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**COMMISSION STAFF WORKING PAPER**

**Extended impact assessment of the**

**proposal amending the amended proposal for a decision amending Decision  
No 1692/96/EC on the trans-European transport network**

**{COM(2003)564 final}**

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## A. INTRODUCTION

Creating a dynamic EU economy and fostering deeper integration of the national economies rely on a properly functioning transport system. However, transport activities have certain negative consequences, which could turn economic growth into unsustainable development if left unmanaged. Congestion and environmental nuisances in urban areas are now a common experience in most European cities, while congestion on the major arteries of the trans-European transport network is a more recent but growing phenomenon. The number of accidents, in particular on roads, despite positive developments recently, is still too high and costs huge amounts to the European economy. While emissions of pollutants caused by transport were reduced significantly in the last decade due to technological development, greenhouse gas emissions from transport continue to rise and can make it more difficult for the EU to reach the Kyoto targets.<sup>1</sup>

Increasing transport volumes, a lack of interoperability between the transport modes and systems, poor interconnections between national networks plus a fall in real investment may be the reasons for the problems identified, which have particularly adverse effects for transit regions. In addition, the peripheral countries of the European Union suffer not only from long distances and isolation due to insufficient connections to the central markets of the EU, but also from congested networks in the centre. Hence, they are directly affected by the deterioration of traffic conditions in the central countries.

Natural barriers hamper the smooth functioning of the transport system, whether through higher congestion, environmental nuisances or the considerable investment costs needed to overcome them. Mountain crossings, such as the Alps or the Pyrenees, are a typical example of a natural barrier. Ice, which covers the north of the Baltic Sea during the winter, is another example requiring specially adapted equipment (ice-breakers). Overcoming such barriers typically requires considerable investment, which in turn needs the commitment of and coordination by national administrations.

Congestion and insufficient connections from peripheral regions to the central markets affect the competitiveness of companies by increasing their production costs. Congestion also has a negative impact on the environment and human health through extra fuel consumption and pollution.

Enlargement adds a new dimension to all these phenomena, and transport infrastructure planning, as an integral part of the European transport policy, has to help tackle these challenges.

As the analysis in this document shows, the current patterns of investment in the trans-European transport networks would lead to increasing environmental nuisance and accidents and would not be enough to meet future demand, leading to increasing congestion and jeopardising the success of enlargement (Part C).

In October 2001 the Commission proposed an amendment to the Decision of the European Parliament and of the Council of 23 July 1996 on Community guidelines for

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<sup>1</sup> TERM 2002.

the development of the trans-European transport network. As early as in the 2001 White Paper<sup>2</sup> on *European transport policy for 2010*, the Commission was already pointing to the need to add to this initial proposal in order to keep the focus on priority projects in the context of the enlarged Union. To this end, the Commission set up a High-Level Group, chaired by Mr Karel Van Miert and composed of experts nominated by the Transport Ministers of the current and future Member States and from the European Investment Bank. The report of this group was submitted to the Commission on 30 June 2003 and made public at the same time.<sup>3</sup>

The Commission proposal<sup>4</sup>, covered by this assessment, is based on the recommendations made by the High-Level Group and the reactions received and adds to the amended proposal submitted in September 2002. These additions to the amended proposal aim to make it easier to reach agreement within the Council and the European Parliament thus to attain the objective set by the European Council of adopting these new guidelines quickly (Parts B and D).

The sustainability impacts of both the proposed revision ("European + scenario") and the alternative of sticking to the initial Commission proposal ("European scenario") are quantified in this document. The socio-economic profitability of both scenarios is highly positive, in particular for the European + scenario, which is proposed as the basis for revision of the guidelines (Part E).

The infrastructure projects of the European + scenario will contribute, for example, the rebalancing of transport modes; the modal split is forecast to stabilise in comparison to the situation in 2000. The European + scenario will also contribute to a potential reduction in travel times on interregional routes worth almost €8 billion and to a 14% decrease in congestion delays while the European scenario would lead to potential travel time savings of only €4.5 billion and a lower reduction in congestion. In the European + scenario, trade and freight traffic in acceding countries will benefit in particular. In both current Member States and the acceding countries, the growth of greenhouse gases from interregional transport will be slowed down by 2% and air pollution will be reduced.

The investment package will stimulate Europe's competitiveness and its economy. It will contribute to the development international trade, notably in the acceding countries. In the short term, the construction works will spur employment, in particular in the regions concerned. In the longer term, welfare improvements stemming from greater opportunities to meet people and for business thanks to better transport connections and accessibility are expected to account for 0.23% of GDP, meaning about one million permanent jobs.

This assessment must be seen as a forecasting exercise to illustrate the impact of the general options chosen in the proposal amending Decision No 1692/96/EC. In the context of the growth initiative, the Commission will follow up this assessment with a more detailed analysis of the macro-economic impact of the programme proposed to shed further light on the decisions concerning financing proper.

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<sup>2</sup> COM(2001) 370, see [http://europa.eu.int/comm/dgs/energy\\_transport/index\\_en.html](http://europa.eu.int/comm/dgs/energy_transport/index_en.html)

<sup>3</sup> See [http://europa.eu.int/comm/ten/transport/revision/hlg\\_en.htm](http://europa.eu.int/comm/ten/transport/revision/hlg_en.htm).

<sup>4</sup> COM (2003)564

This assessment is not intended to evaluate individual projects. This would demand enormous efforts to collect local data which would duplicate both the preliminary studies submitted to the High-Level Group by the Member States and the detailed individual evaluations generally conducted at a later stage by the promoters of the projects, either during the environmental impact assessment procedure or in the cost-benefit analyses before decisions are taken on funding. The inclusion of a project in the list of priority projects in no way prejudices the variant chosen at the end of the environmental impact assessment procedures, in line with the Community rules on the subject, nor its eligibility for Community funding, which depends on confirmation of its socio-economic viability. In this respect the new Article 19 proposed is a means of confirming the commitment on the part of the States to complete these studies rapidly.

**B. MAIN OBJECTIVE FOR THE REVISION OF THE GUIDELINES;  
ISSUES AND PROBLEMS THE POLICY PROPOSAL TACKLES**

The general goal of the trans-European transport network (TEN-T) policy is to improve the competitiveness of the EU economy as a whole, to support the completion of the internal market, and to contribute to a balanced territorial development of the Union. The proposal to amend the TEN-T guidelines aims to reflect two additional new policy goals which are given greater prominence:

- to contribute to a sustainable transport system at European level by giving higher priority for investments in environmentally friendly modes in view of rebalancing modal shares.
- to make a success of enlargement by integrating transport networks of acceding countries with those of the current Member states and by improving the quality of the networks in the acceding countries in order to reduce travel times, accidents and environmental damage from transport.

It is also important to adapt planning methods to ensure greater coherence at European level of investment decisions, to ensure interoperability of the national networks and operating systems, to involve more private funding and seek the maximum European added value.

**1. Sustainable transport: giving greater opportunity to intermodality and modal rebalancing**

The current plans for the trans-European network are the result, essentially, of a juxtaposition of national plans. After enlargement, this lack of a common global vision on a continental scale will lead inevitably to greater difficulties in ensuring coherence between the different initiatives to plan, implement and operate the network, in particular the networks for intermodality (rail, inland waterways), at European, national or even regional level.

In the new context of sustainable development, the Gothenburg European Council of June 2001 requested that, in future, stress should be laid on the development of rail, maritime and inland waterway transport. The White Paper on *European transport policy for 2010* also placed the rebalancing of the different modes of transport at the heart of a sustainable development strategy.

As presented in Part C below, we are indeed faced with unbalanced growth of transport volumes, in particular long-distance traffic by road and air. The policy of sustainable development sets out to address rising transport volumes and rebalance modes. Rebalancing of transport modes includes in particular more vigorous promotion of intermodality. This in turn calls for regulated competition within the whole transport sector, so as to establish a framework more conducive to the financing of infrastructure while at the same time targeting investments on major routes within the trans-European network with significant EU added value in an attempt to encourage modal transfer at least on long-distance routes with heavy traffic, where the net environmental, economic and social benefits of rail and waterborne transport are higher.

It is necessary to place each project on the trans-European network in a transport chain and to find the optimum combination of existing transport modes, so as to improve the overall performance of the system while reducing the consequences for the environment.

## **2. Integration of the networks of the new Member States**

Enlargement emphasises the need for new infrastructure on the corridors serving these countries in order to connect them effectively to the trans-European transport networks of the 15 current Member States. There is also a need to improve connections between the acceding countries themselves. A new infrastructure network must therefore be developed East-West, and also North-South.

Integration of national economies through improved transport networks has real potential for improving economic efficiency. Improving transport infrastructure networks therefore plays a particularly important role in the acceding countries, as the process is similar to the removal of trade barriers on the single market. The decrease in transport costs and the increase in opportunities will reinforce competition between firms and could contribute to greater efficiency in the supply chain, in particular via economies of scale.

Consequently, investing in transport infrastructure in new Member States - countries still inadequately linked to EU15 and with domestic infrastructure not yet sufficiently developed to serve the needs of a modern and rapidly growing market economy - might be more rewarding than aiming at marginal improvements in EU15. However, limits in the absorption capacity of these countries and in financing investment from domestic sources without very significantly crowding out other investment may put a limit on rapid improvement of this infrastructure.

As regards the Community decision on the TEN-T guidelines, the Accession Treaties incorporate the necessary provisions, in the form of new maps helping to locate potential projects of common interest. They do not, however, specify priority projects. The pan-European Conferences of the Ministers of Transport in Crete in 1994 and in Helsinki in 1997 identified a series of pan-European corridors crossing the Central and Eastern European countries and connecting with the network of the European Union. These corridors, whose purpose is to take up the major part of international traffic, made it possible to coordinate the action of the various bodies, including the Community, which already actively supports Central and Eastern European countries through the PHARE and ISPA<sup>5</sup> programmes. These corridors, although helpful to target priorities, are neither sufficient nor homogeneous with the concept of priority projects in the current Community decision.

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<sup>5</sup> Instrument for structural policies for pre-accession.



### **3. Greater coherence at European level of investment decisions**

Given the scarcity of funds, the need for selectivity and greater coherence between European and national planning becomes even more acute, not only for the purposes of better identifying priorities but also to achieve greater profitability of investments, taking into account the strong economies of scale arising from interconnected infrastructure.

Clearer network hierarchisation would help to clarify the responsibilities of the various public authorities and to provide them with a long-term vision of network development at European level. Grouping priority projects along major European routes will contribute to this. Greater coordination between Member States should be organised along transnational links in order to synchronise investments and ensure coherent accompanying measures like interoperability. Possibilities for single management procedures in areas like evaluation and public consultation, instead of separate national procedures, should also be open for cross-border projects.

Rail interoperability in particular require a strong coordination between Member States. Directive 96/48/EC on the interoperability of the trans-European high-speed rail system has established the framework for drawing up technical specifications for interoperability (TSIs)<sup>6</sup>

Directive 2001/16/EC on the interoperability of the conventional rail system introduces similar procedures for the preparation and adoption of TSI and common rules for assessing conformity to these specifications. The directive requires a first group of priority TSI to be adopted within three years, i.e. in 2004, in the following areas: control/command and signalling; telematics applications for freight services; traffic operation and management (including staff qualifications for cross-border services); freight wagons; and noise problems that derive from rolling stock and infrastructure.

A fast and coordinated implementation of these standards is required to maximise the benefits of the TEN-T policy in particular in the field of signalling and telecommunication systems. It is why the 2001 Commission's proposal to amend the TEN-T guidelines included rail interoperability as a cross-cutting priority. The "European coordinators" introduced in the current proposal will also play an important role to help a more coordinated implementation between Member States.

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<sup>6</sup> The Commission has adopted in May 2002 the Technical Specifications for Interoperability (TSI) for 6 subsystems. The TSI comprise the following subsystems: maintenance subsystem, control and command subsystem, infrastructure subsystem, energy subsystem, rolling stock subsystem as well as operation subsystem.

#### 4. Involving private funding

As indicated in the Communication on *Innovative financing solutions*,<sup>7</sup> to overcome budgetary constraints there will also be a need to improve coordination in the planning and financing of infrastructure, including the use of innovative financing methods. The latter might include, for example:

- public-private partnerships for certain projects, using the new legal form of "European company";
- allocation, in exceptional cases, of funds generated by charging for road infrastructure use for new investments in other modes of transport. This possibility was already suggested in the White Paper on *European transport policy for 2010* and more recently in the proposal for an amendment to the directive<sup>8</sup> on charging of heavy goods vehicles for the use of certain infrastructure;
- concession of public guarantees, including Community ones, to insure against risks such as political risks.

Although infrastructure control is the responsibility of public authorities, contributions from the private sector in the form of capital and technical and management capacity are necessary and important since they make for better control of risks and help to save on resources through better cost management. It also encourages governments to clarify their long-term policy in terms of pricing, regulation and other aspects which influence the profitability of investments. Project financing techniques, including PPPs, could change the way in which infrastructure projects are carried out, preferably with better evaluation and control of every kind of risk. Recourse to private finance would seem to be a prerequisite, given the magnitude of the financial effort to be made.

The figure 1.1 below shows some typical TEN-T financing models:

- Private sector is associated by means of PPPs thanks to revenues generated from infrastructure charging, possibly other revenues and with substantial grant help. For instance, in an ideal case, a project needs only 40% aid and the rest can be financed by the market, in this case 10% of equity and subordinated loans and 40% of senior loans, while about 50% can be backed by guarantees.
- A purely public project finance (PPF) is a model in which a public enterprise carries out a project only with the help of loans and bonds 100% backed by sovereign guarantees. A flow of revenues is ensured by pricing. Both guarantees and debt can be rolled over. This model requires self-restraint on

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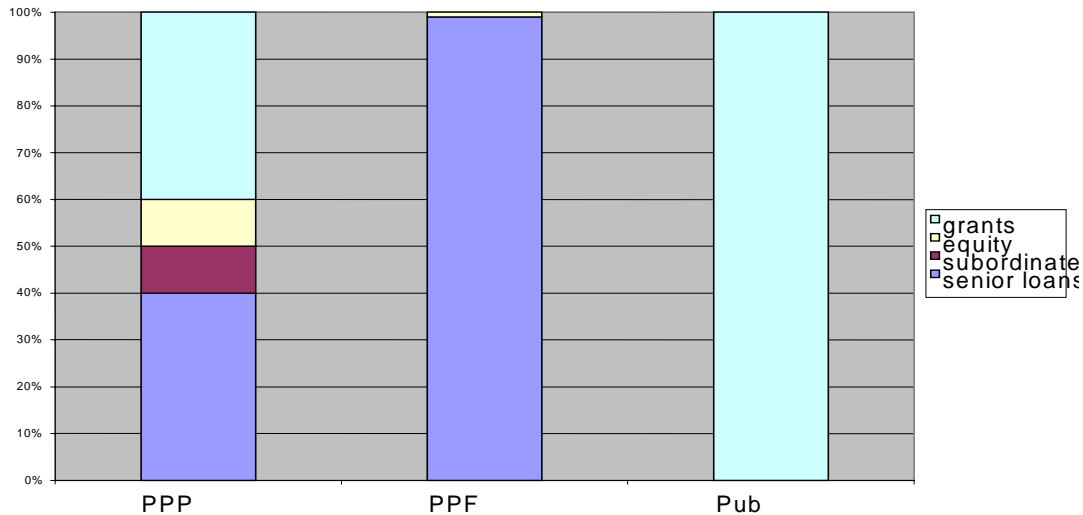
<sup>7</sup> Communication from the Commission - Developing the Trans-European Networks: Innovative funding solutions - Interoperability of electronic toll collection systems, COM(2003)132. See [http://europa.eu.int/comm/TEN/transport/revision/doc/com\\_2003\\_0132\\_en.pdf](http://europa.eu.int/comm/TEN/transport/revision/doc/com_2003_0132_en.pdf)

<sup>8</sup> The proposal to amend Directive 1999/62/CE can be downloaded at [http://europa.eu.int/comm/dgs/energy\\_transport/index\\_en.html](http://europa.eu.int/comm/dgs/energy_transport/index_en.html)

the part of the public decision-makers, but it certainly delivers. A typical example is the Oresund fixed link.

- A third case corresponds to pure grant finance (Pub) which is the way in which most projects are carried out; no guarantees are needed.

**Figure 1.1** *Patterns of TEN-T financing*



## 5. Infrastructure planning and subsidiarity issues

In the case of transport infrastructure it is the State and the regional or local authorities which bear the brunt of the financing and manage the complex administrative procedures prior to construction authorisations, particularly public consultations. Even in the case of projects co-financed by the Cohesion Fund, the States concerned remain liable for the risks of non-compliance with the project objectives.

The EC Treaty confers on the Community the task of identifying projects of common interest and, where appropriate, contributing financially to implementing them. However, these powers are limited for a number of reasons:

- Guidelines and projects of common interest which relate to the territory of a Member State nevertheless require the approval of the Member State concerned.<sup>9</sup>
- Since 1993 the average contribution by the Community has been less than 3% of the cost of the priority projects for countries and regions not eligible for the structural financial instruments.<sup>10</sup>

<sup>9</sup> s provided for by Article 156 of the EC Treaty, despite the qualified majority rule laid down in the same Treaty for the trans-European networks.

<sup>10</sup> he countries or regions not eligible for the structural financial instruments qualify only for funding from the trans-European network budget, 40% of which is allocated to the priority projects.

- Construction authorisations, which depend on compliance with a host of national rules and on expropriation, remain in the hands of the Member States, although Community directives on environmental impact assessments introduced minimal common requirements.

Even if Community funding is increasing, it is clear that the action taken by the Community complements the action by the States and by the regional or local authorities on infrastructure of interest at national, regional or municipal level but cannot replace it in practice. Two conclusions must be drawn:

- The Community added value should be limited to highly specific action designed, for example, to improve the transnational traffic flow and, in the process, dynamise the internal market, in the form of aid for infrastructure-building or initiatives to improve coordination between Member States on establishing transnational links.
- The Member States remain partners in a privileged position. Often the decision on the guidelines cannot be turned into reality unless it is based on a plan put together from the proposals made by the Member States themselves.

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For this reason, the Commission set up a High-Level Group, composed of national experts and chaired by Mr Karel Van Miert, whose work, combined with the framework research programmes and studies financed by the Commission, laid the foundation for this impact assessment.

The analysis presented in this document aims at estimating the broad socio-economic impacts of various TEN-T policy packages in comparison to a business-as-usual scenario (trend scenario, see part C). The assessment is performed at the European level and it is important to note that the sustainability of the individual TEN-T projects is not assured by this assessment. According to EU legislation (ch. E.4.1), each individual project will have to undergo a separate environmental assessment before financing decision is taken.

## **C. TREND SCENARIO – CONTINUATION OF CURRENT DEMAND AND INVESTMENT TRENDS**

### **1. Transport demand up to 2020**

#### *1.1 Drivers of transport demand*

Economic growth and the ensuing increase in household incomes have been the main drivers underlying the continuous increase in transport demand. More recently, globalisation of the world economy and greater reliance on just-in-time production processes, the completion of the single market and its enlargement towards the East have been contributing to increasing trade and traffic growth. Enlargement of the EU by ten new countries will increase the EU population by 75 million inhabitants and the single market to 450 million consumers. Of these, three hundred million will use the Euro as a common currency and new countries are set to join.

As set out in the White Paper on *European transport policy for 2010*,<sup>11</sup> transport demand in Europe has grown faster than the economy in recent decades: while economic growth, measured in GDP, has averaged 2.4% per year, growth in transport has exceeded 2.7%. The aim of the Union, as established at the Lisbon Council in 2000, is to achieve sustained growth of the economy of 3% per year, even if at the moment growth levels closer to 2% seem more realistic. In the analysis presented in this report, it is assumed, however, that European GDP will grow by 2.4% per year or 60% in total between now and 2020.<sup>12</sup> Without investment in capacity or demand management measures, congestion will rise considerably (see Chapter C.3.1 below).

The acceding countries register levels of economic growth 60% higher than those of EU15<sup>13</sup> and will therefore face higher overall growth rates in transport. The current infrastructure in these countries will not meet this demand and, without considerable investment in capacity and better transport quality, economic growth will be constrained.

## 1.2 *Freight transport forecast to grow rapidly*

Recent studies<sup>14</sup> forecast that rapid growth in trade flows and freight transport will continue. One of the most recent estimates, the TEN-STAC study,<sup>15</sup> shows that the highest growth in trade is forecast to take place between the current and new EU Member States (almost 2% pa) and between the enlarged EU and other European countries such as Turkey or Russia (up to 2.6% pa).

As presented in Table 1.1 below, the volume of inter-regional land freight traffic is expected to grow by 70% by 2020 in the current Member States while the estimate is as high as 95% for the new Member States. Growth in the volume transported may appear moderate but the increases in distances travelled, in particular for international transport, will be appreciable. Similar forecasts distinguishing international traffic and domestic traffic shows that international transport (+95%) grows significantly faster than domestic traffic (+62%). Overall, growth in freight transport demand still exceeds the growth in GDP, although slightly less than in the past decades.

Although the forecasts below assumed a reduction of relative rail transport costs as a result of opening up freight to competition in 2003, the growth in trade is likely to strengthen the dominant role of road haulage. In the current Member States, however, the increase in rail freight is estimated to be considerably higher than for road,

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<sup>11</sup> Op.cit.

<sup>12</sup> DG ECFIN analysis on the economic impact of ageing which shows that, on the basis of unchanged policies, EU potential growth rates could even fall to around 1.3% in the longer run (European Commission, DG Economic and Financial Affairs, *The EU Economy : 2002 Review*, p. 206).

<sup>13</sup> In low-income countries, the objectives of growth at national level and convergence at regional level are sometimes conflicting. Concerning the development of a transport demand forecast and its implicit actions for the identification of priority corridors, special attention should therefore be paid to the regional distribution of growth. See M. Hallet (1997, DG ECFIN Economic Paper 120).

<sup>14</sup> See forecasts produced within e.g. SCENES, TRENDS, PRIMES projects.

<sup>15</sup> Scenarios, Traffic Forecast and Analysis of Corridors of the trans-European transport network”, Phase I, see <http://www.nea.nl/TEN-T-stac/> for further details.

reflecting the faster impact of opening of the networks to competition<sup>16</sup>. For the acceding countries, however, transport by road will increase at a very rapid pace, about 4.5% pa and 137% by 2020 (see Table 1.1).

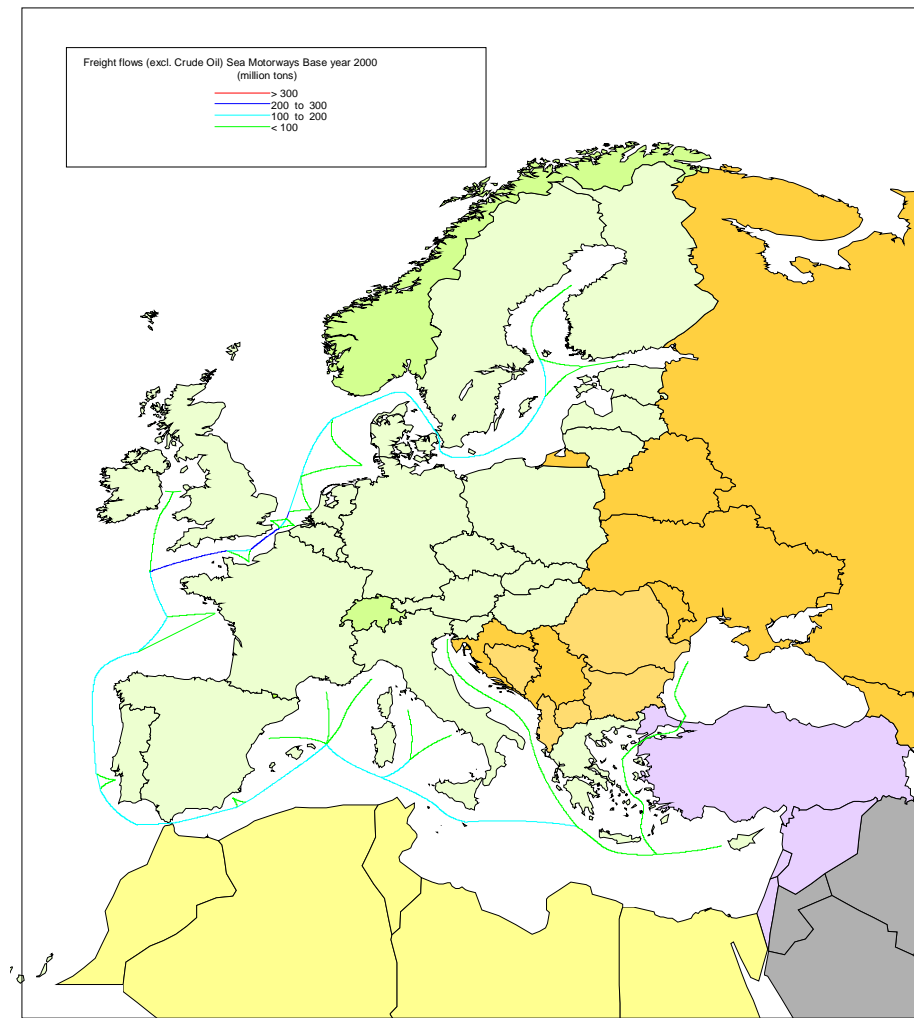
**Table 1.1** Freight traffic forecast 2000-2020 in trend scenario (Source: TEN-STAC study)

<i>in billion ton km</i>	<i>Current Member States</i>			<i>New Member States</i>		
	<b>2000</b>	<b>2020</b>	<b>%</b>	<b>2000</b>	<b>2020</b>	<b>%</b>
Road	987	1647	67%	158	374	137%
Rail	210	392	87%	166	254	53%
Inland waterways	145	242	67%	8	18	125%
<i>Total</i>	<i>1342</i>	<i>2281</i>	<i>70%</i>	<i>332</i>	<i>646</i>	<i>95%</i>

Maritime transport accounts for a high share in the total trade of European countries. Figure 1.2 below highlights the traffic volumes on the main European maritime corridors.

<sup>16</sup> In the light of past trends, the estimated strong growth in rail freight in the current Member states may seem unlikely and a more conservative figure might have been more plausible. However, limiting the base line scenario to extrapolated trends would assess policy measures decided recently and therefore would overestimate the estimated impacts of the TEN-T policy scenarios, presented in part E..

**Figure 1.2** Freight volumes by sea (Source: TEN-STAC)

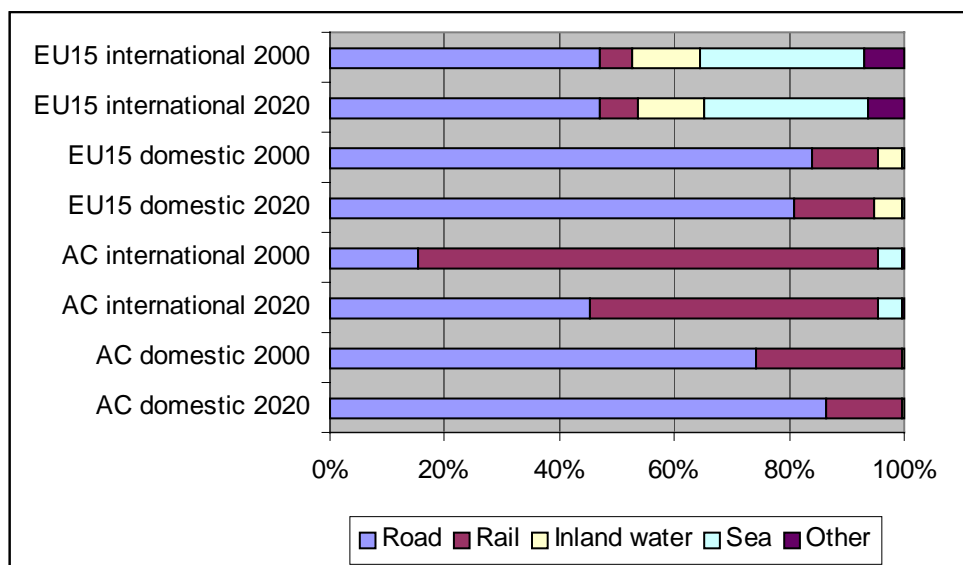


### 1.3 Modal share of road freight will increase in acceding countries

The domestic transport market is dominated by road in Europe (see Figure 1.3). Today, road's share is 84% in EU15 while in the acceding countries this share is slightly lower, at 74%. While road's share in the current Member States may stabilise by 2020 due to measures to open to competition rail networks, in the new Member States a considerable increase, taking it up to 86%, is anticipated.

The role of rail freight is still important in the acceding countries, with a share of 26% in domestic and 80% in international freight transport between acceding countries. However, this share is expected to fall dramatically, to 13% and 50% respectively, due to economic growth, enlargement of the single market and modernisation of the production system linked with major market changes in favour of manufactured goods, which are mostly carried by road transport.

**Figure 1.3** *Modal shares in tonnes transported in EU15 and acceding countries (AC) in 2000 and 2020 (Source: TEN-STAC study)*



One of the main concerns for the coming years in Europe is increasing freight transport and especially the rapidly increasing share of road in acceding countries, both for exchanges between EU15 and the acceding countries and between the acceding countries themselves. As described below (Chapter C.3), this will lead to increasing congestion and environmental pressure in general and in sensitive areas in particular. Traffic safety is also an important issue to keep in mind with increasing road freight transport volumes. Given this outlook for 2020, the challenge for modal shift from road to alternative modes takes on new dimensions.

#### 1.4 Passenger transport

For passenger transport, decoupling of demand from economic growth has been observed for a decade and this trend is likely to continue, except in the new Member States and a number of cohesion countries. The development of passenger transport in Europe is characterised by the following factors:

- Slow population growth in both current and new Member States will slow down overall traffic growth.
- In some European countries car ownership may have arrived at a degree of saturation that would suggest moderate growth in the level of car purchases in the future. However, the situation is different in the acceding countries where the growth in car ownership is expected to exceed 5% per year.
- Increasing congestion in cities cuts down short-distance journeys by car in particular, which account for up to 90% of all journeys. However, long-distance trips at high speed both by rail and by air are expected to continue to grow rapidly. Tourism trips by car are also expected to increase.



The traffic forecast in Table 1.2<sup>17</sup> suggests that for current Member States average growth will be 28% for inter-regional passenger transport between 2000 and 2020, against 60% growth in GDP. While demand for road and rail increase almost at the same pace in the EU15 (25% and 20% respectively), the growth in air transport is almost four times higher, 88%. However, as long-distance journeys are estimated to increase at twice the rate of short journeys, the daily mobility of European citizens is expected to continue to increase from 17 km per day in 1970 and 35 km in 1998 to 44 km per day in 2020. For the acceding countries, inter-regional passenger transport is forecast to grow rapidly, by 74% in total. The most rapidly growing demand segments are air (133%) and road (79%).

**Table 1.2** *Passenger traffic forecast 2000-2020 in trend scenario (Source: TEN-STAC study)<sup>18</sup>*

<i>in billion person km</i>	<i>Current Member States</i>			<i>New Member States</i>		
	<b>2000</b>	<b>2020</b>	<b>%</b>	<b>2000</b>	<b>2020</b>	<b>%</b>
Car & coach	4142	5170	25%	443	794	79%
Rail	356	426	20%	61	74	21%
Air	281	528	88%	18	42	133%
Total	4779	6124	28%	522	910	74%

### 1.5 *Impact of enlargement and rapid economic integration*

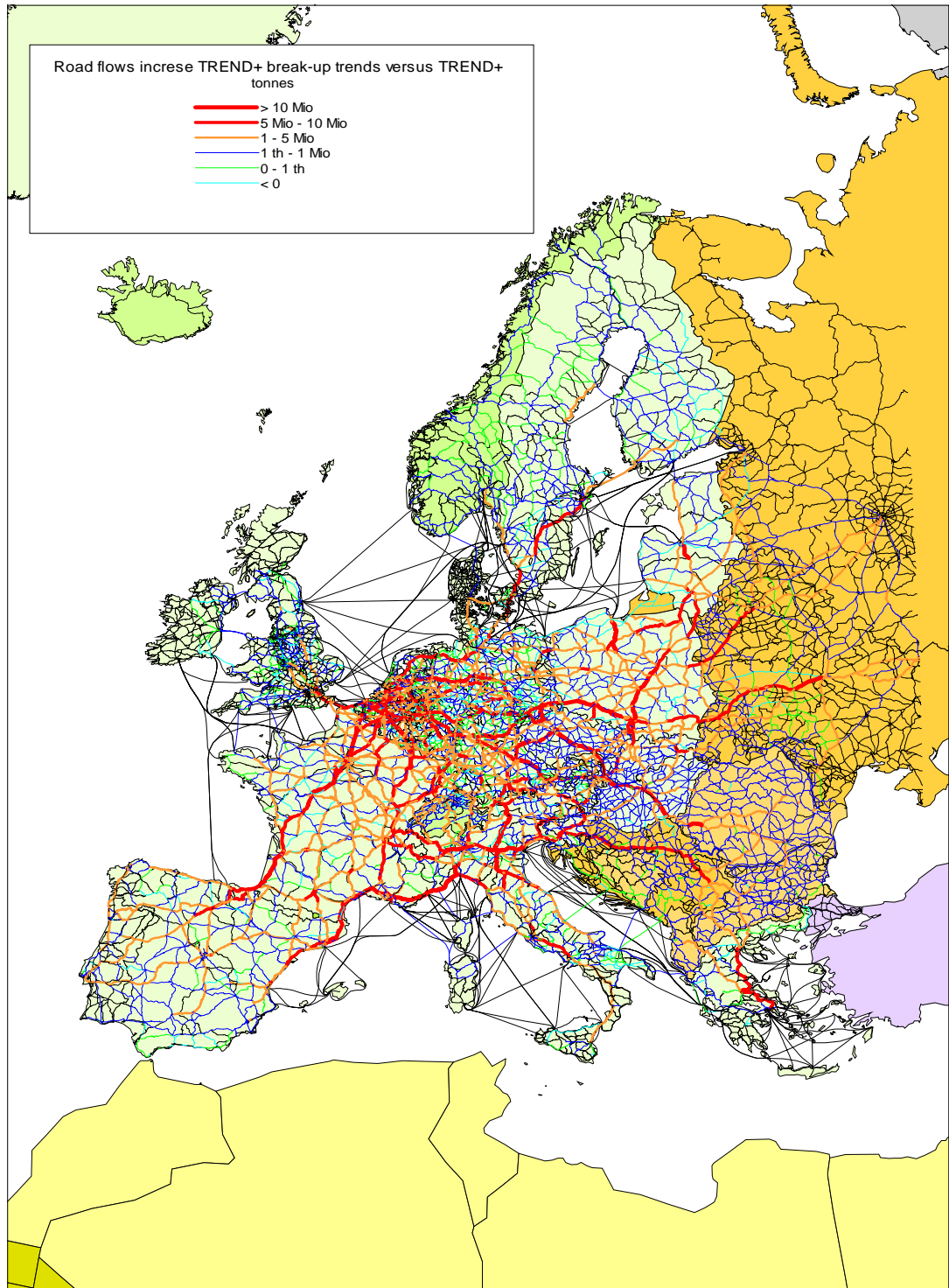
The trend forecast, presented above, has been made using conservative assumptions about economic growth, which are in line with past trends. However, enlargement of the Union and extension of the single market are likely to give an additional boost to trade and stimulate economic activity and traffic beyond past trends. This was already the case when Spain and Portugal joined the Union; freight traffic crossing the Pyrenees has been growing at a rate of 10% per year for the past decade, four times more than the average growth.

Figure 1.3 below shows the increase in traffic flows that would occur if the GDP of the acceding countries grew 2 percentage points more rapidly than in the trend scenario. For EU15, this is forecast to lead to one percentage point higher GDP growth, as compared to the trend scenario presented above (Chapter C.1.1). The effects of this rapid integration on traffic are not limited to the new Member States. As can be seen from Figure 1.4, the regions of the Union bordering the acceding countries will be strongly affected, as will important transit routes, such as those crossing the Alps and the Pyrenees. Some of the peripheral Member States will also benefit from increased intra-EU exchanges, as can be seen on corridors through, for example, the Baltic States or the Eastern Balkans.

<sup>17</sup> These forecasts exclude traffic on urban and secondary networks.

<sup>18</sup> Interim results

**Figure 1.4** Impact of higher economic growth in the new and current Member States on freight traffic volumes (Source: TEN-STAC study)



## 2. Scarce funding and insufficient coordination

As presented above (Chapter C.1), transport demand, in particular long-distance and international traffic, is forecast to grow rapidly in the coming decades. At the same time, the provision of TEN-T transport infrastructure on transnational links and sustainable transport modes will not keep pace because of insufficient coherence in investment decisions between Member States, the scarcity of public financing and the difficulty of mobilising private funds.

### 2.1 *Delays in implementing transnational links and sustainable transport modes*

Since 1996, progress in implementing the TEN-T network has been very uneven. For road, less than 4% of the length of planned links will still not be completed by 2010, and, for rail, up to 50% of the length of planned links will remain uncompleted. As regards the 14 priority projects, only three have been completed<sup>19</sup> and five are expected to be completed by 2007.<sup>20</sup> The remaining investments in the order of magnitude of €60 billion - suffer from significant delays. The main causes for these delays have been the lack of firm planning, significant changes in project specifications, challenges in local courts and lack of funding due to both changes in national governments priorities and poor attractiveness for private investors. Slow progress in opening to competition rail networks has lower private investors interests. As shown in table 1.3, transnational links have a low implementation rate of 24% against 44% for the purely domestic links. The most significant delays were concentrated on the cross-border sections of the projects, which in turn discourage Member States to invest on access links. It is one of the reasons why the Commission proposes in parallel to the proposal assessed in this document, modified rules to grand aids in the field of TEN up to 30% of the cross-border sections costs.

**Table 1.3** *Estimated rate of implementation of Essen/Dublin projects*

<i>Mio €</i>	<i>Total costs</i>	<i>&lt;1996-2003</i>	<i>2003-2020</i>	<i>% of progress</i>
Total	168.143	60.915	107.228	36%
Transnational	65.568	16.044	49.524	24%
Domestic	102.575	44.871	57.704	44%

The figures on investment costs must be taken with caution since several of the priority projects has suffered from significant cost-overruns, even if corrected for inflation.<sup>21</sup> Such deviations are indeed common in large-scale transport infrastructure projects and stem from redesign of the project, price revisions, higher land acquisition or environmental protection and safety requirements costs, and delays.

<sup>19</sup> Oresund fixed rail/road link, Malpensa airport and conventional rail link Cork-Dublin-Belfast-Stranraer.

<sup>20</sup> Betuwe line, PBKAL, Greek motorways, UK/IRL road link and West Coast main line in the UK.

<sup>21</sup> Investment costs in constant prices for priority projects have been revised upwards by around 20% on average.

For candidate countries, the Accession Treaties identified, as per the objectives and criteria of the 1996 decision on the guidelines, approximately 20 000 km of roads and 30 000 km of railways, plus ports and airports, where works are planned. The works look set for completion more in 2015 than 2010. However, recent studies suggest that even within this timeframe the network will not be completed.<sup>22</sup>

## 2.2 *Insufficient coherence in the provision of infrastructure at European level*

The networks in the various Member States have been developed mainly on a national scale, giving priority to the development of radial routes serving major cities. As presented in the previous chapter, cross-border sections are generally the last to be completed on a given transport route, and Member States tend to delay investments in transnational links, given the risk of ‘missing links’ on the other side of the frontier.

Moreover, infrastructure project management has become increasingly complex. Carrying out major projects today may take 10 to 15 years. This affects cross-border projects in particular, typical obstacles being different timetables and administrative procedures on both sides of the border, or simply difficult negotiations on financing.

The political decision-makers are sometimes inclined to sacrifice cross-border projects in favour of national projects, which are seen as being more politically attractive. This indirectly affects the domestic sections on transnational links, the profitability of which depends on the cross-border section.

A long-term vision is therefore required in order to avoid short-sighted decisions on financing infrastructure - according to the political priorities of the day. Continuity and coherence over time of policy decisions is in particular required to attract private investors. A Community vision of network development, on the scale of an enlarged Europe, together with firm Member States commitments, is therefore required for planning major infrastructure and maximising their social return.

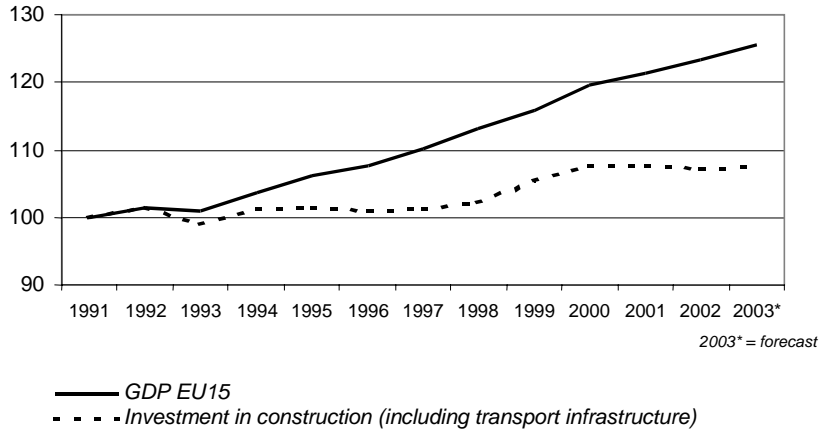
## 2.3 *Pace of investments*

Total transport infrastructure investments, including urban and regional transport, which accounted on average for 1.5% of GDP in the Member States during the 1980s, now accounts for less than 1%.<sup>23</sup> Although some acceding countries currently invest 1.5% of their GDP, it seems highly unlikely that they could sustain or increase this level without external support. The graph below shows that a similar slowdown will also affect the construction sector.

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<sup>22</sup> TEN-Invest project.  
<sup>23</sup> ECMT.

### Comparison of GDP and investment (1991=100)



Source: FIEC

Roughly a third of public investment in transport infrastructure, i.e. approximately €30 billion a year, is devoted to TEN-T infrastructure, the lion's share being allocated by Member States to national, regional or urban transport projects serving mostly short-distance or domestic traffic. Around 25% of TEN-T investment is currently earmarked for priority projects, i.e. less than 0.1% of GDP (see E.1).

Extension of the TEN-T to applicant countries, as already defined in the Accession Treaties, means new investment needs estimated at about €100 billion, which is considerable compared with their GDP.

The estimated cost of the whole trans-European transport network, as agreed in the 1996 guidelines and the 2002 Accession Treaties, amounts on its own to nearly €500 billion<sup>24</sup> for all projects initially due to be completed by 2010, including 112 billion still to be invested for the Essen/Dublin projects.

The work of the High-Level Group showed that new needs not yet identified in the current guidelines now have to be considered in terms of 2020. Adding these new needs to what has to be completed to achieve past commitments puts the total estimated investment at more than €600 billion by 2020 (see Chapter D.1).

### 3. Current trends lead to more congestion and environmental nuisances

#### 3.1 Congestion to worsen, in particular on roads

Rising traffic levels lead to increasing congestion, causing delays and unreliable journey times for both individuals and firms. To the traveller, congestion means lost time, missed opportunities, frustration, and a waste of personal resources. To the employer, congestion means lost worker productivity, delivery delays, and increased

<sup>24</sup> 2003 prices, excluding traffic management and information systems and partly airports and ports.

costs. Nationally - and internationally - speed, reliability and the cost of urban and inter-city freight movements are increasingly affected by congestion.

The White Paper on *European transport policy for 2010* pointed out that in the EU “some 7 500 km, or 10% of the road network, is affected daily by traffic jams. And 16 000 km of railways, 20% of the network, are classed as bottlenecks.”<sup>25</sup> As described in Chapter C.1, transport demand is expected to continue to grow rapidly: freight volumes in particular are expected to rise by 70% in the current and 95% in the new Member States by 2020.

If the policy status quo continues and the above predictions become a reality, congestion is set to increase further, both in urban and in inter-urban areas. The monetary value of congestion delays, as estimated by TEN-STAC, will come to almost € billion for inter-regional users<sup>26</sup> just on the TEN-T road network by 2020. Congestion will grow most at the borders between the current and new Member States as well as on major transit routes such as the Alps and the Pyrenees.

### 3.2 *Accidents will decrease more slowly*

With increasing traffic volumes and a higher modal share for road transport, in particular in the acceding countries, the number of accidents will continue to be high despite recent positive developments in several countries. Of all transport modes, road is the most dangerous and the most costly in terms of human lives. The risk of a road accident varies considerably by country, the acceding countries typically facing a considerably higher risk level than the average current Member State. The number of accidents also varies according to the type of infrastructure, motorways typically being the safest. Table 1.5 below depicts a number of indicative accident risks for different contexts.

**Table 1.4** *Risk of a fatal accident on certain types of infrastructure (Source: RECORDIT<sup>27</sup> deliverable D4)*

Region	Infrastructure	Accident risk <sup>28</sup>
EU15 – best performing countries	Motorway	2 – 4
	Extra-urban	3 – 5
EU15 – worst performing countries	Motorway	9 – 15
	Extra-urban	15
Acceding countries	Motorway	10 – 20
	Extra-urban	17 - 24

<sup>25</sup> OM(2001)370.

<sup>26</sup> 2003 prices, excluding time losses incurred by intra-regional users (local users).

<sup>27</sup> RECORDIT is a research project funded under the 5th Framework Programme. Deliverables can be downloaded at [www.recordit.org](http://www.recordit.org)

<sup>28</sup> Calculated as number of fatal accidents per billion vehicle-km.

### 3.3 *Emissions to increase and the quality of life to deteriorate*

#### C.3.3.1. Greenhouse gas emissions and security of energy supply

The White Paper on *European transport policy for 2010* paid particular attention to the Kyoto Protocol, which requires the Union to reduce its emissions of greenhouse gases by 8% over the period 2008-2012 with respect to 1990. This reduction in emissions should, of course, be carried out using cost-effectiveness criteria, that is to say, in the sectors where the biggest CO<sub>2</sub> reductions can be made at the lowest cost. However, the transport sector also has its contribution to make, since it is a sector with a significant share of total emissions and one of the highest growth rates.

Transport was also the sector with the fastest growing energy demand in the 1990s. It is projected to grow at 0.9% per year up to 2030 – this is, however, considerably lower than the rate in the past due to fuel efficiency improvements following the environmental agreement with the car industry and a certain amount of decoupling of transport activity from economic growth. Between 1990 and 1999 the energy efficiency of all transport by private car increased by 2%. Emissions of CO<sub>2</sub> by new cars were reduced by 10% between 1995 and 2001.<sup>29</sup>

For acceding countries, emissions of CO<sub>2</sub> in 2000 were 8.5% below 1990 levels. This decrease was mainly caused by the economic downturn in the first half of the decade. Since 1995, CO<sub>2</sub> emissions from the transport sector have been rising again. In the future, CO<sub>2</sub> emissions are expected to increase further due to increasing transport demand and continued shifts in modal split towards road transport.

According to TEN-STAC estimates for the enlarged EU, greenhouse gases are expected to increase for all transport modes between 2000 and 2020 by 40%. Emissions are set to increase by almost 34% for current and new Member States and app. 70% in the acceding countries. The highest growth is forecast for the air sector, 67% for the enlarged EU as a whole.

#### C.3.3.2. Pollutant emissions

The sustainability of transport fuels has been considerably improved by the Auto-oil directives and other legislation aimed at reducing conventional pollution from motor vehicles and the fuels they use. Emissions of conventional polluting gases in the EU were lowered by around 30% during the last decade and will be reduced by 70% by 2010, as a result of the use of catalytic converters and improvements in fuel quality.<sup>30</sup>

Fuels are also subject to **diversification away from oil**, as witnessed by the recently approved Directive relating to the promotion of biofuels for transport.<sup>31</sup> The

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<sup>29</sup> Source: TERM report, p. 45.

<sup>30</sup> Consideration should, however, be given to pollutant emissions, in particular of sulphur dioxide (SO<sub>2</sub>) from vessels. Given the strong increase in maritime transport and the proximity of many ports to population centres, these emissions and their damage to human health will increase in the future if no regulatory or other policy action regarding fuel quality or engine technology is taken.

<sup>31</sup> This directive will lead to a proportion of 5.75% of biofuels in 2010. Besides reducing energy dependency on the outside, the use of biofuels will reduce the consumption of CO<sub>2</sub> as transport emissions will be offset by the CO<sub>2</sub> absorbed by the plants as they grow. Furthermore, the

programme for the development of alternative fuels also comprises the promotion of natural gas and hydrogen<sup>32</sup> as fuels.

Given these improvements in fuel quality and vehicle technology, and in spite of the strong growth forecast in traffic volumes and distance by 2020, NO<sub>x</sub> emissions from road traffic are expected to decrease by approximately 40%. The reduction is considerably stronger in the current Member states (42%) than in the acceding countries (19%). However, despite these positive trends, because of the strong estimated increase in air transport, overall NO<sub>x</sub> emissions will increase by 1.5% in the current Member States and by 2.3% in the acceding countries or 1.6% for the enlarged EU. The transport sector is, with a share of 63%, by far the biggest generator of NO<sub>x</sub> emissions in EU15, followed by energy production (17%) and the manufacturing and production industry sectors (13%). In the acceding countries, the share of transport in NO<sub>x</sub> emissions is somewhat lower at about 42% of total NO<sub>x</sub> emissions from all sectors.

Emissions of particulate matter are mainly caused by uncontrolled combustion of coal and diesel. Consequently, emissions of particulate matter are mainly generated by the transport sector, at 38%, and the service/household sector, at 30%. Total EU15 emissions of particulate matter were reduced by 35% between 1990 and 1999. The situation is different in the acceding countries, where the share of the transport sector in total emissions of secondary particulate matter increased from 14.7% in 1990 to 18.5% in 2000. In the future, from 2000 to 2020, emissions of particulate matter are expected to be cut by 40% in the current Member States and by 20% in the acceding countries, due to improved road vehicle technologies, according to TEN-STAC estimates.

### 3.4 *Traffic noise*

Figure 1.5 below indicates that almost 40% of the population of EU15 are exposed to noise from road traffic exceeding sustainable levels (55 decibels). With traffic volumes continuing to grow, the disturbance from noise from all modes will increase in the future. One efficient way of combating noise is to construct noise barriers along infrastructure and to improve noise insulation in buildings; such measures should be part of any infrastructure project already at the planning stage when cost-efficient<sup>33</sup>. As explained below (Chapter E.4.1), Member States have to make environmental impact assessments at project level in order to minimise environmental nuisances and to take appropriate mitigation measures. It should also be noted that the Directive 2002/49/EC on environmental noise requires the Member states to set up noise maps among all major infrastructures by 2008 and to take appropriate measures to reduce noise nuisances.

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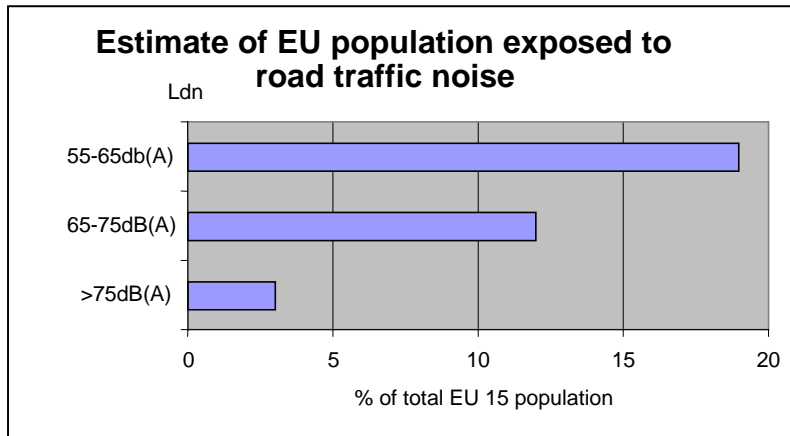
Commission has proposed a target for alternative fuels of 20% of the market by 2020, to be achieved through the use in motoring of natural gas, hydrogen and biofuels.

<sup>32</sup> Through its RTD programme the Commission is promoting the concept of a vehicle that produces no contaminating emissions. Of special interest is the "CUTE" programme to demonstrate the possibilities of hydrogen fuel cells. Thanks to this programme, 27 buses powered by fuel cells will be in service in nine European cities as from this year.

<sup>33</sup> Other measures to combat noise of course also exist. The STAIRRS project showed that for railway noise, measures taken at the source (e.g. retrofitting existing fleets, putting into service more efficient applications) were most cost-efficient.



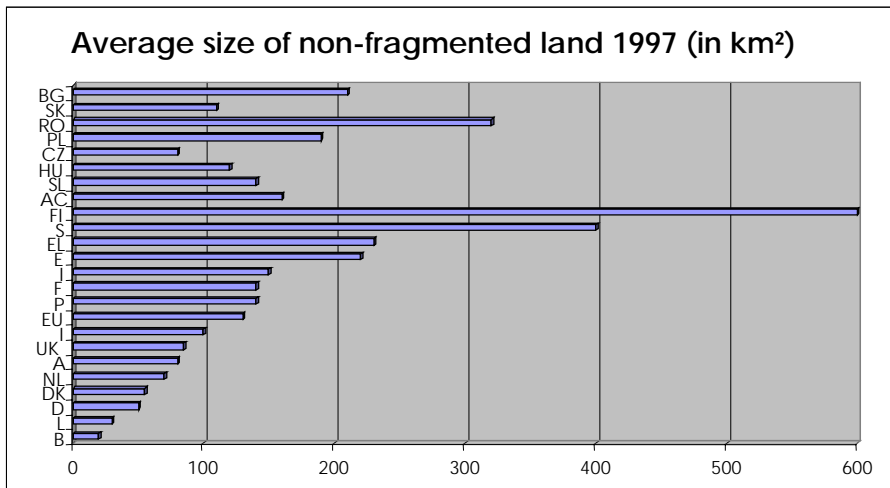
**Figure 1.5** Noise exposure in EU15 (Source: SUMMA<sup>34</sup> project)



#### C.3.4.1. Land take, fragmentation and NATURA 2000 sites

New transport infrastructure can lead to further fragmentation of the territory, which can have adverse effects on biodiversity and certain endangered species. The average size of contiguous land units that are not cut through by major transport infrastructure is presented in Figure 1.6 and ranges from about 20 km<sup>2</sup> in Belgium to nearly 600 km<sup>2</sup> in Finland, the EU average being about 130 km<sup>2</sup>. The average size of contiguous land units in acceding countries is 175 km<sup>2</sup>, which is about 40% higher than the EU average (ranging from 80 km<sup>2</sup> in the Czech Republic to 320 km<sup>2</sup> in Romania).

**Figure 1.6** Non-fragmented areas 1997 (Source: EEA 2001)



Due to data constraints, it has not been possible to assess the impact of the trend scenario or the continuation of current investment policy on land take and fragmentation. It should, however, be noted that land fragmentation depends appreciably on population density and that transport investments can thus be said to

<sup>34</sup> See deliverable D2 - SUMMA is a research project funded by the 5th Framework Programme. Deliverables can be downloaded from <http://www.summa-eu.org/>

have only an indirect influence on fragmentation. It is important to note also at this juncture that several EC directives require Member States to carry out environmental impact assessments at project level and to pay particular attention to the protection of legally recognised natural sites (see Chapter E.4.1 on the relevant legislation). Such developments help to minimise environmental nuisances and to take appropriate mitigation measures, but they also introduce additional administrative procedures and legal uncertainty, authorisation decisions being increasingly challenged in the courts, which may delay projects.

## D. MAIN ALTERNATIVE POLICY OPTIONS

### 1. A combination of instruments

The impact of the trans-European network depends on how it is used. The Member States' plans on infrastructure and investment decisions are closely linked to transport policy, particularly on charging for the use of infrastructure, management of the railways and intermodality. At Community level, attainment of the objectives mentioned earlier, notably of shifting the balance between modes, depends on a package of measures, to ensure better management of the existing network and coherent development of the network at European level.

Any evaluation of the new guidelines on investment in infrastructure in the TENs must go hand in hand with evaluation of the complementary and, in some cases, even alternative instruments.

The policy options to be developed have to give answers to the following questions:

1. Taking into account the demand trends, it should be assessed how far the need for transport infrastructure investment could be reduced by alternative options like liberalisation or **demand management**, in order to make better use of existing infrastructure.
2. The degree of **concentration and coordination** of investment on specific trans-European **corridors or priority projects** depends on the transport mode, has to be balanced by the need for investment in nodes or management systems, e.g. inter-modal platforms, intelligent transport systems, etc.
3. The **financing** mix for any increase in transport investment between user participation, cross-subsidisation and public financing (via taxes or borrowing) has to be defined.

#### *1.1 Structural reforms and demand management*

Numerous network management measures have been adopted already under the Common Transport Policy, notably on opening rail freight networks to competition and charging for the use of infrastructure.

On charging for the use of roads in particular, the Commission recently proposed a reform of the taxation on heavy goods vehicles (amendment of Directive 99/62/EC). This reform opens up the possibility of differentiation of charges to make more efficient use of infrastructure and of imposing increases in certain sensitive areas to co-finance projects of European interest. This reform already proposed by the

Commission adds to the need to provide alternatives to the road corridors on which the charges are likely to be increased, particularly for crossing natural barriers, such as the Alps, the Pyrenees or the Baltic Sea, and in the new Member States. The Commission has also proposed that the revenue from the charges should be allocated to funds reserved for transport. This, in turn, will have an impact on the capacity of the Member States to finance the TEN-T.

The options chosen for assessing the impact of the trans-European network must therefore take account of these measures, considering that the way in which they are implemented in the Member States will decide the prospects and interest of developing the trans-European network.

## *1.2 Concentration and coordination of investments*

Coordination of investments on corridors allows more coherent planning for a number of reasons. It is necessary, when planning the network, to consider in parallel major infrastructure projects, the deployment of operating systems and the gradual elimination of smaller bottlenecks, or even the management of demand, which is easier to do along a single corridor than by taking the network as a whole. For instance, priority projects identified by the High-Level Group may need to be accompanied by investments in intelligent transport systems, intermodal platforms etc. on the same corridor.

An increase in intermodality, one condition for sustainable development of transport, is possible only on corridors with substantial long-distance traffic, these being the only ones where it is possible to compete with road transport. Concentrating investments on major corridors gives rail freight, inland waterways and maritime transport a better chance to be attractive. In contrast, in dense western road networks, traffic tends to be much more diffuse, hence making it less interesting to target investments on specific corridors.

The coordination and follow-up of investments on the whole network at European level has proven to be complex and is unlikely to work efficiently in a network covering 27 countries. In contrast, it appears feasible quickly to set up mechanisms that provide for coordination and follow-up for each major corridor .

Priority projects, as identified by the High-Level Group, seem to be a set of projects grouped along corridors rather than indivisible, clearly identified, technical tasks with their own objectives. Their key role can therefore be seen as to organise cooperation to improve capabilities for project evaluation, monitoring policy objectives like modal rebalancing and seek coherence with accompanying measures like interoperability, intermodality and pricing. The new mechanisms introduced in the Commission's proposal to designate 'European coordinators' per project or group of projects is therefore a crucial element to make this planning approach successful.

Eliminating bottlenecks and completing missing links on the main European routes to stimulate transnational trade and providing access to every European region are separate problems with different solutions. Distinguishing these problems, and thereby clarifying responsibilities, will help differentiate between planning at European, national and regional level, and between planning in the long and short

term. At Community level, given the above reasons, it appears appropriate to concentrate coordination efforts and major funding on corridors.

### 1.3 Financing

Whether the TEN-T project results in a virtuous circle or not depends on the issue of financing. If TEN-T priority projects were merely to crowd out other types of investment (i.e. the capital stock stays constant), the macroeconomic effects would be largely confined to whether they increase productivity by more than the investment they replace. The less crowding-out there is, the more TEN-Ts constitute a net increase in overall capital stock and the larger their impact will be. This situation could occur, in particular, when there is short-term spare capacity in the economy.

If the government finances the project without incurring any debt, but by reducing government consumption or transfers, the new investments will translate directly into an increased capital stock. Only current consumption during the construction period would decrease. If, by contrast, canceling other types of government investment to finance the TEN-T, positive impulses will occur only insofar as the TEN-T investments are more profitable than the alternative investments. In the case of debt-free financing, the short-run expansionary effect of infrastructure will tend to be counterbalanced by contractive effects in other parts of the economy. This will also be the case if the government increases taxes.

In case that at least part of the investment will be financed through issuing new government debt, the increased government demand will increase economic activity in the short run. In the longer run, the debt needs to be repaid and private households may tend to anticipate this fact in their behavior. However, this *crowding-out* effect could be balanced with a *crowding-in* effect, when the increase in public capital has a positive impact on output and productivity. (see section E.2.3. below)

Charging for infrastructure can be an important tool for efficient use thereof. What exactly the charging rate is or should be will depend on the details of the projects. Greater reliance on financing through charges would make it easier to attract private finances to a project. Public-private partnerships as opposed to purely public investments could also exert a considerable influence on limiting the risk of cost overruns and on the efficient management of the new infrastructure.

## 2. Policy options and scenarios for development of the TEN-T

The TEN-T guidelines is one of the principal instruments available for encouraging the Member States to adapt their investment policy in order to attain the objectives outlined earlier. The policy on granting Community support from the TEN budget and the Cohesion Fund and on EIB loans, as well as many national planning documents are in fact based on this Decision.

The 2001 proposal<sup>35</sup> for amending the guidelines already introduced new horizontal priorities<sup>36</sup> such as the development of a rail network dedicated to freight, the

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<sup>35</sup> OM (2001) 544.

<sup>36</sup> Article 5.

development of intermodality, greater use of intelligent transport systems or focusing of efforts on specific priority projects, particularly to cross the Alps and the Pyrenees.<sup>37</sup> The Council has not been able to adopt this proposal.

To sum up, the options facing the Commission can therefore be illustrated by three scenarios for development of the network up to 2020 which would be consistent with the accompanying measures described earlier:

1. **Trend scenario – The Commission does nothing:** The Community framework for the trans-European network remains as in 1996. Only the projects in an advanced stage (completed before 2008) are built. The rail freight network is opened up to competition. Big yet disparate changes are made to the charges levied on heavy goods vehicles for use of infrastructure but only in the countries which have already initiated reforms in this field. Due to the lack of a common view of traffic trends, linked to the development of the networks in neighbouring countries, the Member States defer their investment in the intermodal transnational corridors. The impacts of this scenario are described in Part C of this document.
2. **European scenario – The Commission urges the Council to adopt its 2001 proposal and adds parallel measures on charging for the use of infrastructure plus a more ambitious railways policy:** The investments made include, in addition to the trend scenario, all the Essen/Dublin projects plus the six new projects as proposed by the Commission in 2001, and half of the works planned in the Accession Treaties. Charges for use of infrastructure are imposed on heavy goods vehicles throughout the network. National measures to improve interoperability and train path management, particularly on freight routes, are applied on the links along the priority projects. This scenario would imply a change from the trends observed.
3. **European+ scenario – The Commission adds to its proposal new projects, closer coordination of investment, measures on charging for the use of infrastructure and a more ambitious rail policy:** In addition to the investments envisaged in the previous scenario, the new priority projects identified by the High-Level Group are built<sup>38</sup>. The network planned in the Accession Treaties is nearly completed. Coordination between Member States is reinforced along the corridors formed by the priority projects. It allows faster interoperability and better capacity management than in the previous scenario, which encourages operators to offer more efficient services to ports and on long-distance transnational routes. Cross-financing implying higher motorway tolls in the Alps and Pyrenees is introduced. This scenario applies the recommendations made by the High-Level Group.

The sustainability impacts of the two TEN-T policy scenarios, as described above, are presented in Part E below. The scenarios are compared to the trend scenario, the socio-economic impacts of which are described in Part C of this document.

The focus of the assessment is on the European wide aggregate impacts of the above two TEN-T policy scenarios as compared to the trend scenario. The realisation of the

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<sup>37</sup> Article 19.

<sup>38</sup> Projects identified in List 1 in the report of the High Level Group.

impacts depend on several assumptions, e.g. that all projects are completed as planned, their cost estimates are not exceeded, no policy measures in other fields or sectors are taken that might affect transport demand. It should also be emphasised that the sustainability of the individual projects is not assessed in this document but each project should undergo a detailed environmental assessment according to existing EU legislation (see ch. E.4.1) before financing decisions are taken.

## **E. SOCIO-ECONOMIC IMPACTS OF DIFFERENT POLICY PACKAGES**

The scenarios outlined above and analysed in this chapter must be seen as a forecasting exercise to illustrate the general options for the common transport policy, beyond the simple TEN guidelines. This preliminary evaluation takes no account of the funding aspects described above. It should be acknowledged that demand forecasts and benefit evaluations - essential for assessing the financial and economic viability of any transport infrastructure project - are subject to uncertainty and that such uncertainty is higher when traffic modelling is carried out at European level. However, it gives a fairly comprehensive set of results, such as time savings, environmental effects, impact on network, regional accessibility, etc.

It should, however, be noted that despite uncertainties, traffic models are the only way to assess of policies in a consistent framework taking into account the many interactions and feedbacks. Further research is, however, still needed to improve databases and model coverage as well as to include such impact parameters that are currently lacking. The Community's 6<sup>th</sup> Framework Programme for research, technological development and demonstration activities will continue work in this area under the area Scientific Support to Policies<sup>39</sup>.

### **1. Financial impacts: investments will have concentrated more on priority projects**

#### *1.1 Total cost of the trans-European network*

The cost of the trans-European network, in the form adopted in 1996, up to 2010 was evaluated recently. The study was based on a survey of the Member States and candidate countries on the investment made since 1996 and already decided for the period up to 2010. The cost of the remaining projects included in the guidelines but on which no decision has yet been taken were estimated from the average unit costs.

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<sup>39</sup> See <http://fp6.cordis.lu/fp6/home.cfm> and <http://www.cordis.lu/fp6/support.htm>

**Table 1.5** *Total investment costs (Source: TEN-T-Invest study)<sup>40</sup>*

	Cost in €billion	1994 price	1999 price	2003 price
EU15	Total cost TEN –T	485	546	590
	Already invested (1996-2001)	157	176	190
	Remaining costs	328	370	399
12 CC	Total cost TEN-T		80	103
	Already invested (1996-2001)		8	10
	Remaining costs		72	92
EU27	Total cost TEN-T		626	693
	Already invested (1996-2001)		184	201
	Remaining costs		441	492

The total cost excludes port and airport investments on which no decision has yet been taken and a large number of traffic management systems. By comparison, in 1994 the Commission estimated the total cost for EU15 at €400 billion, i.e. 20% lower. Half of this difference can be attributed to the projects added by the Council and Parliament during the co-decision procedure and to the ports added by the amendments in Decision 1341/2001/EC.

When examining the projects proposed by the Member States for classification as priority projects, the High-Level Group also identified projects to be completed by 2020 which had not been identified in 1996. Some of these have been included on the list of priority projects (e.g. bridge over the Strait of Messina, Pyrenees crossing and Galileo), others have not, although they remain eligible for inclusion in the TEN-T based on the criteria adopted in the 1996 decision.

On this basis the Group estimated that the major new requirements up to 2020 will total at least a further €100 billion and concluded that the total cost of the TEN-T (priority projects plus other projects) will add up to at least €600 billion by 2020, of which over €100 billion will be spent in the future Member States. This is a conservative estimate based on the cost of the major projects which could be classified as priority projects but not on the entire network, since it is difficult to predict the more day-to-day investment requirements (to increase existing capacity) in the distant future.

### 1.2 *Cost of the priority projects*

The High-Level Group provided an opportunity to update the total cost and the timetables for the Essen projects and to collect the same data on the new projects recommended by the Group and assessed in this document. The outstanding investment totals €220 billion, of which €107 billion will be for the Essen/Dublin projects already adopted.

<sup>40</sup> Applying the GDP deflator.

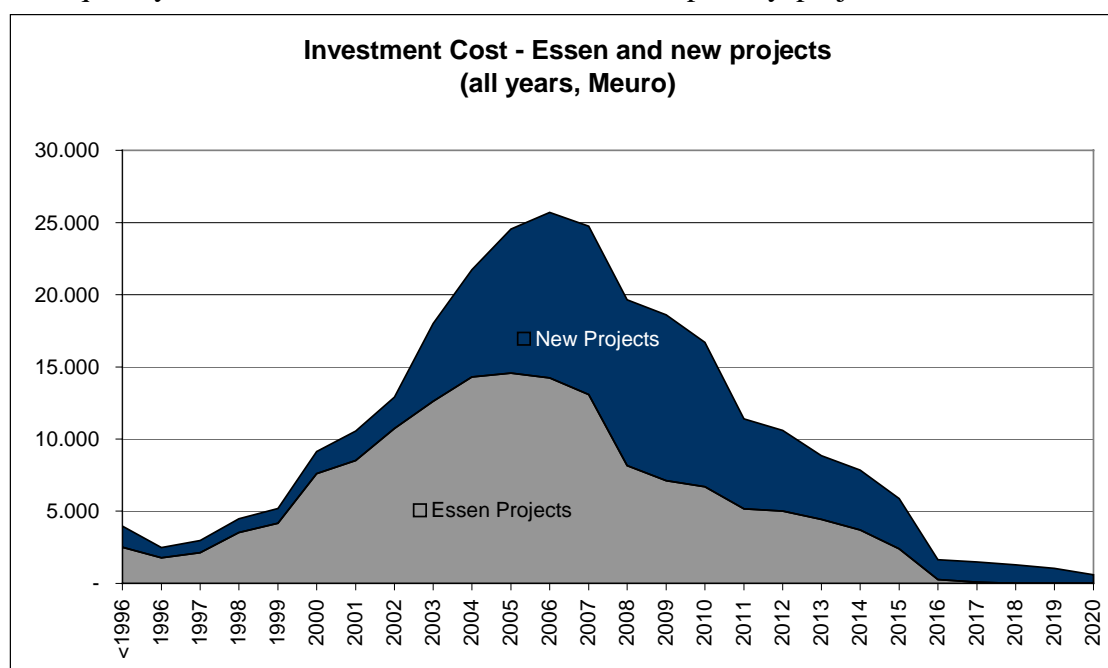
**Table 1.6** *Costs of Essen/Dublin projects and new priority projects*

€ million <sup>41</sup>	Total	up to 2003	2003-2020
Essen/Dublin	168.143	60.915	107.228
2001 Commissions' proposal	63.165	12.597	50.568
2003 Commission's proposal	65.799	2.882	62.917
<b>Total</b>	<b>297.107</b>	<b>76.394</b>	<b>220.713</b>

This comparison between the outstanding investment and the investment made to date must be treated with great caution, since the projects are not properly delimited in the existing guidelines. Three of the Essen/Dublin projects (Nordic triangle, multimodal corridor between Portugal and the rest of Europe, and UK/IRL corridor) are rolling programmes which are updated regularly.

The graph set out below shows the year-on-year investment profile built up from the timetables proposed by the Member States and the type of project, since the profile depends on the nature of the project.

Consequently, overall the rate of investment in the priority projects would have to



double in order to complete these projects by 2020. Approximately €10 billion would be needed for the period 2007-2013 alone, and € 80 billion by 2006. On average, for 15 years half of the €30 billion currently earmarked for the TEN-T every year would therefore have to be allocated to the priority projects, peaking at over €20 billion per year by 2008.

<sup>41</sup> xcluding part of project n°28 and project n°29



It would, therefore, be crucial that the States and the Community adopt a consistent approach to improve and facilitate the investments needed, as indicated in the abovementioned communication "*Developing the trans-European transport network*". In addition to participation by financial intermediaries, such as the private sector, to encourage better management of costs and risks, it will be essential to obtain the best mix of the three existing sources of funding, i.e. the national budgets, the Community budget and resources generated by direct contributions from users:

- Funding from the national budgets will have a key role to play. The Member States should therefore be called on to adopt a policy in this field which is consistent with the commitments given under this decision.
- As for the Community budget, the resources available up to 2006 from the financial instruments for the trans-European networks (TEN budget, Cohesion Fund and instrument for structural policies for pre-accession) will have to focus on the projects declared to be of European interest. In the case of the cross-border sections, the parallel proposal opening up the possibility of aid of up to 30% of the cost of the project from the trans-European networks budget should make it easier to put together the funding package.
- The contributions from users are inextricably linked to the charges made for the use of the infrastructure and to the Community rules on this subject. Beyond that, the amendments proposed on 23 July 2003 to Directive 99/62/EC on taxation on heavy goods vehicles provides a basis for cross-financing under certain circumstances.

Preliminary simulations done by the Commission, based on the characteristics of the individual projects and integrating the above mentioned regulatory changes, indicates that the ability to pay of TEN users could bring around 20% of the investments needed<sup>42</sup>, which can be considered as the upper limit of the private capitals that could be called on. In view of the inherent risks with projects of this kind, granting loan guarantees would however be needed to mobilise this capital. The lion share will therefore have to be financed by the national budgets and the Community budget. It gives an idea of the resources needed within the framework of the forthcoming financial perspectives after 2006.

### 1.3 *Cost of the scenarios*

To assess the impacts of the Commission's proposal to modify the TEN-T guidelines, it is necessary to estimate the cost corresponding to the scenarios reflecting the policy options considered (see Part B and Chapter D.2), as well as the cost of the business-as-usual scenario since several priority projects are already under construction and will be completed regardless what happens with the guidelines. The cost of the investments made in the network in each of the scenarios was estimated from the data collected by the High-Level Group and from the TEN-STAC study and is set out below (Table 1.5). The cost includes the cost of the priority projects and of the other projects in the candidate countries, considering the cohesion policy targeted on these countries an integral part of the scenarios outlined above. The cost of the

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<sup>42</sup> Including cross-financing

accompanying measures (electronic toll collection systems, etc.) is not taken into account in this assessment.

**Table 1.7** *Cost of scenarios*

€billion	EU15	CC12	Total
Trend (business as usual)	71	26	97
European	161	49	210
European +	206	87	293

## 2. Economic impacts

### 2.1 *Impacts on international traffic*

The TEN-STAC study modelled inter-regional traffic on the network, identifying the proportion of international traffic. This makes it possible to estimate the volume of international traffic on the main routes forming the priority projects and, in the process, to assess the overall European added value offered by the projects.

On average, over 20% of the inter-regional passenger traffic and close to 50% of the inter-regional freight traffic forecast in the priority projects (European+ scenario) consists of international traffic.

Compared with trend, the European+ scenario would induce additional international movement of goods by 4% while European scenario does not yield significant new international movements. In European +, growth of international traffic, until 2020, is +172% in acceding countries and +81% in current Member States. It suggests a significant impact in terms of widening market areas in the acceding countries, hence dynamising international trade. .

In term of modal split, Table 1.9 shows that the TEN-T policy scenarios growth of international traffic takes place mainly on the rail network and is reduced on the road network. It suggests that both TEN-T policy scenarios are successful in rebalancing the modes on the international traffic segment, but that only European + can be successful in dynamising the internal market.

**Table 1.8** *Growth of international traffic in % of tkm(EU27)*

2020/2000 growth	All modes	Rail	Road
Trend	95%	88%	99%
European	96%	96%	96%
European +	104%	120%	96%

A less contrasted pattern occurs with international passenger transport, which grows, in EU27, only by 55% in European + against 53% in trend.

## 2.2 *Transport economic impacts: significant travel time savings for candidate countries*

The direct economic benefits would be time savings triggered by faster means of transport, reduced transfer times and reduced congestion in existing networks. Other parameters to be quantified would include potential improvements in quality of transport (comfort and convenience and reduced transaction costs) and more numerous choices of location as a result of better accessibility of remote regions previously not sufficiently well linked to the centre.

User time and operating cost savings<sup>43</sup> are typically one of the most important impacts of transport infrastructure improvements. The monetary value of these potential time savings, for interregional users only, is estimated to be more than €4 billion and almost €8 billion for the European and European+ scenarios, respectively.<sup>44</sup> As Figure 1.7 below indicates, the benefits to the acceding countries are considerable and reflect the emphasis put on the integration of the networks of the new Member States (Chapter B.2). When measured in per capita terms, the time savings to the new countries are approximately twice as high for passenger transport while the difference is four-fold for freight.

In the longer run, time savings generated by infrastructure improvement will be (partially) translated into changes in land-use patterns.<sup>45</sup> While time savings *per se* may vanish, the improved accessibility will result in a greater choice of opportunities in the product, labour or housing markets increasing the welfare of citizens and business.

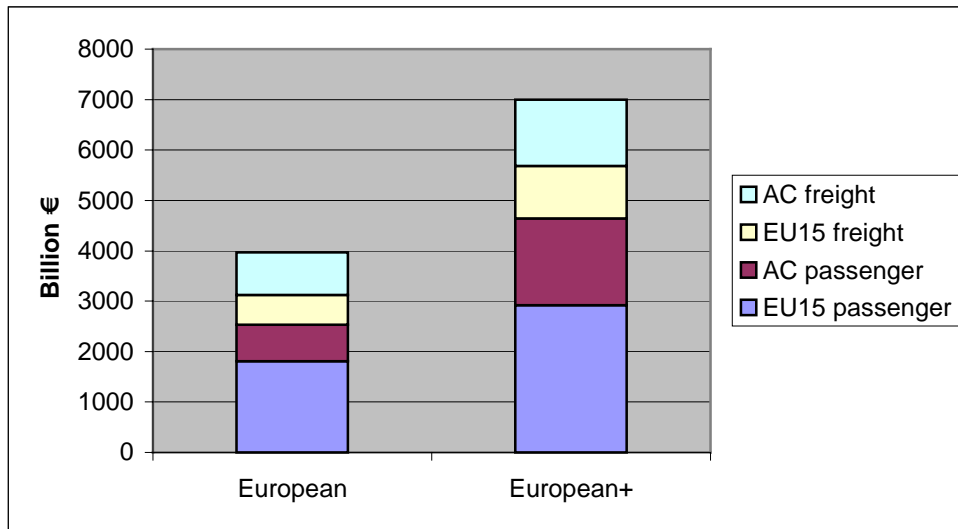
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<sup>43</sup> Time and operating costs are the so called “generalised costs” of transport. The modelling tools used did not, however, allow assessing impacts on operating costs, which typically decrease when time costs and congestion decrease. Therefore, time savings can be said to represent a lower bound estimate of generalised costs. However, these ‘gross’ benefits would have to be corrected in case of switching demand from non-congested infrastructure (of the same or of competing modes) would reduce the latter’s economic viability, or the service provided by existing infrastructure were to deteriorate as a result of declining demand.

<sup>44</sup> 2003 prices.

<sup>45</sup> One very illustrative example of this in the field of local transport is urban sprawl - the relative constancy of the “time budget” dedicated to daily passenger transportation, independent of the location and of car ownership. Investing in TEN-T could have a similar effect at national and European level.

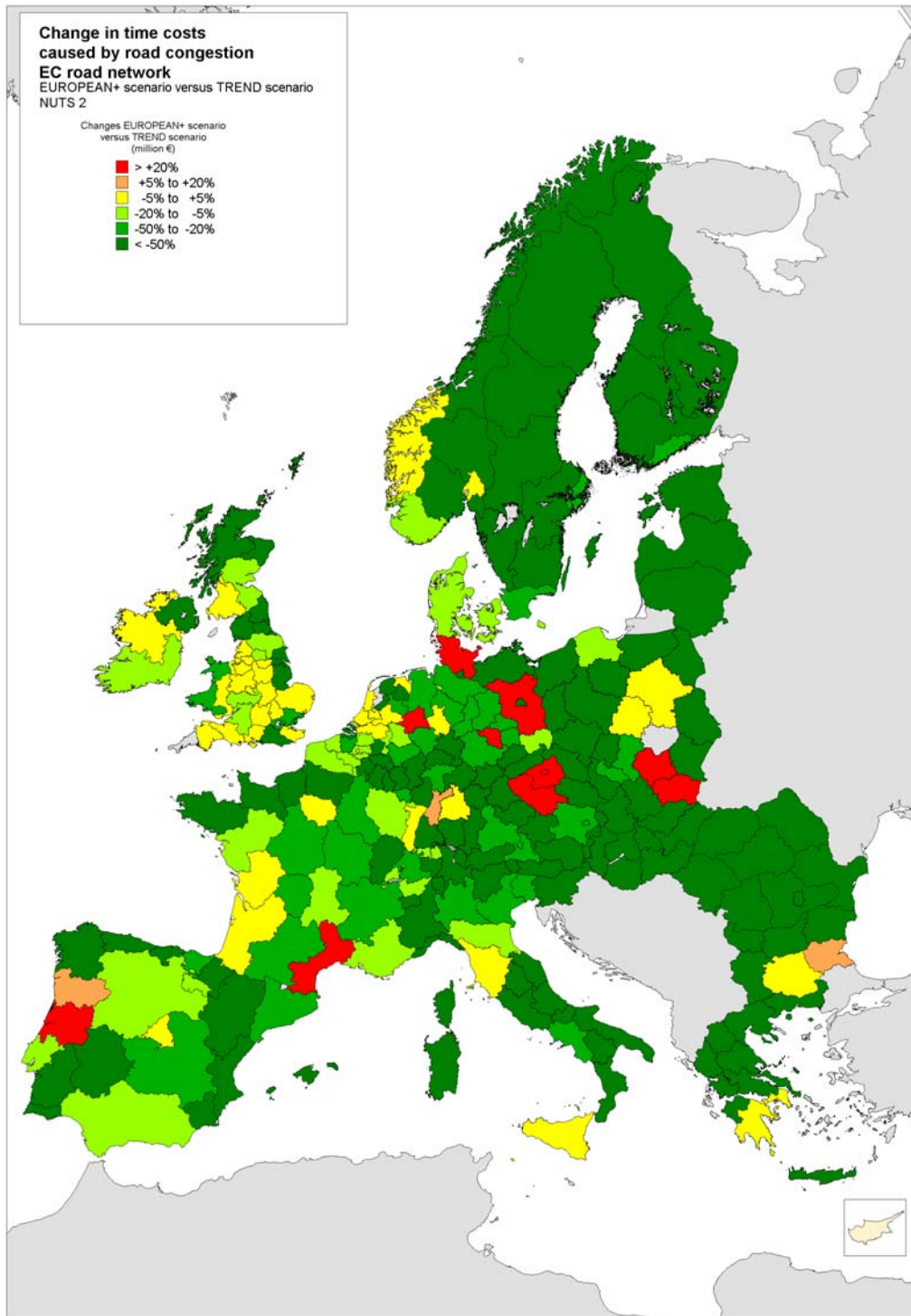
**Figure 1.7** Time savings of European (+) scenario versus Trend scenario



A more detailed analysis of the road congestion shows that the European scenario will reduce congestion delays in Europe by almost 3% while, due to more investments, in the European+ alternative delays will be reduced by 14%. It is the acceding countries in particular that will see dramatic cuts in the congestion forecast: the European+ scenario would almost halve delays on TEN-T roads. This congestion refers only to delays incurred by inter-regional traffic flows, and thus does not include intra-regional traffic. The above figures can therefore be considered as the lowest case scenario since the modal shift brought about by the European and European+ scenarios will also free capacity for local traffic.

Figure 1.8 below shows the regional distribution of congestion reduction for the European+ scenario. As can be seen, the acceding countries, as well as peripheral regions both in the north and south, will benefit considerably from the investments, thus highlighting the importance to the periphery of smooth traffic conditions in the centre.

**Figure 1.8**      *Reduction in congestion on TEN-T roads by region, European+ vs. trend scenario*



### 2.3 Indirect economic impact

On average, increased demand for infrastructure construction creates overall economic activity that is roughly half as large as that generated by the original project.<sup>46</sup> Input-output calculations potentially provide information on the sectoral breakdown of employment created by increased construction activity, assuming that other activities are not crowded out. Thus, these input-output estimates represent the upper limit of the potential employment effects of the infrastructure construction. However, this demand-side effect disappears once the project has been completed. The extent to which this happens depends on the spare capacity available in the economy. While this constraint may not appear binding, there are two reasons why the implementation of TEN-T investment might run into a macroeconomic capacity constraint: Firstly, there are limits on the financial side (see below). Secondly, often available economic capacity does not match the structure of the demand. One corollary of the foregoing is that stable long-term planning of investment is necessary to maintain production capacity and moderate costs for infrastructure and equipment alike.

Improving transport infrastructure in regions or countries which lack appropriate infrastructure and integrating them more closely with the infrastructure networks of the centre will improve their accessibility and reduce transaction costs within these economies. It will also play an important role in the location of productive activities and services. This may hold especially true for peripheral regions and accession countries. This might lead to increased regional specialisation and a *concentration* of high value added services in a set of urban areas, competing to attract multinational firms or major facilities. However, under specific circumstances, a *deconcentration* of activity could also occur as low transport costs make it possible to move to zones or regions with lower land rents and lower municipal costs.

The last way in which transport infrastructure investment can contribute to growth is through the increase in public capital stock available for the production of goods and services. The common view is that improvement of transport infrastructure, through changes in accessibility, increases the total productivity of factors, and has an effect on activity and revenue. There are numerous empirical studies<sup>47</sup> on the effects of additional public infrastructure, but their results are neither very conclusive nor particularly helpful to policymakers. Although most studies indicate that public capital has a positive impact on output, productivity or growth, the results appear to be quite weak and fragile.<sup>48</sup> The main problem is understanding the relation between public capital and growth and the direction of the cause-and-effect relationship.<sup>49</sup>

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<sup>46</sup> Estimates from the European Commission QUEST model indicate that, depending on financing assumptions, the short-run fiscal multiplier associated with *one-off increases* in public investment expenditure in general could be as high as 0.6, meaning that an increase in public investment by 1 point of GDP could under favourable conditions lead to an increase in GDP by 0.6 points. The medium-term multiplier for a *permanently higher* level of public investment could under such favourable conditions even be close to 1.

<sup>47</sup> See, for example, an extended review of empirical evidence in "Public finances in EMU – 2003", SEC(2003) 571, and also W. Pfähler, U. Hofmann and W. Bönnte, "Does Extra Public Infrastructure Capital Matter? An Appraisal of Empirical Literature", Finanzarchiv, Vol. 53, 1996.

<sup>48</sup> More optimistic results can be found in a recent ECB working paper (D. Romero de Avila & R. Strauch, "Public finance and long-term growth in Europe", ECB working paper No 246, July 2003), where it is found that a 1% increase in the public investment share of GDP would bring

It is therefore important to look in depth at the micro-economic effects of a transport infrastructure investment project or programme and how these effects can be translated in the production function and the labour market. If higher productivity is passed on in terms of cheaper prices, demand for European products increases. Economic activity rises faster than it would have otherwise. If a share of the additional national product is then invested, over time economic output will be increased even further, thus leaving national productivity permanently higher than it would have been without the project. At the other extreme, an increase in productivity could mean that the same level of output is achieved with fewer resources.

It may also be argued that building and operating the TEN-T involves industrial sectors with a high degree of innovation like rolling stock producers, or industries involved in developing and implementing satellite positioning systems and other intelligent transport systems. Providing long-term and stable infrastructure plans allows them to anticipate business opportunities and may spur them to innovate and improve their competitiveness on the global markets, with spill-over effects on other sectors.

The macro-economic impacts on GDP of the TEN-T policy packages have been calculated within the IASON project.<sup>50</sup> Investments in the European+ scenario<sup>51</sup> are expected to increase the welfare of the enlarged EU by 0.23% of GDP in comparison to the trend scenario without these investments. The impact on GDP is slightly higher for the acceding countries than for EU15. Using employment multipliers from an earlier study,<sup>52</sup> this increased economic activity would mean an almost 0.4% rise in employment or close to one million new permanent jobs. However, the way the infrastructure projects are financed is not considered in this modelling exercise.

The highest impacts according to the forecast are to be expected, apart from in acceding countries, in Greece, in the Iberian Peninsula and in Nordic countries.

In the context of the growth initiative submitted by the Commission on 16 July, the Commission will follow up this assessment with a more detailed quantification of the macroeconomic effects on employment and growth potential of additional investment in the TEN-T with the help of econometric simulations. Different scenarios will be simulated with respect to (i) alternatives forms of financing (public, private, PPP, higher debt, higher taxes/charges, etc.) and (ii) alternative assumptions on the productivity gains resulting from the TEN-T and on the actual development of real wages.

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about a rise in growth of 1.6% over the long run, while a 1% increase in private investment share of GDP would cause a 1.1% increase in growth.

<sup>49</sup> See, for example, J. Fernald, "Roads to prosperity? Assessing the link between Public Capital and Productivity", *American Economic Review* 619-638, June 1999.

<sup>50</sup> IASON is a project funded under the 5th Framework Programme; for details on the project and deliverables see <http://www.wt.tno.nl/iason/>. The calculations have been made using the Computable General Equilibrium Model of the University of Kiel.

<sup>51</sup> The projects used in the model are limited to the 14 Essen projects plus the network in accession countries (excluding new priority projects concerning current Member States). The impact of the European+ scenario is, therefore, probably higher.

<sup>52</sup> Terry Barker and Jonathan Köhler: Charging for Road Freight in the EU: Economic Implications of a Weigh-In-Motion Tax, Accepted for publication by the *Journal of Transport Economics and Policy*.

It has to be noted that the analysis of the impact of transport infrastructure cannot be limited to the purely macro-economic dimension (GDP, employment). Environmental and social variables should be included in the evaluation framework, insofar as they contribute to increasing or decreasing the long-term growth potential. As a matter of fact, in many cases the principal rationale for public investment (in transport) is not to increase efficiency in the supply of goods and services which enter production statistics (GDP), but rather to pursue some other policy objective which will raise overall welfare, e.g. protection of the environment or a fair distribution of resources.

### **3. Impacts on modal rebalancing**

#### *3.1 Sea motorways have huge potential*

A cost comparison was made in the TEN-STAC study between road transport and short sea-based intermodal transport on given corridors. The volume of cargo on which intermodal transport produced lower costs was then calculated. The analysis covered a limited number of ports, assuming that operators would try to maximise economies of scale to serve this particular continental market. The results show that short sea shipping services could potentially attract 7.6 million tonnes between Rotterdam and Bilbao, and 9.1 million between Spain and Italy. The figure below shows in more detail the volumes of cargo with lower costs for short sea-based transport, and thus the potential demand on the Bilbao-Rotterdam corridor.

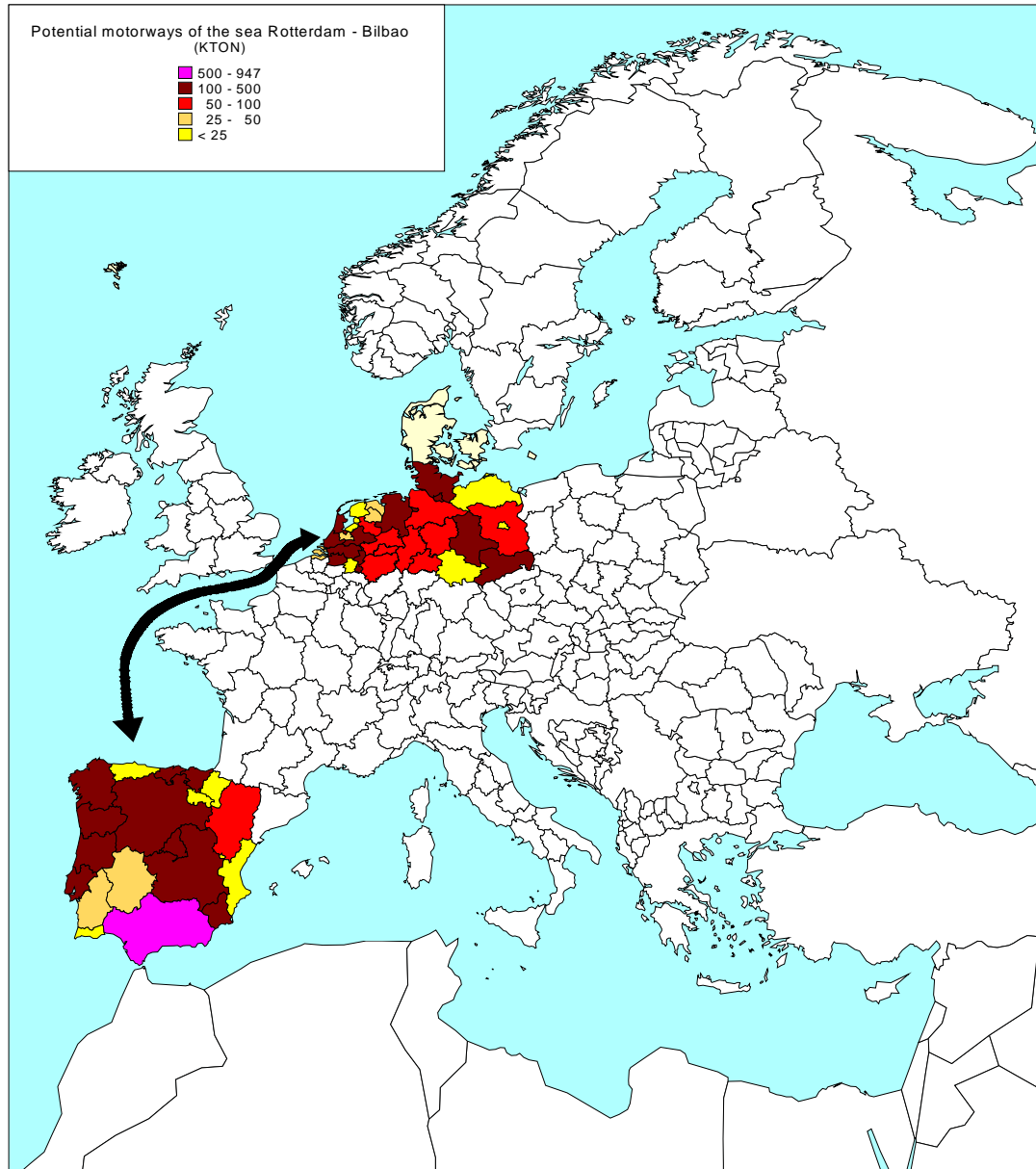
To attract cargo from road transport, services should be such that a shift of cargo towards short sea-based intermodal services provides benefits to the customer in terms of lower costs but also of higher quality (e.g. frequency of several departures per week, improvement of port administrative and handling procedures). In the analysis it was assumed that ro-ro services were used. However, if the logistics industry switches to stackable pallet-wide containers, operational costs on short sea links can be further reduced. It would also provide opportunities for closer integration of this market segment with the deep-sea feeder segment, thereby making for economies of scale.<sup>53</sup>

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<sup>53</sup> An additional advantage is that short sea container services have a better environmental performance than road transport, which is not yet the case with ro-ro transport.



**Figure 1.9** Potential demand on the Rotterdam-Bilbao sea motorway in 2020



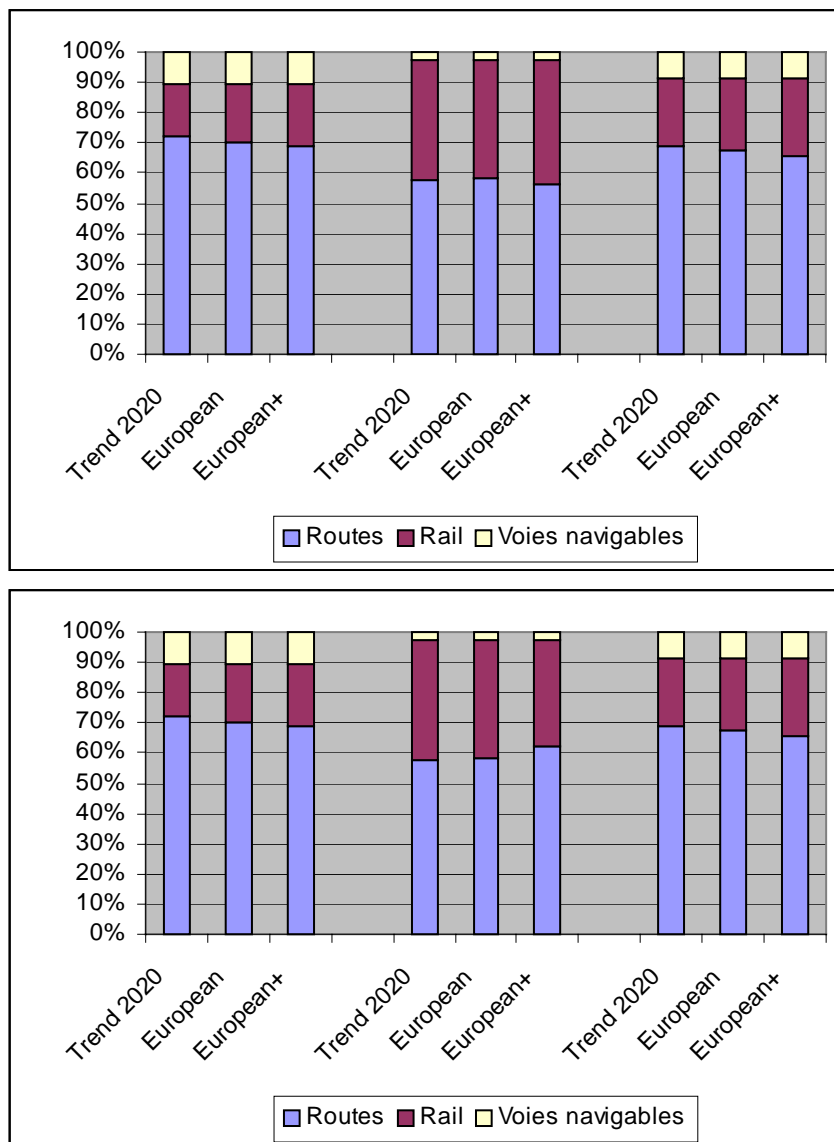
### 3.2 Rail gains in market share

The TEN-T scenarios will help to redress the balance between transport modes in the enlarged EU, as can be seen from Figure 1.8 below. The share of rail transport will increase from the trend forecast 22% to 26% in the European+ scenario in 2020, while that of road would decrease by 3 percentage points. The share of inland waterways remains constant for all scenarios. Therefore, for the current Member States, the TEN-T policy scenarios, in particular the European+ scenario, contribute to the rebalancing of the modes, which is one of the aims set by the white paper *European transport*

policy for 2010 whereby modal shares should return to their 1998 levels. As seen in ch. E.2.1, the rebalancing is particularly successful, in the two TEN-T policy scenarios, on the international traffic segment.

However, given the rapid economic growth forecast in the acceding countries following the extension of the single market, the modal share of road will increase in these countries from 58% forecast in 2020 to 60%. This is, however, still several percentage points lower than the corresponding figure in the current Member States (see Figure 1.8 and Chapter C.1.3). With additional policy measures, the potential of inland waterways could be better used in these countries and the rapid growth of road might be somewhat curtailed.

**Figure 1.10** Modal shares for EU15, acceding countries and EU27



Overall, compared to the situation in 2000, the modal split of the enlarged EU will stabilise, contributing to meeting the objective of the white paper<sup>54</sup>. It is also clear that

<sup>54</sup> It should, however, be noted that the white paper objective comprise only the current Member States.

complementary policy measures, as proposed in the white paper, need to be taken, in particular in the acceding countries, to fully meet the white paper objective.

#### 4. Impacts on environmental sustainability

##### 4.1 *Legal aspects*

Lest there be any doubt, the current decision on the guidelines reminds the Member States that they have to carry out environmental impact assessments, as required by Council Directive 85/337/EEC, for all TEN-T projects, as well as implementing the Habitats Directive (92/43/EEC), which introduces more stringent evaluation and authorisation procedures for projects which could affect legally recognised natural habitats (Natura 2000 areas).<sup>55</sup> The Birds Directive (79/409/EEC) is also relevant for the individual assessment of the TEN-T projects.

Member States also have to implement, from July 2004 onwards, the Directive<sup>56</sup> on the assessment of the effects of certain plans and programmes on the environment and therefore assess the environmental impacts of their plans and programmes leading in a subsequent phase to transport projects, including TEN-T projects. It allows environmental considerations to be integrated upstream in the planning process before any firmer projects are planned (for projects where an environmental impact assessment pursuant to Directive 85/337/EEC has to be carried out).

It is worth noting that, although this document presents only a broad-brush analysis, it is an integrated analysis at European level. It should therefore be emphasised again that despite positive environmental developments at the European level, air quality, noise or other environmental problems may occur at the local level. Therefore, as mentioned earlier, each individual project should undergo a detailed environmental assessment according to existing EU legislation before financing decisions are taken.

##### 4.2 *Greenhouse gas and pollutant emissions to decrease*

The two scenarios reduce total European CO<sub>2</sub> emissions from inter-regional transport by 2% for the European and 4% for the European+ scenario. For the current EU15 the growth in CO<sub>2</sub> emissions will slow down slightly by 2% in the European and by 3% in the European+ scenario. For the acceding countries, CO<sub>2</sub> emissions in both scenarios will be reduced by 5%.

For pollutant emissions, the positive trends described in Chapter C3.3 for land transport modes will be strengthened by the TEN-T scenarios. For EU15, NO<sub>x</sub> emissions from road will be reduced by a further 2 percentage point in the European scenario and 3 percentage points in the European+ scenario. However, the overall growth in NO<sub>x</sub> from all transport modes will remain the same in both scenarios, the gains due to the modal shift from road to rail being too small to offset the growth in air transport.

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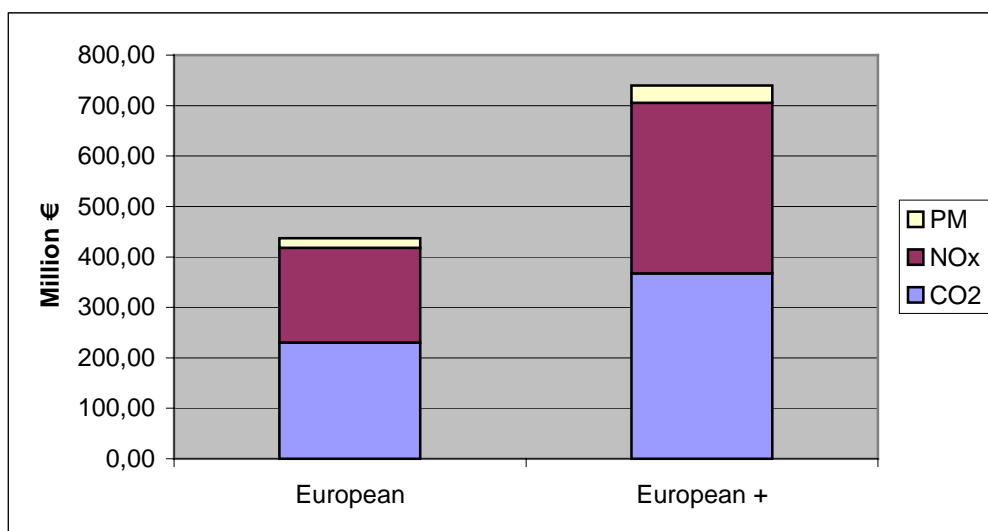
<sup>55</sup> From a legal point of view, EU legislation will apply in the **new Member States** only from accession onwards. However, in granting pre-accession aid, the Commission takes the view that acceding countries should apply and implement the provisions of the environmental *acquis* during the pre-accession period.

<sup>56</sup> Directive 2001/42/EC.

For particulate matter, the European scenario reduces the total amount emitted by 5% and the European+ scenario by 9% due to smoother traffic and less congestion. For acceding countries, the two scenarios reduce NO<sub>x</sub> emissions by nearly 3% since the electrification of the rail network and the reduction of road congestion compensate the overall increase of traffic.

Figure 1.9 gives the monetary value<sup>57</sup> for the reduction (all modes) for each pollutant in the two TEN-T scenarios. The figures, however, reflect only changes in emissions from inter-regional traffic, thus excluding local traffic. European+ reduces air pollution external costs by €740 million per year against €440 million for European.

**Figure 1.11** *Reduction of emission costs from all modes in Europe (versus trend scenario)*



#### 4.3 *Impact on nature small overall – detailed local level assessment necessary*

Assessing impacts on nature requires a detailed analysis, which is performed by the Member States in accordance with the EC directives mentioned above. The criteria used by the High-Level Group to select priority projects included evidence that impacts on nature have already been assessed or commitments that these assessments will be carried out properly in due course for longer-term projects.

The Commission also carried out a proximity analysis of the priority projects with Natura 2000 sites. A rough analysis of this kind cannot be used to discredit a particular project, but it can be used to identify areas where project plans might well need to attach special attention to nature protection or restoration in order to mitigate the short-term effects of infrastructure on nature.

<sup>57</sup> The unit values reflect average European transport and environmental conditions. For further information, see the report on “Estimates of marginal external costs of air pollution in Europe” at <http://www.europa.eu.int/comm/environment/enveco/studies2.htm#Marginal%20external%20costs%20air%20pollution>

It has to be stressed that the Natura 2000 list of sites is not yet complete (e.g. certain German *Länder*) and simply does not exist yet in acceding countries.

A coherent European ecological network<sup>58</sup> - the **NATURA 2000 network** - including flora-fauna habitats and protected areas for birds, has to be established in 2003 and finalised and agreed upon with the Member States by 2005. For some regions, e.g. certain German *Länder* and all candidate Member States, no digital cartographic data on Natura 2000 sites are currently available.

For the analysis in this report, maps of the TEN-T priority projects have been overlaid with maps of the Natura 2000 sites of the European Community. From the available databases on the Natura 2000 sites it is already possible to produce general information like intersection length and area within buffers as well as more detailed information about the vulnerability, habitats and species of Natura 2000 sites.

The maps show how the TEN-T projects are integrated in the railway network, main roads and inland waterways existing in 2000. In cases of overlaying, **buffers** of respectively 0.5 and 2.5 km along the TEN-T projects were used, resulting in corridors of respectively 1 and 5 km. Natura 2000 areas lying outside a corridor of 5 km along the TEN-T projects are also indicated.

To produce basic statistics on TEN-T projects affecting the Natura 2000 sites, the total length of TEN-T projects was evaluated in comparison with the length of TEN-T projects intersecting Natura 2000 sites. The results are presented in Table 1.7 below for projects for which data were available. For most of the projects, the intersection is less than 5%, one is close to 10% (project 07) and project 02 (eliminating bottlenecks on the Rhine-Main-Danube) may cause overlaying of 65.23%, due to the high environmental importance which inland waterways have in many cases.

**Table 1.9** *Natura 2000 analysis of European+ scenario projects<sup>59</sup>*

Project number	(A) Total length [km]	(B) Total length within area with data available	(C) Length within Natura 2000 sites	(C)/(B)x100 Percentage of intersection [%]
<b>LIST 1</b>				
02 Removing bottlenecks on the Rhine-Main-Danube link	135.725	128.684	83.939	65.23
04 Mixed railway line Lyon-Trieste/Koper-Ljubljana-Budapest	1320.449	791.330	42.957	5.43
05 Mixed railway line Berlin-Verona-Napoli/Milan-Bologna	1272.527	1065.999	29.712	2.79
06 Mixed railway line Greek	600.763	189.755	9.483	5.00
07 High Speed Railway lines, South – West	1479.200	1470.691	138.821	9.44
09 Mixed railway line Lyon/Genova –Basel –	1352.259	589.268	20.042	3.40

<sup>58</sup> Council Directive 92/43/EEC of 21 May 1992 (Official Journal L 206, p.7).

<sup>59</sup> The projects that are not presented in the table are completely or partly missing from the maps used in this analysis.

Duisburg - Rotterdam/Antwerp				
10 Mixed railway line	558.176	463.394	36.390	7.85
Paris – Strasbourg – Stuttgart – Wien – Bratislava				
12 Multimodal links Ireland – United Kingdom – Continental Europe (Railway)	1298.907	1272.498	23.726	1.86
12 Multimodal links Ireland – United Kingdom – Continental Europe (Road)	615.459	614.401	9.066	1.48
14 Fehmarn Belt fixed road and rail link (Railway)	702.617	303.817	0.000	0.00
14 Fehmarn Belt fixed road and rail link (Road)	155.875	109.300	0.000	0.00
15 Nordic Triangle (Railway)	243.476	243.476	0.358	0.00
15 Nordic Triangle (Road )	1810.925	457.063	1.723	0.38
16 Multimodal link Portugal-Spain-Central Europe	212.930	212.930	5.990	2.81
18 Motorway Gdansk – Katowice –Brno/Zilina –Wien	969.813	622.256	11.012	1.77
<b>LIST 2</b>				
04 Seine-Scheldt river link	322.166	164.365	3.296	2.01

It is important to note that at this early stage of planning the exact alignment of many sections of priority projects has not been determined. The type and scope of potential environmental nuisances depend fundamentally on national planning and construction work, which are determined by the Member States. Under the aforesaid directives, they have to undertake a strategic impact assessment for plans and programmes as well as an environmental impact assessment for projects in order to check for alternatives and to minimise environmental effects as far as possible.

The only conclusion that can be drawn at this stage is to stress the importance of a project level environmental assessment for the analysis of impacts occurring at the local level. It should also be noted that inland waterway projects need to pay particular attention to mitigation measures or measures for nature restoration to maximise the ecological value of the aquatic environment.

## 5. Social impacts

### 5.1 *Better quality infrastructure leads to fewer accidents*

Due to lack of available data and model parameters, it has not been possible to quantify the impact of the scenarios on accidents. Nevertheless, as presented in Part A, the TEN-T policy scenarios will lead to slower growth in road transport and to improved modal balance.

Both factors will lead to reductions in road accidents. In addition, more traffic will use roads that are of better quality, which will make for further reductions, in particular in acceding countries (see Table 1.2 in Chapter C.3.2).

Intelligent transport systems, proposed by the Commission as a horizontal priority in 2001, include road accident prevention systems which also may also improve the overall road safety records.

In the rail sector, the deployment of modern traffic signalling systems and the phasing-out of road level crossings, as proposed by the High-Level Group within some priority projects (e.g on Corridors IV and V), will in turn improve the safety performance of the rail sector, in particular in the acceding countries.

## 5.2 *Regional accessibility of acceding countries and the periphery to improve the most*

Improved accessibility will enable businesses to reach further markets at lower costs and is of particular importance to the peripheral regions of the enlarged EU, which suffer from the long distances to the big central markets. Better accessibility to regional centres and to tourist destinations during their leisure time is of relevance to citizens in their daily life. The accessibility impacts of the TEN-T scenarios have been calculated by the TEN-STAC project.

Whilst the European scenario presents certain improvements to accessibility when compared to the trend scenario, the European+ scenario improves regional accessibility considerably, as can be seen from Figure 1.9 below.

The relative changes are larger for peripheral regions than for regions centrally located within Europe. The biggest improvements in accessibility, at more than 25%, are anticipated for the Iberian Peninsula, southern parts of France, Italy, the Nordic countries, the UK and Ireland of the current Member States. The acceding countries will gain considerably overall, the biggest relative improvements being calculated for the Baltic countries and Poland.

Despite these accessibility improvements, it is also important to ensure balanced development of the European territory by improving regional connectivity.<sup>60</sup> This can be done by linking the priority projects and the overall trans-European networks with secondary networks.

According to a recent study,<sup>61</sup> regional connectivity is typically much lower in acceding countries and northern parts of the Nordic countries than in central regions. Connectivity to motorway entrances alone reveals a clear distinction between the new and current Member States. The majority of the most disadvantaged regions in terms of connectivity to motorways are located at the Eastern periphery of the enlarged EU and are three hours away from the closest motorway entrance.

While the objectives for the TEN-T, as presented in Part B of the document, focus on international transport and the completion of the single market, other Community instruments as well as national and regional transport planning have an important role

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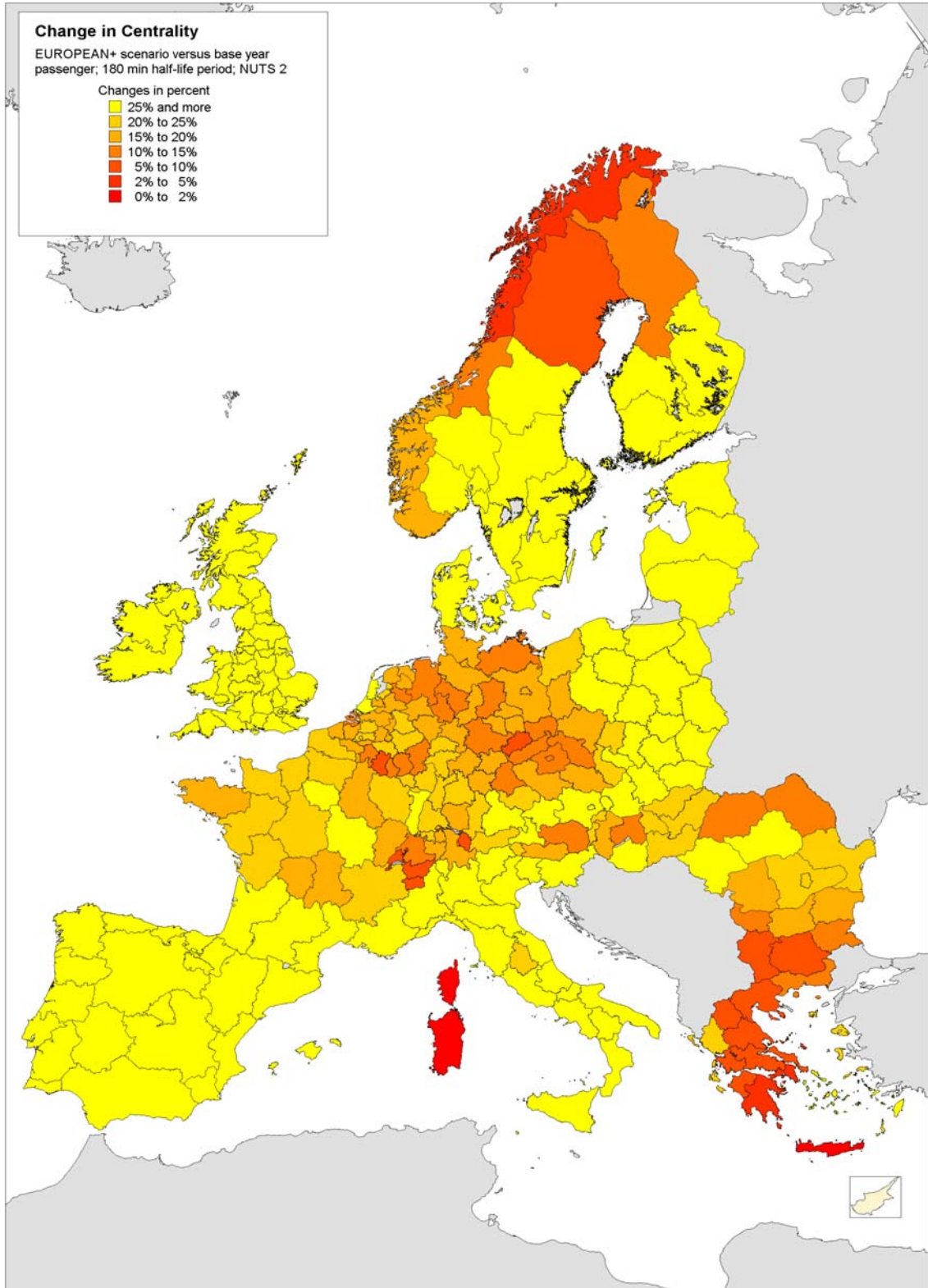
<sup>60</sup> Connectivity can be measured, for example, as the minimum access time from a place to the closest transportation node.

<sup>61</sup> ESPON project, see [http://www.espon.lu/online/documentation/projects/thematic/thematic\\_17.html](http://www.espon.lu/online/documentation/projects/thematic/thematic_17.html)



in complementing the TEN-T policy by ensuring connections to secondary networks and the periphery.

**Figure 1.12** Accessibility improvements of the European+ scenario





### 5.3 *Distribution of economic impacts*

Analysis of the distribution of the impacts among citizen groups, regions and countries can be important for social and equity considerations and for the identification of possible complementary measures. This chapter summarises the distribution of the economic impact, the analysis being based on the results of the IASON project.<sup>62</sup> Distribution of most of the other impacts assessed in this report is presented in the respective chapter.

While the European+ scenario is expected to increase long-term GDP growth by 0.23% in the enlarged EU, the range of impact is between 0.05% - 0.60%. At country level, the biggest gainers in relative terms are Northern and Southern peripheral countries.

Regarding investments in the individual modes, the average impact of the TEN-T policy is 0.12% for rail and 0.16% of GDP for road in the current Member States. In the acceding countries, the effect of rail is smaller (0.05%) whereas the impact of road investments is considerably higher (0.5%).

The distribution of impacts at regional level is analysed on two fronts:

- Economic cohesion and integration - comparison of GDP growth impacts on poorer vs. richest regions.
- Peripherality - comparison of impacts on central vs. peripheral regions.

The analysis is performed both in relative terms, i.e. the impacts are measured as percentages of GDP, and in absolute terms, i.e. in € per inhabitant. It transpires that the results are not the same for both types of measurements.

For economic cohesion and integration, the results show a picture of mostly pro-cohesive effects in relative terms for the TEN-T projects analysed. This can be seen from the fact that effects are on average much higher in lagging and potentially lagging regions (0.48 % and 0.33 %) than in non-lagging regions (0.24%). They are also higher in Objective 1 regions (0.45%) than in the whole area (0.28%). However, this trend is reversed when effects are measured in absolute terms: absolute gains tend to be somewhat larger, the higher the current per capita income.

Regarding the distribution of impacts between centrally located and peripheral regions, there is a tendency for TEN-T projects to benefit the periphery more than the centre. According to the estimates, the highest impacts are expected in Greece, the Iberian Peninsula and in the Nordic countries, highlighting the importance to peripheral countries both of improved connections from the periphery and of better traffic conditions in the centre.

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<sup>62</sup> The IASON analysis is based on the CGE model of the University of Kiel, see <http://www.wt.tno.nl/iason/>. For ESPON see [http://www.espon.lu/online/documentation/projects/policy\\_impact/index.html](http://www.espon.lu/online/documentation/projects/policy_impact/index.html).

## 6. Summary of impacts: European+ scenario offers high socio-economic benefits to Europe

The analysis presented in this chapter indicates that both the European and European+ scenarios offer socio-economic benefits to citizens and businesses across the enlarged Europe. However, the benefits of the European+ scenario far outweigh those of the European scenario, as the higher level of investments, in particular in the acceding countries, makes it possible for the new countries to be more effectively integrated within the Single Market, for congestion and bottlenecks to be better targeted and for the growth of road freight traffic in Europe to be stabilised, with positive impacts on the environment. Table 1.11 below summarises the socio-economic impacts of the European+ scenario versus the trend scenario.

**Table 1.10** Summary of socio-economic impacts versus trend

Category	European	European+
<b><i>Economic</i></b>		
Potential travel time savings	€4.4 billion	€7.7 billion
Cost	€13 billion	€96 billion
Effects on internal market dynamics	Small increase of international traffic	Increase of international traffic particularly important for acceding countries
Reduction in road congestion delays	3%	14%
<b><i>Sustainable development</i></b>		
Modal rebalancing	Reduction of road growth on international market segments	Stabilisation of modal split at European level, reduction of road growth on international market segments and in 12CC
Emission reduction	€0.4 billion	€0.7 billion
Impact on nature	Risks to be further assessed at local level in particular for inland waterway projects	Risks to be further assessed at local level in particular for inland waterway projects
<b><i>Social</i></b>		
Accidents	Fewer accidents due to modal shift and better quality infrastructure	Fewer accidents due to modal shift and better quality infrastructure
Balanced territorial development	Relative accessibility to improve for peripheral countries	Relative accessibility to improve most for peripheral and acceding countries
Higher GDP growth and employment	n.a.	Welfare 0.23% GDP or one million permanent jobs

## **F. MONITORING AND EVALUATION OF THE RESULTS AND IMPACTS OF THE PROPOSAL AFTER IMPLEMENTATION**

The guidelines decision is addressed to the Member States, including the new Member States from the day of their accession to the Community. They will be responsible for implementation of the decision, i.e. for taking the action necessary to turn into reality the projects identified and for cooperating with the Commission and the other Member States to this end.

The Commission in turn will ensure that the aid granted from the TEN budget reflects these new guidelines, by concentrating its support on the priority projects identified, particularly in the indicative multiannual programme implementing the TEN budget and by ensuring that the Cohesion Fund and instrument for structural policies for pre-accession gives priority to them, while complying with the variety of Community rules on the environment, competition, interoperability and safety.

A series of mechanisms will ensure monitoring at Community level. The mid-term review of the action programme provided for in the White Paper on European transport policy will check that the guidelines are consistent with European transport policy. The implementation report provided for in Article 18 of the decision will provide a means of assessing progress towards completion of the entire network. Certain projects or groups of projects will be closely monitored by a European coordinator designated for this purpose, notably to detect any risks of delays as early as possible or any changes in the regulatory environment or other aspects which could influence the characteristics of the projects.

The decision calls on the Member States to conduct a posteriori evaluations of the priority projects not later than five years after the completion of the projects and to inform the Commission of the results to provide input for a more comprehensive assessment. One inherent feature of the work involved is that it will take a long time to complete the programme mapped out by the guidelines. A posteriori evaluation of the entire programme makes sense only after a certain time. Based on the recommendations made by the High-Level Group, the Commission plans to conduct a full ex-post evaluation towards 2010, in order to prepare new guidelines, if necessary, before the financial perspectives for 2013-2020.

## **G. STAKEHOLDER CONSULTATION**

The public debate on revision of the guidelines for the trans-European transport network was opened as soon as the White Paper on European transport policy was published. This document had already set out the broad lines of the revision and explicitly announced a two-phase revision process, the second phase of which would be shaped in the light of the reactions triggered by the White Paper, which is the purpose of the additional proposal. The initial proposal, submitted in 2001, started the debate, both within the institutions and amongst the interested parties. A conference in Barcelona, bringing together over 500 participants in November 2002, focused on the future of the trans-European network.

To a large extent the report by the High-Level Group composed of experts from the current and future Member States and from the European Investment Bank reflects what the Member States expect on most aspects concerning the trans-European transport network. The Member States were also consulted formally in the committee provided for by Article 18 on organisation of cooperation along corridors and funding.

Public consultations were also organised as soon as the report by the High-Level Group was published<sup>63</sup>, providing an opportunity to add to and update the views gathered. The Energy and Transport Forum - an advisory committee made up of representatives of operators, users' associations, infrastructure managers, environmental protection associations and universities - in turn gave a formal opinion on 10 September 2003. The European Economic and Social Committee likewise adopted an exploratory opinion on the subject on 26 September 2003. The 77 comments received by the Commission in the course of this broad consultation exercise can be summed up as follows:

- Certain institutional bodies (Energy and Transport Forum and Economic and Social Committee) argued in favour of strengthening the financial capacity and ensuring closer coordination at Community level in order to complete the network in the enlarged Union, including penalties for States which fall behind schedule with their projects and institutionalising coordination along the major routes.
- General industry called for greater public investment by the Community and the Member States in infrastructure of European interest, chosen on the basis of strict criteria, giving preference to infrastructure which would rapidly become economically profitable, notably road schemes. Certain associations representing the automobile industry criticised the priority given, in advance, to non-road infrastructure.
- The railway, inland waterway and intermodal transport industries, consignors' associations and certain road and logistics operators stressed the importance of a coordinated route-by-route approach, of an interoperable high-speed rail network, of greater public investment in railways and inland waterways, particularly in order to establish a dedicated Europe-wide freight network and to promote intermodality, and closer coordination of investments.
- The maritime and port industries welcomed the concept of motorways of the sea, but encouraged the Commission to develop more precise rules than those outlined by the High-Level Group in order to maintain fair conditions of competition and at the same time make it possible to put together specific projects.
- International environmental protection associations favoured planning which gave priority to better quality infrastructure, by means of policies to manage or restrict traffic rather than to construct new infrastructure, and paying greater attention to the environmental impact risks in the new Member States. Local associations from Italy and the new Member States voiced dissatisfaction about the way in which the Member States conducted environmental impact assessments for sections of some

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<sup>63</sup> See [http://europa.eu.int/comm/ten/transport/revision\\_1692\\_96\\_en.html](http://europa.eu.int/comm/ten/transport/revision_1692_96_en.html)

of the priority projects proposed and drew the Commission's attention to variants which would soften the adverse impact on the environment.

- Associations representing regional or local authorities spoke out in favour of shifting the regional balance, particularly via motorways of the sea, and backed the concept of European corridors as instruments for shaping regional development in Europe.
- Various citizens or groups of citizens argued in favour of projects not recommended in the report of the High-Level Group, inter alia the planned high-speed link between Brussels and Luxembourg (Eurocap), the inland waterway schemes along the Elbe and Oder, projects in northern Sweden, projects along the Mediterranean arc in France, a road link between Italy and Austria or projects recommended only in the long term by the High-Level Group (inland waterway link between the Seine and the Escaut). Others even took the initiative to voice opposition to projects not selected by the Group, such as the abovementioned planned road link between Italy and Austria.

It must be stressed that many of the comments put the problem of the priorities for the trans-European network in the wider context of the common transport policy, including other measures such as charging for the use of infrastructure and continuing the reforms on the railways. Most of them also linked this problem to the question of funding by the Community, which is generally considered insufficient, and with the lack of coordination between Member States on the transnational links.

The Commission's proposal to amend the TEN-T guidelines integrates several of the above suggestions, namely strict criteria for selection of the priority projects, new mechanisms for operational and financial coordination between Member States and clearer rules on the motorways of the sea.

## **H. SUMMARY OF THE COMMISSION'S PROPOSAL**

The Commission proposal, based on the recommendations made by the High-Level Group and on the reactions received, adds to the amended proposal submitted in September 2002. This impact assessment demonstrates that the socio-economic impact of the proposal will be positive.

These additions to the amended proposal aim to make it easier to reach agreement within the Council and thus to attain the objective set by the European Council of adopting these new guidelines quickly. The proposed new amendments are the following:

- add to the list of priority projects proposed in 2001 the new projects identified by the High-Level Group, including new forms of support for the development of transnational projects for motorways of the sea;
- grant a "European interest" label to these projects giving them priority to use the Community resources available in accordance with the rules applicable to the Community financial instruments for the networks; in particular, this label

provides for the Member States to carry out, prior to the authorisation of projects, coordinated evaluation and public consultation procedures or a transnational enquiry in the case of certain cross-border sections;

- introduce a mechanism aimed at closer operational and financial coordination between the Member States for certain projects or groups of projects declared to be of European interest, with the designation of "European Coordinators";
- extend the deadline for completing the trans-European network to 2020; this is in view of the time which has passed since the initial proposal was presented in October 2001 and also the time it will take to build the transport infrastructure.