

Public consultation on the *Green Paper* on Future TEN-T Networks

Towards a Unified European High-Speed-Rail Network

A contribution by the European HSR Vision Group

The Green Paper and the TEN-T Guidelines stress the need of a single, multimodal trans-European transport network. Important parts of this network are major high-speed rail (HSR) projects, opening up a new generation of passenger traffic able to compete successfully with air and private cars. It is also stressed that TEN-T network planning has until now not been driven by genuine European objectives that would ensure that the whole is greater than the sum of its parts. The European perspective must be reinforced also in national planning. We, an independent, professional HSR vision group, agree with these standpoints and want especially to stress the potential of HSR as a main structure in a pan-European, comprehensive inter-modal transportation network.

There is a need for a long-term vision of a pan-European high-speed rail network

In the last decades HSR networks have been growing quickly in Europe, particularly in France, Spain, Germany, Italy and by the Thalys-Eurostar system. The European Commission is working hard with an improved European transport policy and networks. The report *Trans-European transport network, TEN-T priority axes and projects 2005* gives a good picture of the present situation and decided plans. The very recent paper *High Speed Rail: An easy way to connect* does not go beyond stocktaking, either. Hence, there is need for a really comprehensive long-term vision of a future pan-European HSR network. The TEN-T rail planning until now is mostly a sum of individual projects, with much focus on technical and administrative issues, but still lacking a real long-sighted vision. Moreover, several existing, but not decided plans and ideas are not included.

The recent study *European High Speed Rail: An Easy Way to Connect* is an important step towards planning a future European HSR network. It deals with issues of interoperability, intermodality, liberalisation of rules and important technical, environmental and economical questions. It also describes experiences of HSR until now and what could be learnt from them. This is an excellent starting point for a long-term vision study.

The *Green Paper* describes different structural options for the shaping of TEN-T. Irrespective of which option will be chosen there is a need for defining a “priority network” or a “core network”, connecting the principal urban areas as well as tourist regions in Europe (also outside the EU). Within the multi-modal network we regard it as crucial to give priority to sustainable and environmental-friendly modes of transport. Rail transport – both for passengers and freight – should within Europe be given priority to car and air transport. Although new types of more environmental-friendly cars will be developed, the problems of urban sprawl, growing urban transport and inefficient transportation patterns lead to a radical change of both urban development and transportation structure. A coherent and continuous rail system, including both passenger and freight transport and different levels from international HS lines to regional, local and urban networks, should be a key component of TEN-T.

In this contribution we want to pay special attention to the HSR network. TEN-T policy has its “feet on the ground”, being rooted in existing national and EU policies and financial resources, aiming at implementing concrete actions and measures within definite

time schedules. It is a realistic step-by-step policy, successively setting new goals. However, we have come to the conclusion that the long-term TEN-T policy needs a vision beyond the limits of what could today be included in investment decisions and political promises. There is a need for developing visions at a principal, scientific and “academic” level above the everyday political level. Such visions could help to discuss and define more far-sighted possibilities, principles and goals, as frameworks and inspiration for policy-making in the shorter term.

Concerning a pan-European HSR network, there is a need for a far-sighted vision, not limited to existing plans or anticipated decisions, but useful as a tool and inspiration for possible future plans and decisions. This vision should be based on non-national, genuinely European points of view and on a rebalancing of road, rail and air transport as postulated in the 2001 White Book. It could also – shown at different steps – be used for principled assessments and comparisons of different ambition levels of HSR and general railway standards. These assessments should include direct and indirect costs, environmental and climate effects and urban/regional development, comparing rail with air and road transport.

Such a vision might be a tool and a perspective far beyond what today appears to be the “final plan” for a European rail network. It could give inspiration and open up new perspectives to the European Commission, the different stakeholders of transport network planning and the different rail authorities in connection with future rail development and planning. An important aspect of the vision is that it should be included in an overall European intermodal transport system. Special attention should be given to the connections with regional and local rail networks and with intercontinental airports.

Some elements of the HSR vision

The vision must be based on available data, partly already gathered in the study *European High Speed Rail: An Easy Way to Connect*, including: current and expected numbers of passengers between main European metropolitan regions, other important cities and tourist areas; modal split between air, rail, road (and sea) transport; existing rail system and current plans and proposals for improvement and extension of the rail system, including HSR. The existing HSR systems of France, Germany, Spain and Italy should be compared with each other, with due attention to costs and achievements [?], and to the impact of modal split on transport systems. The main transportation policy documents of the EU and the national authorities have to be reviewed.

The basic data should include a description of main travel patterns and predictions of future travel patterns, as a point of departure for outlining a HSR vision. The pan-European high-speed rail network should not only cover the EU member states but all European countries, accessible by rail. In principle, all capital cities, other major metropolitan areas and main tourist regions in these countries should be accessible by HS rail. In some cases HS rail could be connected with ferry lines, possibly as train ferries. The HSR network should include gateways for connections outside Europe: to the Middle East, Central and South Asia, Far East as well as Africa. The vision should focus on long distance connections, although these may also allow shorter journeys “along the line”. Very long continuous HSR lines, e.g. through all Europe and Asia, are relevant even if most travellers between the endpoints chose flights, because HS trains are competitive on the shorter sections along the lines – and travellers who have time can choose to use the train over the whole distance.

The vision could include a first priority basic pan-European network, in a second step completed with new lines covering more regions and cross connections. The vision could also include different combinations of improvements of existing lines and construction of quite new lines. The vision will include already planned or proposed HSR lines. The

expected achievements of these lines should be described. The first priority network will consist of existing and already planned lines, supplied with a few lines, serving the most important cities, especially in Central, Eastern and South Eastern Europe.

Prerequisites for the vision

It must be assumed that existing administrative, political and similar obstacles to an effective European rail system are removed. Today there are problems with different national legislations, different technical standards, an ineffective ticketing system and a price system that favours flights. We must assume that these types of problems are solved. Already Railteam is dealing with improved ticket systems.

It must also be assumed that every mode of transport will have to pay for its own direct and indirect costs and environmental impact, which must imply that train tickets are always cheaper than corresponding flight tickets. Also, due to the environment, climate and energy issues, it might be necessary to accept longer travel times, also for business travels, in the future. In this connection, morning and evening flights combined with hotel nights should be compared with comfortable night trains. Generally, the possibility of working or relaxing during train travel should also be stressed.

Important aspects of the vision

An important issue is the design and typology of nodes in the HSR network. Some stations are mainly starting or end points of journeys while other stations have greater importance for change between HS trains. Several nodes should be flexible for many different train relations. The connection HS network / regional and local network is very important as well as the possibility of rapid bypasses and direct connections to airports.

A typology of nodes is required (dead ends, through-passes, bypasses, airport connected and different combinations of them), having different impact on the cost of the nodes, the level of service for the local users and the level of service for through passengers.

HSR is a convenient substitute for both road and flights over a range of distance. Important criteria are the total journey duration (including the quality of the journey time) and the total cost of the journey. We must reorganize the transport system to make it more environment-friendly and energy-efficient. Of course, there will also in the future be a need for air transport overseas and over very long distances, but air transport should be integrated with effective rail transport. HS trains should replace feeder airlines and short-haul flights. A special issue will be how to transfer passengers from flights and cars to HSR.

Suggestions for TEN-T policy

We propose that DG Energy and Transport, as the next step in the TEN-T work, should contemplate a study of a far-sighted vision of a pan-European high-speed rail network, covering all parts of Europe possible to access by rail and suitable for inclusion in a future HS network also extending into Asia and Africa. This vision should not be limited to what can be effectively implemented within the next few decades. At the same time, it should not be regarded either as a promise or as a definitive plan or project. Despite its principled, academic or even theoretic character, it could serve as inspiration and a framework for action-oriented railway and inter-modal transportation network planning. The vision could highlight pan-European and long-term sustainable perspectives.

A very important policy issue also is to improve the ticket order and purchase system, especially for international train travels. It must be as easy as flight booking. Also the

fare policy must be changed: Train tickets should never cost more than comparable flight tickets.

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A fundamental review of TEN-T policy?

[Comments on the *Green Paper*, in expansion of the HSR Vision Group's contribution]

by Boguslaw Jankowski & Bo Larsson

All this justifies undertaking a fundamental review of TEN-T policy rather than just reviewing and possibly updating outline plans and priority projects. Green Paper on future TEN-T networks, p. 3

The paper submitted by the European High Speed Rail Vision Group (on 30 April) does not address any of the 13 questions of the *Green Paper*. This is so because the current review of the European Commission's TEN-T policy is enclosed in a narrow framework that leaves no room for a truly European vision and, at the same time, does not bring us any closer to what is a badly needed *fundamental revision* of that policy.

In spite of the 'fundamental' objective spelled out in the citation above, the 13 questions of the *Green Paper* address narrowly defined issues, channelling our thinking into either an established EC approach [Q1: ... *any other factors* (than those assessed by the EC?)] or an EC-coined concept [Q2 & Q3: *comprehensive network* versus *priority network*, or Q7: *shifting borderlines between infrastructure and vehicles*].

Moreover, some basics are taken for granted, for example, the dominance of *Member States' individual infrastructure decisions* over what is a murky *planning at Community level* [Q4].

A bit more leeway is allowed in Q5: not only *aspects outlined above* but also *further aspects* are acknowledged.

Admittedly, in Q8 there is a fleeting reference to a *core network* with *clear European objectives and the highest priorities* (and even to *interconnections between modes*), but this question is promptly abandoned in favour of an extensive treatment of implementation levels, which boil down to financing.

Implementation is indeed a vital issue, but should we not decide in the first place *what* is to be implemented, specifically, *what kind of European transport network?*

The concluding question [Q13] is devoted to a seemingly broad issue, namely, the further development of TEN-T, but again our thinking is channelled by notions such as *dual/single layer structure* — even if the appended table offers a good overview of the three options proposed.

Interim conclusion

In effect, the pivotal question about the role of the European Community—and the Commission in particular—in shaping the future of the European transport system, is excluded from the current TEN-T policy review. Even if the *Green Paper* does broach this issue at one point, stating [bottom of p. 7] that "the increasing complexity, innovative nature and geographical scope of the

tasks at stake also call for a strong Community role" —when it comes to details, nothing is left of this bold idea.

This explains why the concept of a pan-European high speed rail network, set out in the European HSR Vision Group's contribution, could not be accommodated in such a narrow framework.

The present contribution

The *guiding idea* of the present contribution is that the future of Europe (and the world at large) hinges on the conservation of our natural habitat and social matrix (typically referred to as *natural and social environment*, or *ecosystem*, in short). The way our civilisation is developing forebodes a catastrophe to our ecosystem, and a major evildoer is transport in its present form(s). Consequently, if we want to survive for the next few centuries, a radical reform of European transport must be undertaken. This is as urgent and inescapable as are the EC's efforts to slow down climate change.

The prospect of global warming has alerted the European Community and its various bodies to the approaching climatic disaster. All 27 Member States of the EU have put their destinies into the hands of the EC President José Manuel Barroso, who did not shrink back from assuming leadership in the gruelling task of averting the catastrophe.

Short of evidence to the contrary, the plain truth is that between one fifth and one third of the air pollution is attributable to transport, with road traffic being the main culprit, and aviation a prominent second. Consequently, the EC dare not hesitate in offering the same kind of firm leadership in reforming transport.

Basic tenets

In the face of the dire realities, we have no choice but agree—all of us—on the rudiments of the game, which can be subsumed *in four tenets*.

1. To conserve our environment, we must drastically reduce the damage done to it by transport.
2. The two most harmful transport modes, road and air traffic, must be burdened with their actual external costs [e.g., by promoting Galileo and emission allowances].
3. The long-overdue rebalancing of transport modes must be accomplished with no further delay, in order to ensure to the railways the competitive edge they certainly deserve.
4. A fully balanced and harmoniously integrated transport system will benefit us at once ecologically and economically [e.g., by substituting rail for much of the air and car traffic].

For the record, let us recall that all those objectives were spelled out fully and squarely in the 2001 Transport White Paper, but have since been either played down or pushed to the margin, also in the 2005/6 mid-term review.

Here are a few *supplementary tenets*:

Even if powered by non-fossil fuels, air planes will generate heat and noise, and will clog the skies over the more populated areas of Europe, whereas private cars will continue to infest our landscape and make our cities uninhabitable.

Hence flying must be restricted to global travel, all short-haul flights eliminated, and car driving reduced as much as possible.

High-speed rail offers a comfortable and environment-friendly alternative to a substantial portion of air and road traffic (though it must become less energy-thirsty).

High-speed night trains can substitute for medium-haul flights across the continent.

The environmental challenge

Recently, Europe has become aware of the hazards posed by the intensifying greenhouse gas emissions, and the European Union is taking measures to curb the progress of climate change. The EU Environment Council, in its [Conclusions on climate change](#) (20 Feb. 2007), affirmed "that the EU makes a firm independent commitment to achieve at least a 20% reduction of greenhouse gas emission by 2020 compared to 1990" (Pt. 10) and intends to implement this commitment by, i.a., "limiting transport emissions" (Pt. 12). In the same Conclusions, the Council listed "emissions from international aviation" as an element of the framework beyond 2012 (Pt. 7).

The fact is that nearly 30% of the poisonous CO₂ emissions come from transport, and though most of them are due to road traffic, the share of aviation is growing fast. This makes it all the more urgent for the European Commission to develop a system of external cost internalisation under which all significant "loads" on the environment are calculated as cost and proportionately incorporated in (rail, road, air) charges. Only when this is accomplished will the *rebalancing* of the three transport modes, that is, bringing them into balance, become a realistic option.

Civil aviation needs to adapt to a rapidly changing world

Fact 1. *The mobility of people is on the rise, in parallel with the growing speed of travelling.* European air traffic is expected to double in the next 25 years, but this forecast is Europe-centred in that it does not account for the future influx of air passengers from Asia, notably China, where air traffic is growing at a much higher rate; the Chinese are enterprising people and nothing will prevent them from visiting Europe. In effect, human mobility will become global and thus transgress European 'standards'.

Even if by 2030 supersonic flying will not have become commonplace, the very number of air passengers aiming at Europe will dramatically aggravate the congestion in European airports and air space alike.

Fact 2. *Due to technological progress, new means of transport come into use.* Bigger airliners will bring larger numbers of air passengers to Europe, and many of them will be moving around this continent as tourists or on business. A new means of transport has become available in the past few decades, one that offers a speed of travelling on the ground comparable to the effective speed of air travel over short distances: the high-speed train.

Fact 3. *Ingrained habits and vested economic interests slow down the dissemination of novelties.* New technologies spread like wildfire only as long as they generate and can meet *new* needs; those meant to satisfy existing needs more efficiently have to prove their superiority in an uphill struggle with routine, ingrained habits and vested interests—before displacing the old technologies.

The dissemination of high-speed rail (HSR) is hampered by the cost of the infrastructure, the high cost of maintenance (operation), as well as by social and economic inertia. Eventually, the high operational costs of HSR will be outweighed by the internalisation of external costs imposed on road and air traffic (example: gas emission allowance trading). Environmental considerations will give a boost to HSR once rich sources of 'clean' energy have become available.

Airports tend to hold up passengers

Fact 1. *An airport thrives with growing traffic, but even more so on the many facilities offered.* Even the most crowded hubs are seeking to expand their terminals, runways and other facilities, and thus attract passengers in ever greater numbers. Airport revenues do grow with the volume of traffic, but also with the range of services available to passengers awaiting further transportation. Hence, swift transfer of passengers (from plane to plane, or between plane and ground transportation) is not conducive to the airport's overall business.

Fact 2. *Swift transfer (and hence rotation) of passengers should boost traffic, augmenting the economies of scale.* The basic business of an airport is, after all, to expedite as many passengers as swiftly and as cheaply as possible. In a sound economy, this basic function should be the most profitable airport business; the other, non-transport functions must not be inflated, lest they interfere with the essential airport business. Accordingly, the higher the passenger (and cargo) turnover of an airport, the greater the economies of scale and hence the larger the profits.

Fact 3. *A compact airport layout can reduce (landside) transfer times and streamline airside operations,* contributing to a swift turnover of passengers and cargo alike. Landside compactness can be ensured by distributing operations over numerous levels, with ground transport (for accessing the airport) placed under the ground and passenger flows concentrated in a multi-storey mid-field terminal (concourse). The airside layout must ensure quick plane movements between stands and runways. This arrangement should help reduce passenger (and cargo) transfer times, both from plane to plane and from plane to ground transport (where rail is the most effective transit mode).

Short-haul flights are uneconomic

Fact 1. *Airliners are built to fly.* An airliner is meant to transport people and/or goods over distances too long to be covered by land or sea in a reasonable span of time. The time gained or saved must justify the extra expenditure, for the customer as much as for the service provider (airplane operator). The critical factor is the amount (and hence cost) of the energy spent on the operation.

Aircraft operators are about to realise that short-haul flights are not just less economic than other flights, but downright uneconomic. The high cost of the aircraft itself, the extra fuel needed to take off, ascend and gather speed, and the fees charged by airports, make it obvious that flying short distances means wasting money. After all, airplanes are built to fly, and the ratio of flying time to the time spent on the ground (boarding, loading, taxiing, queuing etc.) must be kept within limits. A plane that is 20 minutes in the air and then spends an hour on the ground simply doesn't earn you money.

Fact 2. *Low-cost carriers are at the end of the tether.* The low-cost carriers have profited so far from the inflated overheads of the veteran airlines and the lower charges at secondary airports. It remains to be seen whether they can win against HS trains, on routes where such trains already compete against airplanes, considering that the vexing security checks at airports will remain in place for long, if not forever. The growing popularity of HS trains makes it possible to implement for them the 'cheap ticket' principles as developed by low-cost airlines.

Fact 3. *Feeder flights will become largely redundant.* The argument that transfer passengers are well served by feeder flights to hubs from where they begin their long-haul flights, holds water only as long as there is no convenient rail service to the hub in question. The effective substitution of HS trains for feeder flights depends on a proper location of the HS rail station inside the

airport. The ideal solution is to install the station right underneath a mid-field terminal, which is possible only at new airports (greenfield projects), like Munich and BBI under construction. The relatively new CDG airport at Roissy had the HS rail station installed ‘retroactively’, that is, 20 years after its opening in 1974; this is why the station is sandwiched between just four of the 15 terminals, and most of the remaining eleven are accessible only by a people mover (VAL).

High-speed rail can replace all short- and many medium-haul flights

Fact 1. *HS trains are competitive with airplanes on three-hour train journeys already.* Considering the time it takes to reach the airport and to travel from the destination airport to the final destination, for a vast majority of short-haul passengers such a trip takes altogether three hours. Except for those who happen to reside near the airport and/or are heading for a place near the destination airport, all other passengers are well served with a train journey of up to three hours. The actual distance covered by HS trains in three hours varies with the effective speed of the HS service: from 450 km in Germany to 750 km in France (e.g. Paris to Marseille). HSR lines built in relatively less crowded, non-urbanised, flat terrain may offer higher scheduled speeds and hence cover longer distances in three hours.

Fact 2. *HS night trains may become competitive on distances of up to 2500 km.* For passengers who wish to reach a destination that is farther away than three hours by HS train (e.g. 1000 km, or 600 miles, and more) early in the day, or intend to spend more than one day there, a convenient solution will be an overnight high-speed train (sleeper) that may save them time as well as some hotel expenditure. Assuming a scheduled speed of 250 kph, distances of between 1500 km (6 hours) and 2500 km (10 hours) could be covered overnight in this way.

Fact 3. *Europe may become the first continent without short-haul and with few medium-haul flights.* The combination of daytime HS train journeys of up to three hours and overnight HS train trips of up to ten hours will not only eliminate all short-haul flights, but also greatly reduce the demand for medium-haul flights in Europe. Tunnels built under the sea bed (like the Channel) will link places at present separated by the sea. In Europe, such a tunnel may be built between Tallinn and Helsinki. Most recently, an immersed tunnel has come to link Europe and Asia under the Marmara Sea. Currently, a tunnel is being studied that would link Spain with Morocco under the Straits of Gibraltar. All these projects may come to fruition by 2030, or shortly thereafter.

Towards a European high speed network

Thanks to the advancing integration of the EU member countries, border checks are no obstacle to train journeys any more. Under guidance of the European Commission, the unification of railway systems is making progress and should eventually ensure a genuine interoperability of railways across most of Europe. For high speed rail, this objective could be reached even earlier because new lines are designed and built to meet the EC interoperability specifications right from the start.

In practice, the idea is implemented only where the TGV has spilled over the French border into the neighbouring territories of Great Britain and Belgium (now also to the Netherlands). The current extension of the Paris - Brussels route into Germany already poses problems, mainly because, instead of building a new line, sections of existing lines are being upgraded to accommodate high speed trains, albeit at lower speeds. The first HS project to reach the eastern part of the continent, that is, Bratislava (65 km beyond Vienna), will rely mostly on upgraded lines again.

Anyhow, we may safely assume that, in one way or another, some kind of HS network will build up across Europe in the not-too-distant future. It is up to the European Commission to see to it that this is a truly European, purposefully designed and operationally efficient network.

Co-ordination or leadership?

While the European Commission is determined to reorient the energy sector upon renewable energy and is working on measures to curb greenhouse gas emissions—in an effort to avert the most dramatic consequences of climate change, so far it has failed to work out measures aimed at rebalancing the transport modes and *make national governments implement them.*

With this goal in mind, one would expect the EC to monitor closely the ratio of (EU-shared) financial outlays on the three ‘competitive’ modes: Rail, Road, and Air *in each EU member state.* Alas, even in the face of the threat of climate change and its deplorable consequences, the European Commission (or DG TREN) seems reluctant to exert any pressure on the national governments to make them revise the allocation of funds to rail and road in favour of the former—in oblivion of the ambitious goals set by the 2001 White Paper, bent as it was on rebalancing the transport modes in favour of rail.

Speaking of HSR, one wonders why the EC has left the planning and development of the European high speed rail network in the hands of the national governments. Dare we hope that, in absence of a European master plan, the EU member countries will not drag their feet too much?

As in the case of the "energy shake-up", our European habitat could only benefit if the European Commission, on top of ensuring coordination, were to provide leadership in the realm of transport.

Concluding motto

Unfettered competition will destroy the human habitat;
complementarity can help us survive.

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