TEXTE

42/2010

Rail network 2025 / 2030

Expansion concept for an efficient rail freight service in Germany

Summary

Umwelt Bundesamt

| TEXTE | 42/2010

Project No. (FKZ) 363 01 244
Report No. (UBA-FB) 001400

Rail network 2025/2030

Expansion concept for an efficient rail freight service in Germany

Summary

by

Michael Holzhey
KCW GmbH, Berlin

On behalf of the Federal Environment Agency (Germany)

UMWELTBUNDESAMT

This publication is only available online. It can be downloaded from
http://www.uba.de/uba-info-medien-e/4005.html
along with the complete version (in German) and a German-language summary.

The contents of this publication do not necessarily
reflect the official opinions.

Publisher: Federal Environment Agency (Umweltbundesamt)
P.O.B. 14 06
06813 Dessau-Roßlau
Germany
Phone: +49-340-2103-0
Fax: +49-340-2103 2285
Email: info@umweltbundesamt.de
Internet: http://www.umweltbundesamt.de
http://fuer-mensch-und-umwelt.de/

Edited by: Section I 3.1 Environment and Transport
Martin Lambrecht

Translation: Heather Stacey

Dessau-Roßlau, April 2011

Table of Contents

1 Introduction

For the three years before the onset of the global economic crisis in autumn 2008, comparatively climate-friendly rail transport, in particular rail freight, enjoyed a minor renaissance. This was something which observers, in the wake of the motorisation of private transport and the increasing dominance of the truck, had hardly thought possible. After four decades of intermodal market share losses, rail was, thanks to globalisation, bucking the trend and again growing more rapidly than rival modes of transport. But that was before the still continuing economic slump destroyed these successes at a single stroke.

Serious though the impact of the crisis may be, with rail freight transport in 2009 declining to 2005 levels, in the medium term there is much to suggest that, once it has bottomed out, rail freight could attain something approaching the growth rates seen before the collapse of the markets. The global trend towards an international division of labour, which is accompanied by an increase in commodity flows, appears to be far from exhausted.

In addition, the capacity limits of other modes of transport, together with their environmental disadvantages, provide arguments in favour of continuing the revitalisation of rail. Nevertheless, this should not be taken for granted, as illustrated by the German Federal Government's forecasts, according to which the share of road transport to 2025 will see greater growth again (+ 79 per cent), while rail will contribute a below average increase (+ 65 per cent)[1].

Since such a development would present a serious threat to environmental policy objectives, in autumn 2009 the German Environment Agency (Umweltbundesamt – UBA) put forward a strategy based on a greater shift from road to rail.[2] However, rail freight can only grow if forwarding companies believe it is capable of providing a good service. In addition to excellent transport quality, a key requirement is that the necessary volume of train paths is made available. In this respect, there are a number of serious weaknesses in the German rail network in its current form. At numerous sensitive points, for instance in access to and from sea ports and hubs, capacity is currently stretched close to its absolute limits. The current drop-off in demand provides infrastructure policy-makers with an unexpected window of opportunity of around five years to make up for lost time – planning for new construction and expansion projects had fallen significantly behind, even before the crisis.

This study sets out the new construction and expansion work required on the German rail network to meet the UBA strategy target of rail freight being able to absorb 213 billion tonne kilometres (tkm) in 2025. Whether this ambitious target is met by this deadline or a couple of years later is of secondary importance. The decisive factor is the choice of a target which compels all parties involved to undertake forward-looking infrastructure planning, assuming they are convinced of the benefits of rail in principle.

---

1 Cf. ITP/BVU (2007): Prognose der deutschlandweiten Verkehrsverflechtungen 2025; München/Freiburg.

2 Cf. Umweltbundesamt (2009): Strategie für einen nachhaltigen Güterverkehr (UBA-Texte 18/2009); Dessau (for summary and fact sheet in English see <www.umweltbundesamt.de/uba-info-medien/3857.html>)

2 Capacity potential before new construction and expansion

A total of 95.8 billion tkm was transported on the German rail network in the crisis year of 2009.[3] If this figure is to rise to 213 billion tkm by 2025/2030, the network capacity must be able to absorb an increase of 122 per cent. Before costly upgrading of existing lines or even construction of new ones is undertaken, options should be explored for increasing the capacity of the existing network.

At current capacity, the network has proved capable of successfully handling 115.7 billion tkm (2008) or 1,049 million train-path kilometres (2007). Absolute capacity will be reached with an additional 10 to 15 per cent in freight services (around 130 billion tkm), as this is the point at which the existing bottlenecks are likely to be blocked completely. *This means that around 80 billion tkm must be accommodated by means of proactive measures implemented by policy-makers and the network operator.*

There are currently considerable untapped resources in terms of the operational, commercial and institutional aspects of network management. The greatest potential leverage is to be found in the *consistent optimisation of the control, signalling and safety systems* (shorter blocks and a systematic shift to continuous train control (LZB and ETCS) and *greater harmonisation of speeds (*estimated*: 20 billion tkm)*. We consider, however, that there is little potential in much-debated measures such as increased train lengths ('1,000-metre trains') or changing to double-decker containers. The reason for this is the high initial costs of investment in the infrastructure which, at least on the main routes, would have to be fully upgraded and would also have to be coordinated with the EU Member States. However, it might be possible on certain individual corridors after 2030.

In the *medium-term it is the 'small-scale' infrastructure schemes which are more likely to bear fruit*. Among the most significant of these are the electrification of bypass routes, the provision of or rebuilding of sidings/crossovers and the creation of grade-separated entry and exit routes at junctions. These three measures alone could, according to our estimates, yield around 30 billion tkm, provided they were implemented consistently along the high-volume corridors.

We estimate that all these measures taken together could generate a potential 72 billion tkm. However, it should be noted that this is a theoretical gross figure which assumes that each individual measure will be implemented consistently on a nationwide scale. Since this is unrealistic, in terms of both time and financial resources, we quantify the *real capacity-generating potential* of the above-mentioned measures at a *maximum of 35 billion tkm*. This falls short of the 213 billion tkm target by 48 billion tkm, which can only be made available if the rail network is expanded and upgraded specifically for this purpose (see Figure 8 on page 47 of the German complete version).

3 Source: German Federal Statistical Office (Statistisches Bundesamt (destatis)) (2010): Rail transport 2009: Quantities down by 15.9 per cent, Press release, 5 March 2010.

3 Analysis of the capacity bottlenecks in the UBA scenario

In order to ensure a demand-oriented and efficient expansion of rail network capacity, the starting point must be to identify the points on the long-distance and major urban area networks where bottlenecks will arise if the target freight activity of 213 billion tkm is to be achieved by 2025/2030. Since the spatial distribution of this – currently theoretical – increase in volume is not fixed, we assume a positive correlation between transport services and train numbers, which is empirically robust. Starting from this basis, the model capacity analysis comprises four elements:

- The first stage is to establish the *current capacity utilisation* of the rail network by freight transport. The data sources used are the route-based train figures for the boom year of 2007 (and, in part, 2006)4. From the map (Figure 9 on page 51 of the German complete version), it can be seen that the majority of rail freight transport is concentrated on five corridors or routes. The most heavily used is the route along the Rhine, with 300 goods trains per day on the Cologne – Mannheim section and 200 per day between Karlsruhe and Basle. The second main artery is the North-South axis from Hamburg/Bremen to Hanover and Würzburg, with up to 250 trains. Heavy traffic is also recorded on the East-West line Hamm – Hanover – Poland/Czech Republic, the Gemünden – Regensburg – Passau section to South-Eastern Europe and the line between Munich and Kufstein.
- The core of the analysis is the second stage, in which a model is used to calculate the *theoretical capacity* of all routes which are relevant for freight transport. By subtracting the current capacity utilisation from the theoretical maximum it is possible to provide a figure for the *remaining available capacity for rail freight transport* (surplus or shortfall, as indicated by a plus or minus sign).

  The basis for the modelling is an optimistic operating scenario which *deliberately* assumes a very high network capacity. While this scenario is a long way from reality, these idealised assumptions stabilise the findings, because if the analysis reveals a shortfall in track availability, despite all conceivable measures to mitigate the bottlenecks, *the need for expansion must be considered to be irrefutable*. Thus it can be seen as a ‘stress test’ with very robust results which cannot really be rebutted. If in doubt, action should be taken sooner rather than later.

  The capacity calculations are based on the assumption of a minimum headway of five minutes (or four minutes on some sections with high capacity utilisation, provided a four-minute headway is used at least some of the time). Calculated capacity per hour is thus 12 or 15 train paths. The train path requirements for long-distance and local passenger rail transport must then be subtracted from this. Their highly synchronised operating schedules for the current timetable year are precisely planned into the future

4 Cf. DB Netz (2008): Mixed traffic on high speed lines in Germany, presentation by W. Weigand on 18 March 2008, Folie 6/7; ipg (2008): Analyse der Eisenbahninfrastruktur zur Bewältigung des prognostizierten Schienengüterverkehrs im Land Brandenburg; ‘Güterzugkursbuch’ (www.cargonautus.de)

for each route. In addition to this, individual calculations are made for each route to quantify the train-path-consuming effect of the different speeds of passenger and goods trains. For this a distinction is made between two different situations:

- *Situation 1:* The faster goods train gains on the slower local passenger train. As overtaking is not usually possible, the goods train is slowed down ('barrier effect').
- *Situation 2:* The faster long-distance train overtakes the goods train which results in time lost for both the overtaken and overtaking trains.

If 'Total time lost' is divided by 'Minimum headway' the result is the train path loss per hour for rail freight transport during the 20-hour passenger train operating period. If the remaining train path capacity is added to the number of train paths from the three-hour night-time slot (assuming a one-hour shutdown period), the number of train paths available daily for rail freight transport per route is established. Once the current capacity utilisation has been subtracted, the resulting figure denotes the reserve availability.

The rule of thumb which emerges from the capacity calculation is that, with a five-minute headway, between 200 and 300 train paths per day are available for rail freight transport (in both directions). Lower figures only arise if slower local trains occupy a larger number of train paths. There is a very close correlation between the theoretical availability of train paths for rail freight transport and actual recorded figures.

- The third stage is the route-specific *doubling of train numbers*[5] in the target scenario. As expected, the red portions of the map, which denote train path deficit, increases significantly. In addition to the routes which are already overstretched, there are 20 additional bottlenecks, including Rhine-Main – Rhine-Neckar as the most serious (including the Riedbahn, Main-Neckar-Bahn and Worms section), with a deficit of 200 train paths. There are ten sections where demand exceeds available train paths by 50 or more.
- The final stage is to introduce *network operator diversion options* to the model, with the aim of reducing pressure, as far as possible, on the heavily used routes. For this we have identified four large-scale and six small-scale alternative routes which, on the basis of their current capacity, could take around 700 freight train paths off the main axes in sections.

Even if all the possible courses of action below those requiring new construction and expansion have been exhausted and an optimistic operating scenario is assumed, the findings are

5 Depending on the point of reference used, the UBA scenario of 213 billion tkm by 2025/2030 implies an increase in performance of 122 per cent (cf. 2009: 95.8 billion tkm) or 84 per cent (cf. 2008: 115.7 billion tkm). For the sake of simplicity we talk about a doubling of capacity. If the increase in rail freight transport performance (measured against the same period for the previous year) of 10 per cent recorded to May 2010 remains stable over the whole year, the figure for the year should be around 106 to 108 billion tkm. The UBA scenario would thus entail an almost exact doubling of this figure.

unequivocal: on many of the central sections of the network, the existing capacity *would be unable to cope with the target increase in volumes* (see figure 2 on page 19 of the German complete version). Chronic, long-term overloading is to be expected for the route sections in Figure 1.

As far as investment policy is concerned, the elimination of these inevitable bottlenecks should be treated as a matter of the greatest urgency. There can be no further delay, because the capacity calculation is dependent on an ambitious operating scenario. If the network does not achieve the high level of performance assumed by this scenario, the new building and expansion and upgrading measures will have to come into effect even sooner.

Figure 1: Route sections with long-term train path deficits

Route section	Train path deficit
Hamburg – Hanover	20
(Munich –) Rosenheim – Salzburg	50
Bebra – Fulda	100
Cologne – Mainz/Wiesbaden (various sections)	50 to 120
Rhine-Main – Rhine-Neckar	140
Offenburg – Basle (various sections)	80 to 140
TOTAL	440 to 570

4 High-performance corridors: new building and expansion requirements

The results of the bottleneck analysis can be summed up in one sentence: *"The existing strengths of rail freight transport must be strengthened"*. The highest level of transport growth can be expected on the existing main axes, relieving the pressure on other modes of transport and reducing the negative environmental impact of transport volume increases to a minimum. *There are two starting points for new building and expansion policy: to remedy the bottleneck directly or to construct a purpose-built detour line.*

In relation to the critical sections we suggest the establishment of six high-performance corridors (see figure 4 on page 21 of the German complete version). Five of these share a common feature (in addition to the need for upgrading work on the overloaded sections) in the form of one or more *bypasses* to relieve the pressure on the main sections. The exception is Corridor B: Leipzig – Reichenbach – Hof – Regensburg. Since it does not have significant levels of traffic, the route should be upgraded to form a second North-South axis to South-Eastern Europe. In this way, pressure would be reduced on the precarriage and onward carriage routes for the North Sea ports, especially on the existing Hanover – Fulda – Gemünden – Würzburg line. The main capacity expansion required for each corridor can be seen in Figure 2.

In addition to the corridors, another significant element is the upgrading (102 km new track, 183 km electrification) of *selected sections*, which are not themselves corridors or which connect two of the above-mentioned corridors. With Scandinavian traffic in mind, the decision about upgrading work is substantially dependent on whether or not Denmark proceeds with the construction of the Fehmarn Belt Bridge on its own, with Germany responsible only for the land-based connecting facilities. Although the bridge is unnecessary from a transport perspective, if it is constructed there will be a shift to use it. This would mean that the *Hamburg – Lübeck* line would have to be upgraded to triple track at least as far as Bad Oldesloe. Otherwise, efficiency-boosting measures for the western *Elmshorn – Pinneberg* line (third track) would compete with a potential eastern bypass via *Bad Oldesloe – Neumünster*, for which a second track and electrification would be necessary.

The upgrade to dual track on the *Nienburg – Minden* section is an important measure in strengthening the Hamburg – Ruhr Region axis and possibly also creating an additional alternative North-South route via Herford and Altenbeken. The upgrading of the line between *Fulda and Hanau* in the Kinzig Valley, continuing to Babenhausen, is particularly urgent, at least on the Hailer – Gelnhausen section, as there is fierce competition between long-distance passenger rail transport, and freight and local passenger rail transport for scarce train paths. The *Eifel line* via Gerolstein and Bitburg must be upgraded to a bypass, to absorb traffic from the heavily used Rheinschiene and Mosel line going to and from France.

Relieving the *Hamburg bottleneck* is a Herculean task which requires a separate analysis. Previous attempts, such as the dual-track exit from the port railway at Hausbruch and the dual track between Hamburg/Rothenburgsort – Hamburg/Horn, are useful, but fall short of providing an overall solution, as they are unable to remedy the problems of the actual bottleneck – the Harburg intersection with access to the Maschen marshalling yard. A more far-reaching solution is probably necessary, which would take the western port traffic alongside the A7 motorway on a south-eastern loop to Maschen. A more detailed picture should be provided by the two hub studies by the German Federal Government and the Hamburg Federal State Government, which are yet to be published.

Figure 2: Numerical data by corridor for upgrading/new building and electrification in route kilometres

Corridor	Name	Upgrading/new-build requirements (in route km)	Electrification (in route km)
A	North Sea ports – Poland/Czech Republic	52	67
B	North Sea ports – South-Eastern Europe	164	442
C	North Sea ports – Northern Italy	122	13
D	ARA ports/Rhine-Ruhr – Switzerland	166	112
E	ARA ports/Rhine-Ruhr – South-Eastern Europe	95	0
F	ARA ports/Rhine-Ruhr – Poland	23	0
›G‹	Individual sections	102	183
TOTAL	Germany	725	817

Cost estimate

When all the essential work is summed up, analysed according to the most important subsections and/or project categories, the following overall picture emerges. The existing infrastructure on 725 km of the network must be expanded by a second, third and/or fourth track; 817 km must be electrified; and smaller-scale measures, such as the construction of connecting curves and flying junctions, must also be carried out.

Based on the calculations that each route kilometre of new track costs €12 million and the cost of electrification is €2 million per kilometre, we estimate the *cost of the whole package of* *measures to be around €11 billion*. Of this sum, around €5 billion may be classified as being of the utmost urgency. Measured against the anticipated investment costs to the German Federal Government of the "German Unity Transport Project" sections 8.1/8.2 (Nuremberg – Erfurt – Halle/Leipzig) and the Stuttgart 21/Wendlingen – Ulm line project, which amount to a total of around €11 billion (Federal Government share), *these investment requirements are comparatively marginal.*

While these two prestige projects offer almost no benefits for freight transport, the leverage effect of the investment programme outlined in this study, which we calculate at the same price of €11 billion, could deliver a *doubling of the transport capacity of German rail freight.*

5 Room for improvement in existing investment policy

An evaluation of the performance of infrastructure policy reveals considerable room for improvement. Since the German railway reforms,6 over €20 billion has been poured into projects which are exclusively or overwhelmingly of benefit to long-distance passenger rail services, without delivering any appreciable success in the passenger market. By contrast, the needs of rail freight and local passenger rail transport were only considered peripherally, generally as a by-product of investment centred on long-distance passenger transport. The underfunding of the Federal Transport Infrastructure Plan (*Bundesverkehrswegeplan*) has increased steadily since 1985. Meanwhile, progress on the 'New Projects'7 is negligible, due to an immense backlog of work. Construction periods for important projects, such as the Rhine Valley Railway (*Rheintalbahn*), are now approaching 30 to 40 years. The scattergun approach to resource allocation has pushed the focus towards a small number of major projects.

The efficiency increases which would be possible if the elimination of bottlenecks were to be placed at the forefront of investment policy are illustrated by a comparison of the projected leverage effects of three investment programmes or project bundles.

While the sea ports hinterland transport emergency programme (*Seehafen-Hinterland-Verkehr – SHHV*) entails investment of €15 million per billion tkm of performance growth, the seven *Requirement Plan projects consume 90 times* that amount of resources (*€1,333 million*) to produce the same effect. From the opposite perspective, €100 million in the emergency programme generates additional transport performance of 6,557 million tkm, against a total of 75 million tkm for the *Requirement Plan* projects. The DB AG growth programme is somewhere between the two, but in terms of effectiveness is broadly comparable with the SHHV emergency programme (see figure 3).

6 The German railway reforms were initiated in 1994.

7 As outlined in the Federal Transport Infrastructure Plan (BVWP).

Figure 3: Transport leverage effect of investment programmes[8]

Programme/bundle of measures	Cost (in million euro)	Transport performance growth (in million tkm)	Transport performance growth per €100 million (in million tkm)	Costs per 1 billion tkm (in million euro)
Sea ports hinterland transport emergency programme (SHHV)	305	20,000	6,557	15
Growth programme ("Wachstumsprogramm")	2,100	20,000	952	105
Requirement Plan ("Bedarfsplan") (VDE 8.1/8.2, Wendlingen – Ulm, Y-line, Karlsruhe – Basle, Rhine-Main – Rhine-Neckar, Paris – Eastern France – Southern Germany (POS Nord))	> 20,000	15,000	75	1,333

6 Conclusions and recommendations

"An investment programme of around €11 billion would enable the rail network to double rail freight transport performance within 15 to 20 years and build on the success of local passenger rail transport. Increased traffic on the railways would thereby become reality rather than remaining a political vision."

The starting point of this study is the transport and environmental policy target of more than doubling rail freight transport by 2025/2030 (from 95.8 billion tkm in 2009 to 213 billion tkm within the target period). Even if general economic conditions swing back in the near future to the level seen before the crisis in the financial markets, this growth path for rail freight transport within a period of 20 years seems very ambitious. However, it is of no great importance, in terms of this study, whether the target is reached a few years earlier or later. The important thing is the general thrust of the message sent out by a deliberately ambitious target.

An ambitious, but viable rail infrastructure policy will orientate the capacity of the rail network in such a way that rail freight (and local passenger transport as well), on which the hopes of climate and transport policy are pinned, can grow steadily for at least three decades. Currently, this growth path would come to an abrupt end with an estimated capacity maximum of 120 to 130 billion tkm. The reasons for this are the bottlenecks along the network's main axes.

A significant expansion of railway performance parameters requires, in addition to the operational optimisation of network capacity, *a rapid and consistent paradigm shift in rail infrastructure policy. Future decisions should be made strictly on the basis of transport-related*

8 DB Netz (2009), 'Perspektiven des Güterverkehrs auf der Strecke Nürnberg – Berlin', presentation by O. Kraft on 12 May 2009, page 4; author's own calculation and presentation.

criteria, founded on an analysis of the bottlenecks, rather than on political considerations. The most important indicator should be the number of additional train paths which a project could contribute, progressively and in the shortest possible time, to the rail system.

The 90-fold increase in transport leverage effect of the cost-effective sea ports hinterland transport emergency programme (SHHV), compared with the Requirement Plan, indicates the enormous potential which can be mobilised through the efficient deployment of resources. *Our analysis points in the same direction, with a long-term investment programme of around €11 billion placing the network in the position to absorb over 200 billion tkm.*

For the breakdown of a more effective and efficient investment strategy, based on our concept, into concrete measures at project level, the following steps are necessary.

- The very cost-effective sea ports hinterland transport emergency programme (SHHV) must be completed on time by the end of 2011.
- *At the same time all reversible Requirement Plan projects which promise minimal or no benefits for rail freight must be halted straight away.* A project may be considered to be politically reversible provided that the costs already incurred when the project is abandoned can be justified to the public. This applies to the following projects: Stuttgart 21 (Federal Government contribution), plus the construction of the new Wendlingen – Ulm line, the Y-line and the upgrade of the Paris – Eastern France – Southern Germany (*Paris – Ostfrankreich – Süddeutschland (POS Nord)*) line. Economically speaking, it would also make sense to call a halt to the Nuremberg – Erfurt – Halle/Leipzig project (around €2 billion has already been spent, with another €6 billion to come before completion). However, this could be a no-win proposal politically, due to the number of tunnels and viaducts on which work has already begun. On this point, the actions of DB AG in relation to the growth programme are inconsistent as, probably due to political considerations, projects with debatable benefits continue to be supported. *Unless the prestige projects are dropped, the most urgent capacity-building projects will not be financially feasible even by 2030.*
- *The Federal Government must also act speedily to award DB AG the contract to initiate upgrade plans, to be executed in small-scale phases, for the bottlenecks already identified in the network.* This specifically includes the rescheduling of those Requirement Plan projects which make sense from a transport perspective but which seem unnecessarily expensive (e.g. Emmerich – Oberhausen, Munich – Mühldorf – Freilassing). The Federal Government should ensure that DB AG is liable for an appropriate proportion of the planning costs.
- *The growth programme proposed by DB AG (improving the efficiency of detour routes and hub schemes) at a cost of €2 billion, must be planned and implemented without delay. In 2011 the Federal Government should produce a master plan, in consultation with DB AG, detailing which corridors and routes should carry the majority of freight transport in the future.* This demands a willingness to develop a 'simplified operating programme' as a service concept, by means of which the network operator can to a limited extent control demand for train paths. If the financing of the growth programme from the regular Federal Railways Improvements Act

(Bundesschienenwegeausbaugesetz – BSchWAG) resources instead of from a special fund is disputed, it must be checked in advance which of the planned measures are covered by the Requirement Plan.

- *Our proposed project list (see Figure 47 on page 118/119 in the German complete version) should be thoroughly reviewed, in order that additional planning measures may be initiated as soon as possible.*

In conclusion, a strategy should be provided for firmly anchoring the outlined action plan in political and administrative reality. Although certain innovative actions are conceivable on the basis of one-off efforts (including halting individual projects or setting up special programmes), it is essential that the processes are institutionally embedded. This is the only way to curb systematic mismanagement more effectively and to establish better rules of procedure in the long term. The necessary changes concern the relationships between the Federal Government and the Länder, the Federal Government and DB AG and the Federal Government and the rail sector. Our recommendations in detail are as follows.

Transport infrastructure planning/project selection

The current procedure is inefficient and opaque and the results tend to be arbitrary. There is empirical evidence to show that, before the decision is taken to include a project in the German Federal Transport Infrastructure Plan, the costs are systematically understated, while the benefits are exaggerated. None of the high-speed lines which have been built currently carry anything approaching the numbers of freight or passenger trains which were predicted. When it comes to hubs and junctions, the problem is, essentially, that expensive, individual infrastructure measures are factored out as far as possible, so as not to jeopardise the advantageousness of a route in terms of the figures (see, for example, Cologne – Rhine-Main). All calculations are to a large extent opaque and, in addition, the success of the investment is not evaluated in transport terms. Projects are not selected on the basis of an objective analysis of bottlenecks and weak points, but instead are subject to substantial political influences. Thus projects are selected with a cost-benefit ratio of less than 1.5 and, if calculated objectively, this probably falls below 1 over the course of time.

Network concepts, with planned cases and reference cases over a period of 15 to 30 years, are so complex that they allow a considerable range of results due to the variety of assumptions. For this reason every ex-post monitoring of the cost-benefit values of a measure after it has been operational for some years reveals a vast discrepancy between planned values and actual values (the rare occasion when they correspond is purely coincidental).

Recommendation: We suggest, as a substitute, or at least for presorting, that *threshold values should be introduced for project evaluations*, based on figures from practice and acceptable to the majority of professionals in the field. For example, new lines which could offer fewer than 160 train paths for freight transport could be ruled out at the outset. Likewise, projects with a cost-benefit ratio of less than 1.5 or even 2.0 would also not be pursued. This would not necessarily lead to the cancellation of large numbers of the projects currently listed, but they would in many cases have to be ‘slimmed down’. This process must be made transparent.

Allocation of budget resources to the funding of the most urgent projects

There are currently numerous deficiencies in the allocation of resources. Instead of the targeted funding of a few urgent projects (ideally carried out in order of priority in accordance with the results of an objectivised Federal Transport Infrastructure Plan evaluation), large numbers of projects are awarded small amounts of money. Examples of this are the '66 List'[9] agreed in 2004 or the selection of projects within the framework of Economic Stimulus Packages I and II. The latter make provision for allocating just €580 million for around 20 Requirement Plan projects from a total of €1.42 billion. On average, each project will receive €29 million, which is a drop in the ocean in terms of the typical levels of rail construction costs. In the case of construction costs of €5.2 billion, as in Nuremberg – Erfurt, there cannot really be serious talk of an acceleration, particularly since, in the medium-term, it is not certain and is not really measurable whether the extra funds may not be cancelled out by reduced budgeted amounts in subsequent financial years.

Apart from the ineffectiveness of the scattergun approach to the allocation of resources, criticism may be made of the project selection system itself. In contrast to the SHHV emergency programme, there tends to be a preference for large-scale projects which primarily benefit long-distance passenger rail transport. The lopsided approach to project selection continues here.

Recommendation: The possibility should be considered of dividing the budgetary funds from the Federal Government into a number of smaller pots. Instead of the existing division into two funds in accordance with Article 8 of the Federal Railways Improvements Act (BSchWAG), it would be possible, following the model of the SHHV emergency programme to *set up another fund for projects which prioritise freight*. As an institutional policy commitment, this should ensure that the needs of the sector with the best prospects for growth, but the smallest lobby, would no longer be overlooked.

Network operation

The fact that expensive investment projects with little or no benefit for freight transport are consistently favoured is in no small way due to an incentive failure in the management of the network. The train path fees for long-distance passenger rail transport, especially on the high-speed lines, do not come close to covering the costs they incur. This subsidisation sends out a distorted price signal whereby the (lifecycle) costs of high-speed transport are largely ignored when investment decisions are taken.

Recommendation: The role of the Federal Network Agency (Bundesnetzagentur), as the regulating body, should be reinforced (a ruling chamber for rail, a larger staff and greater intervention rights and rights to information). The pricing structure for train paths could then be scrutinised and modified promptly.

9 An internal paper by the German Transport Ministry prioritising the funding of rail projects

Financing investments

With regard to network operations, it is not only pricing which does not function adequately. Investment financing conditions and subsidy entitlements also systematically result in poor decisions. Thus it is inexplicable why, since the rail reforms, the Federal Government has successively granted DB AG the right to reduce its own contribution to investment in Requirement Plan projects to zero. Without committing any of its own financial resources, DB AG as the project manager has no real incentive to plan and execute the work cost-effectively. It is de facto exempt from any risk.

Similarly, it does not make sense to restrict subsidy entitlement to Federal railways. As with all other modes of transport, only the functional national significance of a piece of infrastructure should be the decisive factor in whether or not it is eligible for funding (see the rail infrastructure of the Osthannoversche Eisenbahnen AG (OHE) and Eisenbahnen und Verkehrsbetriebe Elbe-Weser (EVB) in the immediate hinterland of the North German sea ports). Who the railway line is constructed or operated by is of secondary importance.

Thirdly, it is not clear why the Federal Government does not undertake investment performance reviews. It is essential to compare the train numbers forecast with the actual numbers recorded in the first ten years of operating and to impose sanctions where there are major discrepancies. It is inexplicable that DB AG can demand order commitments for local transport from the Länder, without having to be liable for its concept for long-distance rail transport.

Recommendation: DB AG's own contribution must not be less than 10 per cent. The subsidies should be made available to all rail infrastructure companies, as provided for in the Federal Government's coalition agreement. Before it receives investment, DB Netz (the DB AG subsidiary company which manages the rail network) must commit itself to guaranteeing the assumed operating programme of the rail infrastructure companies throughout the expected useful life of the railway lines of 20 to 30 years. So long as DB Netz belongs to the integrated DB group ('DB Holding'), then it is the group which takes on liability for the order commitments of its subsidiaries. The activities of competitors will be taken into account.