficult to reverse the upward trend in transport emissions given that the fastest growing transport modes have the highest specific emissions. This is illustrated by Figure 2 which gives emissions by mode for carrying 100 tonnes of freight from Basel to Rotterdam:

Figure 2: Freight transport - Comparison of CO₂ emissions by mode

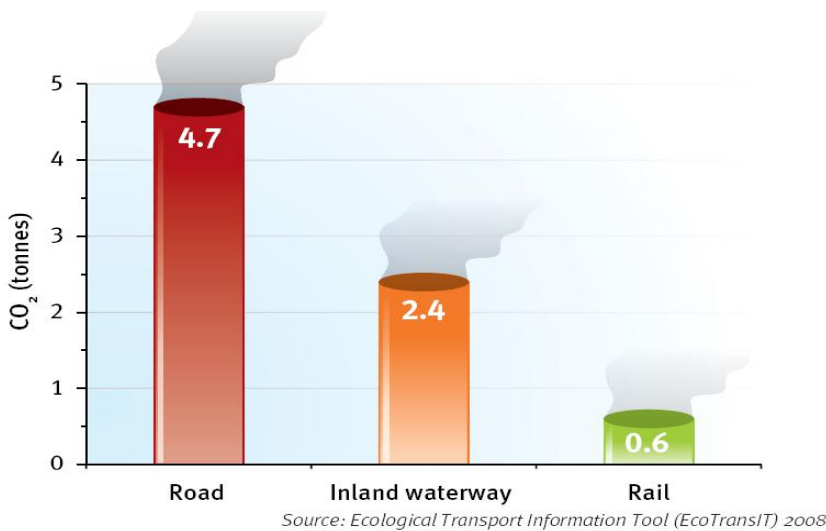


Figure 2 shows that rail produces a quarter of the emissions of inland waterways and one eighth those of road.

At present, the only mode for which renewable sources (through electricity) could be the main source of energy is rail. The Renewables Directive, part of the Climate Change Package, mandates each Member State to ensure that by 2020 the share of energy from renewable sources used in all forms of transport is at least 10% of final consumption of transport energy. There is limited scope for the use of renewable energy for heavy goods vehicles, air or sea transport. The main option for these modes is biofuels, but there are concerns over production capacity given the conflicting demand for agriculture, forests and water resources. These concerns, together with uncertainty about the actual benefits they offer mean that, with existing technology at least, biofuels cannot be relied on to have a significant effect on transport emissions. There is some scope for further use of renewable energy (through electricity) for rail, cars and buses. Investment in rail electrification could increase the share of rail transport

¹ Based on the projected 1.1% CAGR from 1990 to 2010.

powered by electricity (now 50% of the network is electrified and 68% of traffic is hauled using electric power).

Achieving the EU's targets will therefore require both reductions in the use of high emissions modes and reductions in specific emissions for each mode. A key factor is pricing to encourage the discovery, development and use of new technology and changes in behaviour to reduce transport demand. But pricing of high emissions modes will not be enough. There is also a need to make alternatives attractive: this will require investment in low emissions modes, especially in rail infrastructure.

Furthermore, solutions to transport problems may also come from a wider reshaping of industrial, economic, energy and development policies. The wider drivers behind transport demand need to be addressed, with better consideration of the root causes of growth from developments outside the sector, in areas such as just-in-time and urban planning, as discussed below. Decisions made in these sectors influence the carbon footprint of the transport sector but they are usually taken without considering the consequences for transport demand and greenhouse gas emissions.

To properly tackle the challenge of increasing CO₂ from transport, a detailed analysis of the impact of economic activities outside the transport sector is needed. This would also consider the ancillary benefits of managing transport demand, such as boosting local tourism and the local economy.

5. Transport Policy

Transport policy will be a major factor in determining the role of rail in the transport system of 2050. There are three main elements of policy which form the pillars supporting the railways. These are: intramodal competition, intermodal competition and infrastructure and finance. We discuss each in turn below and then discuss specific issues for freight and passenger rail.

Intramodal Competition

Intramodal competition between rail undertakings is now developing rapidly in freight. This trend may be expected to continue and extend to all Member States so that, by 2050, some national operators will have ceased to be the largest operator in their country. To some extent this will be a natural consequence of competition. However, in CEE, competition is not wholly fair as incumbents have not benefited from the same level of support for investment and maintenance as their competitors in Western Europe.

International rail freight is likely to become even more important. In this market, intramodal competition is likely to develop mainly between cross border companies or alliances. Together with the eventual resolution of interoperability and administrative barriers, this should increase rail's competitiveness in international freight traffic in which, given the long distances usually involved, rail potentially has a strong competitive advantage. Competition between these large groups may eventually be similar to that between Class 1 operators in North America (although each operator will have access to all rail infrastructure) leaving smaller operators to handle niche markets and operate short (branch) lines.

In passenger transport, most competition at present is "for the market" through competitive tenders, although the results of this are mixed. Some countries prefer negotiations backed by the possibility of competitive tenders.

Intramodal competition should help make the rail sector more efficient, especially in freight, and improve its ability to compete with other modes. It will be most effective if the same rules apply to all market participants across the European Union.

However, there are other factors which may continue to undermine rail's competitiveness in some countries, especially in freight. These are fair competition between modes and infrastructure.

Fair Competition between Modes

Fair competition between modes is not possible until there is complete internalisation of external costs for all modes of transport. For freight, we expect that some form of internalisation of the external costs of Heavy Goods Vehicles (HGVs) will eventually be introduced through Eurovignette and/or fuel taxes (as a proxy for greenhouse gases) and supplements to insurance costs (as a proxy for the external costs of accidents).

Increased prices of fuel and internalisation of external costs may reverse the downward trend in transport prices. Lower transport prices have been one of the elements making companies reduce in-house stocks and resort to just-in-time (JIT) delivery - the 'warehouses on wheels' phenomenon. They have contributed to the modification of logistics and industrial production behaviour by multiplying the use of small consignments, increasing transport distances and reducing the amount of buffer stocks. If, as we expect, fuel prices increase and if the external costs of HGVs are fully internalised, this may be sufficient to reverse the trend to JIT, at least for some products. This could lead to a shift back to rail.

Furthermore fair competition between modes is not possible until the legal and fiscal *acquis communautaire* is adjusted so that the one sided advantages in favour of one specific mode are removed. An example is VAT-exemption for cross border air transport, which does not exist in the rail sector. Another is the exemption of air transport from paying fuel tax, whereas rail usually pays fuel taxes.

Consumer protection rules, such as passenger rights, must be adjusted as well. There is no reason why railway undertakings should be legally bound to compensate passengers for delays of 1 hour (which is not opposed by railways) whereas airlines do not have to compensate for any delay and only have to refund the ticket price in cases of delays over 5 hours.

The long term future of rail will depend crucially on progress in introducing fair competition between modes and, as highlighted above, a lot still needs to be done.

Infrastructure and Finance

In Central and Eastern Europe (CEE) and some countries in Western Europe, Governments have for many years not provided adequate funding for infrastructure investment and maintenance. As a result, operators are expected to pay (through access charges which make rail uncompetitive with road) for access to sub-standard infrastructure. In addition, in some countries, especially in CEE, the under-compensation of passenger operators for public service obligations results in their inability to pay track access charges, putting further pressure on infrastructure funding. The unwillingness of Governments to provide adequate funding, combined with unfair competition from road, thus results in deteriorating infrastructure quality and high rail tariffs. Rail's competitiveness is therefore declining rapidly and rail is losing modal share: in freight from over 40% in 2000 in CEE to less than 30% in 2007. As a result, debts are increasing.

Investment in infrastructure safeguards assets, increases capacity and improves the quality of rail and should further improve its competitiveness. TEN investments should have a particularly major impact on international freight. For this reason, future investment priorities need to be based on detailed analysis of traffic flows and business requirements. However, both domestic and international freight from terminals not on the TEN network and passenger services may suffer in some countries because scarce resources are concentrated on TEN-T networks. Balanced resource allocation must ensure spending on infrastructure maintenance and investment on the rest of the network.

The current downturn in rail freight is probably temporary in the EU15. But it may be permanent in CEE since it comes on top of a major decline in traffic over

the past 20 years leading to a critical backlog of maintenance of infrastructure which is then unable to support the quality of service expected. It may therefore lead to the closure of lines or even parts of networks, the decline and bankruptcy of national operators and a complete loss of confidence in railways, accelerating this spiral of decline.

Freight Rail

Investment should not be limited to rail lines. Investment in rail freight sidings can have a major impact on modal split by giving companies a choice of mode where before none existed. Most rail freight in Europe today is siding to siding and does not involve road at all. Despite the growth of intermodal this is unlikely to change. But the size of this siding to siding market is limited because many industrial sites lack rail connections to main lines. Intermodal rail-road services, which involve expensive trans-loading between road and rail and sometimes quite long road haulage, could also be reduced by constructing such connections.

On the other hand, we expect intermodal to continue to be the fastest growing freight market for rail and so investment in terminals is also needed. For example, in some countries there is considerable potential in the retail and supermarket sectors. Freight can be consolidated into train loads and shipped by rail to distribution centres. By locating distribution centres near rail terminals, this will further reduce the environmental damage caused by the "last mile". This improves the green credentials of the customer and reduces costs.

But sidings and terminals are rarely commercially viable at current price levels without government support, either financial or through planning controls. Provision of sidings is necessary to provide a level playing field with road as connections between industrial sites and main roads are usually provided by public authorities. Governments in some countries partly fund the construction of sidings and terminals and we expect this practice to spread in response to increasing environmental concerns.

Passenger Rail

Turning now to passenger services, we expect the largest segment, commuter rail to continue to grow as rail is the most efficient mode in large cities and the population of these cities is likely to grow with urbanisation. Unless there is full internalisation of external costs, public sector support will continue to be required for rail, both for investment and operations. This is partly because the low cost of car transport as experienced by the user encourages inefficient settlement patterns including low density housing which are difficult to serve by

rail. To increase the sustainability of cities, more concentrated development is required and this requires both full internalisation of external costs and better planning controls over a long period.

Intercity rail will also continue to grow, partly because of the development of high speed rail. High speed rail is the fastest growing passenger market and, given on-going construction and plans in France, Italy, Spain and Portugal, this rapid growth is expected to continue.² However, these lines are expensive, typically costing 20 million euros/km (depending on how much construction is in cities or mountainous areas) and are best suited to serving city pairs with large populations within a limited distance band. This range is now 300 - 700 km but in the future could be up to 1,000 km.

The greater range will partly come from the extension of the high speed network - few trips over 700km can now be carried out exclusively on high speed lines. Longer distances will also be made possible by higher speeds. Higher speeds will probably reduce the energy consumption and greenhouse gas emission of the transport sector as whole, due to modal shift, higher speeds increase the overall costs of energy and infrastructure investment.

Therefore, as with other passenger rail, the future development of high speed rail lines is dependent on the availability of government support and the extent of pricing of alternative modes for externalities. These will depend partly on rail's continued environmental advantages and rail is likely to retain these, particularly over air. High speed rail development is therefore increasingly likely to focus on longer distance traffic, competing with air in some markets and co-operating with air in others. It is important that rail benefits from this co-operation and that the cost of linking rail to air does not fall wholly on the rail sector.

The gap between the costs of meeting government imposed public service obligations and the compensation received by railway companies will hopefully be reduced once governments realise the effect that these are having on their national railways or once these railways fail as a result of government policy.

6. Technology

The development of new technology will depend largely on pricing signals. It took the high fuel prices of 2008 to get the car industry to take the development of

² In 2007, high speed rail rolling stock represented 23% of passenger km compared with 16% in 2000. Some of this is on conventional track where there is little or no speed advantage. However these figures do illustrate trends.

electric propulsion seriously. This technology or its alternatives could fail again if fuel prices remain low or fall further. Also it is not clear to what extent pricing will be introduced to reflect the external costs of road transport, especially cars, for which charging policy is a Member State responsibility. Projections that 50% of road transport would be covered by hydrogen based applications (Future of Transport, para 87) are therefore highly uncertain as there is no defined way for achieving this and it is not clear that hydrogen will be the technology used in the car of the future.

Rail, above all transport modes, relies on information technology and communications. Rail used “telematics” before the term was used. But new technical possibilities are still only used to a fraction of their potential. It may well be that the standards of railway operation will change beyond recognition during the coming decades.

There are many prospects for new approaches and technologies to cut rail costs and further reduce rail’s environmental effects whilst at the same time improving services. These include:

- Higher levels of standardisation of railway components to reduce life cycle costs and improve the flexibility and hence the availability of trains;
- Increased capacity of the railway system through:
 - More energy efficient (including automatic) driving
 - Longer and higher capacity trains
 - Improved signalling to allow greater traffic density without compromises to safety
 - Increased speeds
 - Increased loading gauge
- Reduced weight of rolling stock allowing higher payloads - composite materials could be a potential way of cutting costs and emissions and increasing capacity;
- More intensive use of telematic applications: integrated traffic management systems will optimise the use of transport capacity and speed, thereby reducing energy consumption and emissions;
- Enhanced interoperability and telematic applications will also facilitate the streamlining of border crossing processing, e.g. through advanced notification and harmonized documentation;

- Other technologies will be introduced mainly to reduce environment impact:
 - Diesel fuel substitution - electrification of lines
 - Increase of energy efficiency (e.g. regenerative braking, energy storage onboard)
 - Green diesel locomotives.

The future of interoperability in rail is key for the future competitiveness of international rail transport. It is however indispensable to give adequate consideration to its economic consequences (costs and benefits). Interoperability must constitute a real advantage to rail in facing fierce intermodal competition and must not become a burden for rail over many years. The objective is not the implementation of what is technically possible. The criterion must be economic efficiency.

It would certainly facilitate technological development if it were not subject to extensive legislation down to the last specific detail. If legislation could be limited to the general framework, to be filled with technical content by the sector and standardisation bodies, more practical, economic and market oriented solutions could be generated.

7. Conclusions

Rail should have a major role to play in the "Future of Transport". The size of the role depends largely on the price and availability of different energy sources, particularly fossil fuels, and the policies of the EU and different levels of government, particularly in response to global warming. Technology is part of the solution although the development and introduction of new technologies will depend crucially on getting the pricing signals right in order to provide the correct incentives for making transport more accessible.