TEN - Invest

Transport Infrastructure Costs and Investments between 1996 and 2010 on the Trans-European Transport Network and its Connection to Neighbouring Regions, including an Inventory of the Technical Status of the Transport-European Transport Network for the Year 2000

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FINAL REPORT

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1 Introduction

1.1 Project Background, Objective and Approach

In 1990, the Council adopted an initial outline plan for high-speed railway lines, which was proposed by the Commission. Subsequently, in 1994, in order to provide crucial political incentives, a list of list of 14 priority projects was adopted by the Essen Council and the European Parliament.

In 1996, the European Parliament and the Council adopted Decision No 1692/96/EC on guidelines for the development of the Trans-European transport network (TEN-T) by 2010, this decision is referred to as the 1996 guidelines. Article 21 of the Decision contains a revision clause, under which the Commission is required to submit a report after five years indicating whether the guidelines should be adapted to take account of "economic development and technological developments in the field of transport, in particular in rail transport". The Guidelines encompass the 14 priority projects, as well as the outline plans for roads, rail, inland waterways and airports.

Since then, on 22nd May 2001, the Parliament and the Council on 22 amended the outline plans to incorporate seaports, inland ports and terminals (Decision No 1346/2001/EC).

Regarding the transport infrastructure networks in the Central and Eastern European Countries a Transport Infrastructure Needs Assessment (TINA) has been conducted after the EC has proposed a structure for European transport networks serving the whole continent at the Helsinki conference in 1997.

The TEN Invest project was launched in order to provide a comprehensive overview of past and planned future investments made in the Trans-European Transport Network (TEN-T) in the enlarged European Union[1]. Hence, the scope of work covered the 15 Member States together with the Candidate Countries, Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

The large number of countries covered called for a substantial data collection exercise, which proved to be a complex task. The optimum methodology for this exercise was the application of an approach (refer also to Annex 1-1), as proposed in Planco's Technical Offer, comprising the following components:

[1] The network dealt with in the course of the project is always referred to as the "TEN-T network in the enlarged European Union". This network is made up of the TEN-T network in the Member States as set out in the 1996 Guidelines and a network in the Candidate Countries, which is based on the so-called TINA network.

- A network of direct and pro-active contacts was established with the relevant administrations in the Member States and the Candidate Countries with the help of sub-contractors of Planco Consulting. Face-to-face interviews were considered a prerequisite for the data collection. Furthermore, substantial information was also gathered by desk research covering, inter alia, national investment plans, infrastructure studies, etc.
- A data collection tool called “PLANTis” was developed on the basis of the digital networks provided by the EC to facilitate the data collection procedure and to input the collected data directly into a specific data management system in a consistent manner.
- “PLANTis” was developed as a stand-alone system not only to collect but also to present the content of the database, which could be used as input material for presentations, documentation etc. Furthermore, all information was prepared in such a way that it could be presented on the TEN-T WEB site.
- The organisation and management of the database in MS-Access was a further step to achieve the final objective to permit the analysis of the data in electronic form and eventually to introduce it into a geographical information system of the Commission.

Based on the data collected in the EU Member States and Candidate Countries, the results provide in-depth information on the technical status of the transport infrastructure where it forms part of the Trans-European Transport network. Both the existing and targeted TEN are covered, as defined in the 1996 Guidelines. The results identify the technical status of all sections of the land transport links and other components of the network.

The infrastructure network not only includes roads, railways and inland waterways but also major ports and airports. Since inland terminals are part of the TEN-T but not specifically defined 1996 guidelines and displayed on a map, they were excluded from the data collection exercise. However, inland terminals were covered by the TINA exercise and some relevant figures were collected in respect of Candidate Countries. These were included in the database. The same also applied to traffic management systems.

Based on this inventory all investments in the TEN-T between 1996 and 2001 and all investments anticipated by experts from national ministries up until 2010 were identified. Furthermore, where available, details of planned network developments between 2010 and 2015 were also collected.

Besides data on investments, sources of financing for road, rail, inland waterways, ports and airports were recorded for the years 1996 and 2001 and changes indicated for the years 2010 and 2015, depending on the availability of information. Analyses of decision-making processes and comments on the reliability of, e.g. past or present forecasts of traffic demand, were also presented. This knowledge will assist the Commission to prepare the proposal for revision of the Guidelines in 2004, including the estimation of the total infrastructure costs and thus the necessary funds to be made available for this sector.

1.2 Network Determination

Due to the limited budget, the information collection had to be concentrated on the Trans-European Transport network, although originally a somewhat wider coverage was envisaged. As far as possible the data were presented at the NUTS III level provided by Eurotat. Counties and municipalities, which in most of the areas form the NUTS III regions, were not contacted.

The results achieved depended on the data made available by the experts from national ministries in the countries (refer to Annex 2-3) concerned as well as on the information concerning networks and other components of the network made available to the Consultant by the Commission. The networks used in the data collection were based on this information.

The link determination was based on definitions and targets set out in the 1996 Guidelines. The start and finish nodes of projects reported in the implementation report of 1998 were not useful to determine links, as these projects sometimes concentrated on small link portions and changed every year. Taking into account the purpose of this project, it was considered more sustainable to determine links by the decision as to whether a link had been defined as a certain type of the network and whether the type was already in existence or whether it was still at the planning stage. For each link, start and end nodes had to be named.

For technical reasons, in Spain, Greece, Netherlands and Ireland, information concerning existing or planned link types for the road network was not available. In these cases the links were determined using the transport information system developed in the framework of the CODETEN project.

The networks presented in the data collection tool therefore indicate the link type, whether the link existed in the year 2001, whether it complied with the TEN-T target, as set out in the 1996 Guidelines, or whether it was still waiting upgrading.

1.3 Expected Findings

The results achieved by the project depended not only on the collaboration of the responsible experts working in national ministries in the Member States and the Candidate Countries, but also on political decisions concerning future network developments. In some countries such decisions have not yet been taken or cannot be published due to constitutional constraints. Therefore very often network developments were reported only for the next two or three years.

In other cases network extensions have been studied and costs estimated but the year of implementation has not yet been fixed. Further, in almost all cases where the costs of different projects were provided they did not distinguish between study, planning and implementation components. Investments were given only as global figures.

Most of the ports, airports and terminals in the network are privately operated. In these cases centralised government institutions are generally not informed concerning their investment plans. Therefore these organisations were contacted individually. To limit the extent of the data collection only international airports and ports categorised as class A were approached. Terminals were included only in the TINA network. As long as the Candidate Countries provided information on such terminals these data were included in the database.

However, in spite of all constraints and problems the project achieved the following:

- The data collection and presentation tool “PLANTis” was developed as a stand-alone system.
- A database was developed, based on MS Access and handed over to the Commission for connection to a geographical information system.
- As far as available, technical information on all networks was provided on a link-by-link basis for the years 1996, 2001, 2010 and 2015 for the Member States and the Candidate Countries.
- Investments for all modes of transport together with the time period during it is anticipated that they will be executed were collected for all countries
- Investment costs distinguished between mode specific measures and were used to determine the investments required to develop a link from an existing link type to a planned link type or to extend the network by additional links. However, unit costs could not be checked using information stemming from the ECMT survey, as this was not available at the time of the study though may be in the future.
- The sources of funding were determined from the data gathered at the data collection stage and were also based on information received from financing institutions.
- An overview is given concerning the procedure and the basis on which investment decisions are taken (e.g. priority finding, forecasts etc.)
- The total costs to implement the Trans-European network as targeted in the guidelines 1996 are estimated for different modes with regard to Member States and Candidate Countries.
- Technical parameters and cost estimates are presented for the specific projects mentioned in Annex III of the guidelines.

2 The Data Collection Approach

2.1 Network Determination

The most important prerequisite for the data collection activity was the definition of the network and its components. Both those who collect and those who provide data had to be able to assign it to a clearly specified component of the network, regardless whether the information was technical or financial. The components of the Trans-European Transport network (TEN-T) are links for road, railway or inland waterway transport and nodes for ports and airports, where short sea shipping, international shipping, air transport or intermodal transport are involved.

The Commission handed over details of two networks to Planco. The first network[2] covered TEN-T for both the 15 EU Member States and the Candidate Countries and consisted of a large number of short links. For this network, short segments with different codes, the length and segment status (i.e. existing or planned) were indicated. No names were given for start and end nodes. A second network[3] covered only the Member states with the exception of Spain, the Netherlands, Ireland and Greece. The network consisted of different links for which the length, the name of the start and end node, the link type (i.e. motorway), the national as well as the European road number was indicated.

Neither network was suitable to serve as basis for the data collection as the links were neither defined by start and end note nor were comprehensive. The information concerning ports and airports, however, could directly be used for the data collection procedure.

Based on the available information, a mode specific network was developed using the segment-orientated network as geographical information. As data could not be collected for each of these small segments, links were determined. According to the objective of the project, the information concerning link type (motorway, high quality road, ordinary road, conventional line, upgraded high speed line, high speed line etc.) and link status (existing or planned, as defined in the 1996 guidelines) was used. Each link was defined by a start node and an end node.

As far as possible, the link with start node and end node was taken from the second network provided by the Commission. Where this network provided no information on routes described by a chain of segments in the geographical information, these links were determined using the Transport Information System (TIS) developed in the framework of the CODETEN project. In these cases the link type, start and end nodes were taken from the TIS. In cases where the TIS did not provide any information, the link type and the start and end nodes were input manually. Whenever in the network used as geographical information, the status

[2] name of the file provided e.g. for road rdeu1mv4.*

[3] name of the file provided e.g. for road rdlktr.*

changed from one segment to another the location served as the end of one link component and the start of another. However, the overall link remained the same. It was divided into different components only to reflect changes in status in different link parts.

All link components had the same start and end node as the link. The length of a link or a link part was calculated by aggregating the length of the segments belonging to it.

To facilitate the data collection procedure for both sides, i.e. information providers and collectors, the networks were presented as follows:

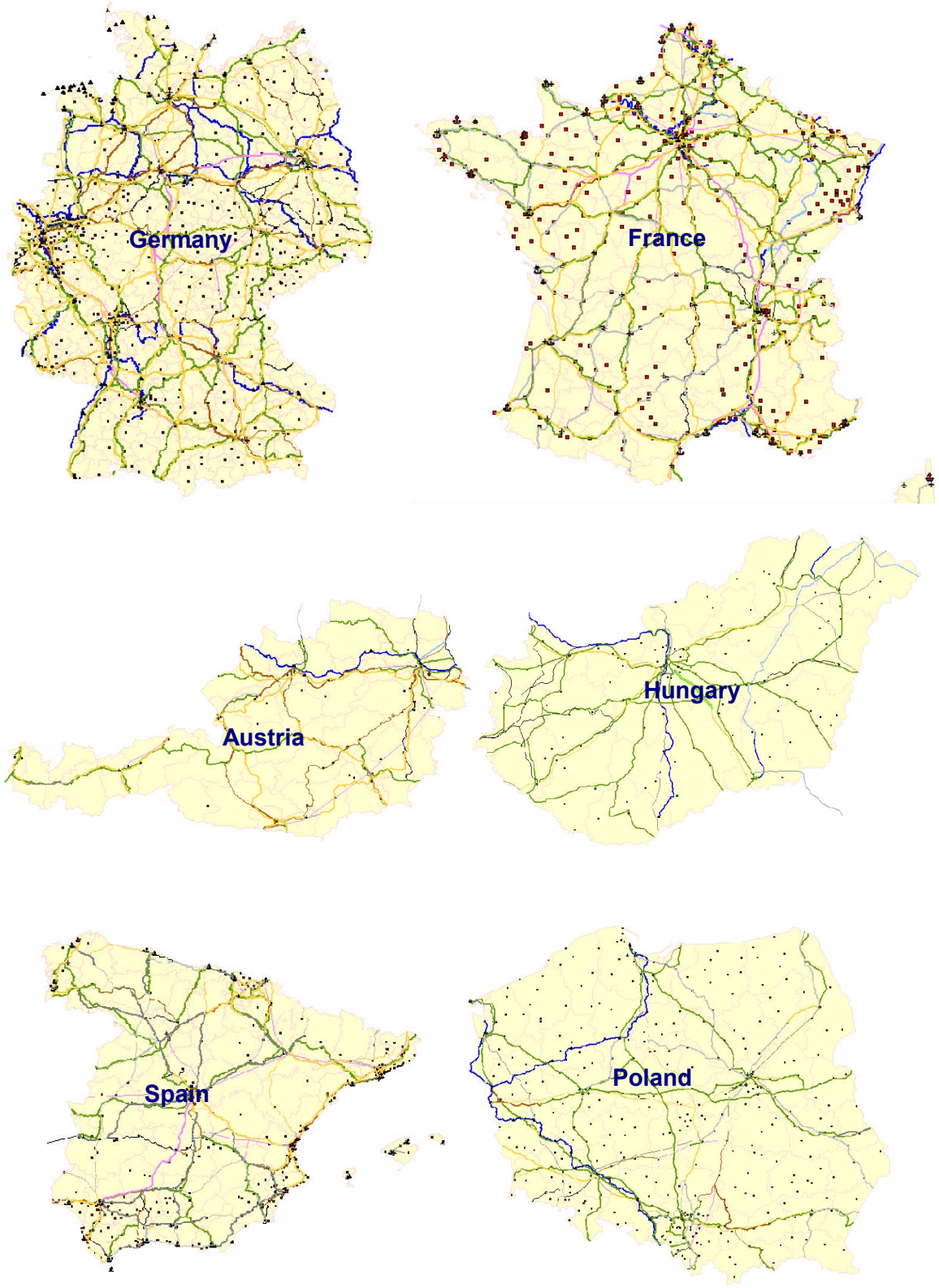
- The road network distinguished between the link type (motorway, high quality road and ordinary road) and the targeted status according the 1996 Guidelines for every link and/or link part. Those links (link parts) that were already in existence in the year 2001 were shown in thick lines and where the expected status was not achieved in thin lines depending on the link type.
- The railway network considered conventional lines, upgraded high-speed lines and high-speed lines as link types and the targeted status according to the 1996 Guidelines. Again, the links (link parts) that were already in existence in 2001 were shown in thick lines and where the expected status is not achieved in thin lines, depending on the link type.
- The inland waterway network distinguished link types in the various ECMT classes. The guidelines anticipated that all links of the Trans-European Transport network would belong to ECMT classes higher than ECTM class IV.

Although the networks were prepared for the whole set of Member States and Candidate Countries forming the area to be covered in the framework of the study, they could be and are presented for each country individually. Examples are presented on the following pages.

2.2 The interactive Data Collection Tool – “PLANTis”

The information to be assembled in the course of the study was extensive. Therefore a comprehensive and user-friendly tool was specifically developed to facilitate the data collection. This tool, named PLANTis, offered the possibility to insert data covering the different transport modes on a link-by-link/node-by-node basis. The basis of the tool was an interactive map, which displayed the existing TEN-T networks and nodes as previously described. The data to be collected with the help of the tool was visualised by different dialogues covering technical and investment/financial information. The detailed instructions on the use of the “PLANTis” tool and which data were to be collected are described in the manual attached to this report. The following paragraphs however provide a summary of the function of the tool and the associated information requirements.

Map 2-1: Display of interactive maps of selected countries (“PLANTis”)



As soon a specific link was marked, the interactive data collection tool showed a mode specific toolbox to be filled in. The tool showed for the link, the link ID, the link part number, the

number of link parts belonging to the link, the start node number, the end node number, the start node name, the end node name, the link type and the status (existing or planned) determined by the 1996 Guidelines. Furthermore, the proposal for a revision of the TEN-T Guidelines issued by the EC in 2001 has been taken into account. The link type and the proposed status within he revised network is shown. These features were predetermined and were not a component of the data collection. (It should be noted that the data on the proposed revised TEN-T network (TEN-T network 2001), made available by the Commission, is still in the process of discussion. It has been approved by the European Parliament. An agreement within the European Council has not been reached yet.)

2.2.1 Interactive Input of the Technical Status

The status of the specific link was input for 1996, 2001, 2010 and 2015[4] by means of a drop down box, distinguishing between existing and planned investments. Where available the information for 1996 and 2001 was already input. Furthermore the length of each link (link part) was also already provided. In the event that a link did not exist in 1996 or 2001 no information for these years was presented (or needed to be input.) By the years 2010 and/or 2015 links may exist or may still be planned. In both cases, the technical information relating to the existing or planned link was input. All features mentioned so far apply to all modes.

From then on, however, the requested technical data were specific to each mode and each is discussed below.

Road network links were categorised as follows:

- ordinary roads or all-purpose roads are open to all kinds of traffic; such roads may or may not have a median,
- high-quality roads, motor traffic roads or express roads are limited to cars buses and trucks; these types of road are connected to other roads via interchanges or at level intersections. They may or may not have a median,
- motorways are internationally defined, i.e. as roads with a permanent physical division (median) between the two directions. All entrances and exits take place at interchanges.

For all roads the following information was requested:

- the number of lanes per direction,
- the speed limit (if any),

[4] The information refers always to the end of the reference years.

- the responsibility for construction and maintenance was requested.

For the railway network the link types were defined as high-speed lines, upgraded high-speed lines or conventional lines. For each link, as far as it was available, the following information was input:

- the type of traffic, i.e. passenger, freight or mixed,
- whether or not the line was designated for intermodal transport,
- the type of traction and if electric, the voltage,
- the number of tracks and the track gauge,
- the minimum loading gauge and the maximum axle load,
- the maximum speed and length of train,
- the type of command control system employed.

For the inland waterway network the following were input for each link:

- the type of waterway, as between a regulated river, a channel or a perennial river,
- the number of single and double locks and the maximum draught,
- the maximum height for containers and the ECMT class.

For ports the data collected sought to verify the following:

- the type of port, i.e. maritime, inland or a combination of the two,
- the maximum draught of the approach channel,
- the existence or otherwise of transhipment facilities for short sea shipping and intermodal transport,
- the type of throughput, as between passenger and freight together with latest operating statistics,
- whether the port is connected to the Trans-European network and if so, by what kind of mode.

The data for airports covered the following:

- the type of airport: international/ international system, community connecting point or regional,
- the latest operational statistics covering freight and passengers,
- the total capacity, the number and length of the runways and the operating hours,

- whether the airport is connected to the Trans-European network and if so, by what kind of mode,

Terminals are covered only in the TINA network. As far as available, information was requested on the following:

- the type of terminal i.e. road, rail waterway or multi-modal,
- the type of goods handled the latest throughput details and the capacity,
- details of any Trans-European network connections.

2.2.2 Interactive Input of Investments

In addition to the information on the technical status for each link and node, data on investments, project status, new measures etc. were also requested. This included details of new projects and developments on every link. A project could be part of one link, cover a whole link or could span several links. Therefore the starting and end points, together with the commencement and completion dates of all projects were required. Furthermore a project identifier was also assigned. This could be related to projects mentioned in the TEN-T implementation report, but had to start with the country code followed by three digits. (e.g.: for a road link in Spain, for which the referencing number to the map is "1" enter "ES001". If the reference number is e.g. "13.2" enter ES013_2.).

Next, the current status of all projects was specified, distinguishing whether they were in:

- the planning stage, involving the conduct of, e.g. feasibility studies and cost benefit analyses,
- the design study phase: typically, when the preparatory work has been completed, concrete design studies are launched, covering aspects such as layout, technical specifications, etc.,
- construction: this is the project implementation phase,
- completed: the project is finished and ready for operation.

Investments or costs related to projects were entered in January 1999 prices excluding VAT. Where possible, costs for planning, studies and construction were separated and the sources of financing indicated for each (national funds, TEN-T, ERDF, EIB and others).

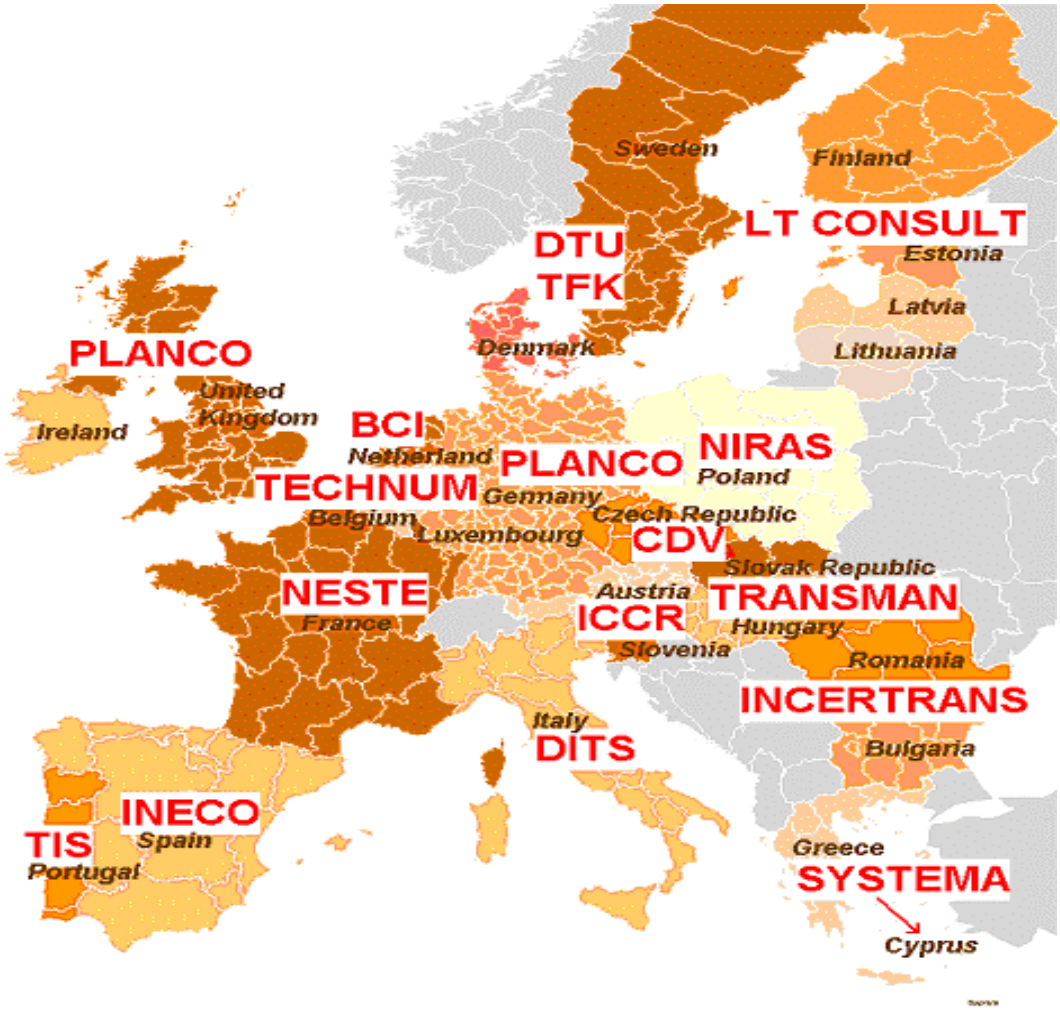
As projects consisted of different measures, the type of measures was to be indicated including the cost and the period of implementation. These measures differed from mode to mode and therefore for each a specific list was provided.

2.3 Data Collection Procedure

2.3.1 Regional Coverage

The large number of countries covered required not only a well-designed data collection tool but also a well-organised and systematic collection approach. Therefore Planco established a system of direct and pro-active contacts with the relevant administrations in the Member States and the Candidate Countries. The local contact set-up included partners in almost all countries. Furthermore, the in-house availability of information and data, together with the close co-operation with the various ministries involved and experts in their countries were also a great help. Based on these contacts, substantial information covering national investment plans, infrastructure studies, etc. was gathered via desk research. The following map indicates which member of the consortium covered which country.

Map 2-2: The local Contact System established by Planco Consulting GmbH and Partners



2.3.2 Data Collection Activities

Face-to-face interviews were considered to be a prerequisite for a successful data collection exercise. In order to optimise their effectiveness, a stepwise approach was adopted and presented to the representatives of the Member States. The initial step was to send a general questionnaire to these representatives and the Candidate Countries (see Annex 2-2). The purpose of this first questionnaire was to obtain and/or verify the names and positions of the experts at the respective ministries responsible for the different modes in the countries involved.

Furthermore these questionnaires also requested information concerning transportation studies, forecasts, decision-making procedures and studies to derive unit costs for transport planning, construction and maintenance. Several national authorities made available transport plans, budgetary information and other relevant material, which were screened and inserted into the database. Several ports and airports had to be contacted directly. The table in Annex 2-3 lists the contact persons who were consulted during this phase of the work.

Based on the results of this general questionnaire, the relevant experts at the ministries were approached via the country representatives to carry out a first round of face-to-face interviews using the data collection tool. The data thus collected were directly input into the data management system for analysis following completion of the first round.

A thorough check of all figures provided so far pinpointed inconsistencies and lacking information. A second round of face-to-face interviews was then undertaken in order to correct inconsistencies and to fill in the gaps.

This whole procedure commenced with a workshop in which the responsible researchers of all members of the consortium participated. At this workshop the procedure and structure of the data collection was discussed and an appropriate set of instructions prepared. At this stage, it also became clear that a recommendation letter from the Commission was necessary in order to explain the official nature of the enquiry and to maximise the co-operation obtained. A draft of a suitable letter was immediately submitted by Planco to the Commission for approval.

The intended data collection procedure was somewhat hampered by parallel activities related to the TEN-T implementation report initiated by the Commission. Thus, additional efforts were necessary to combine both procedures and to collect information.

2.3.3 Availability of Data

The availability of data differed significantly between countries and the situation in the Candidate Countries was often especially difficult. It should be noted that the information on ports and airports mostly had to be collected by direct requests to the organisations themselves.

Since in most countries many of these are privately operated a central authority that could provide global information did not exist. In some cases there was a reluctance to co-operate due to the commercial sensitivity of the figures requested and because of the large and increasing number of requests for statistics from external bodies. The same also applied to some railway organisations.

With regard to projected investments, the availability of data was sometimes not very satisfactory, since future plans either simply did not exist or they were not in the public domain. The situation in the near future, say until around 2005, was generally better than the longer term, particularly beyond 2010.

Most of the data were collected by means of a combination of personal interviews and desk research. The following figure shows where information was available and has been integrated to the largest extent possible in the database.

Figure 2-1: Availability of data per mode and country [5]

	road		rail		IWW		airports		ports	
Country	technical status	invest-ments	technical status	invest-ments	technical status	invest-ments	technical status	invest-ments	technical status	invest-ments
Austria	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Belgium	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bulgaria	yes	no	yes	yes	yes	no	yes	yes	yes	yes
Cyprus	yes	yes	#	#	#	#	yes	yes	yes	yes
Czech Republic	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Denmark	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Estonia	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Finland	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
France	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Germany	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Greece	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Hungary	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ireland	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Italy	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Latvia	yes	yes	yes	no	#	#	yes	yes	yes	yes
Lithuania	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Luxembourg	yes	yes	yes	yes	yes	no	yes	yes	#	#
Malta	yes	yes	#	#	#	#	yes	yes	yes	yes
Netherlands	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Poland	yes	yes	yes	yes	yes	no	yes	no	yes	yes
Portugal	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Romania	yes	no	yes	yes	yes	no	yes	yes	yes	yes
Slovakia	yes	yes	yes	yes	yes	yes	yes	yes	yes	no
Slovenia	yes	yes	yes	yes	#	#	yes	yes	yes	no
Spain	yes	yes	yes	yes	#	#	yes	yes	yes	yes
Sweden	yes	yes	yes	yes	#	#	yes	yes	yes	yes
UK	yes	yes	yes	yes	#	#	yes	yes	yes	yes

not applicable

[5] Status as of 28th of February 2003

2.4 The data base

The collected information is stored in an MS-Access data base. The most important advantage of the PLANTIS tool is the interactivity with the data base. Data input into the PLANTIS are directly inserted into the data base and can directly be extracted from the data base per mode, link part, number of links, region country.

The data base is organised according to technical information and investment information. The technical information distinguishes between the modes roads, railways, inland waterways, ports, airports and inland terminals. For each mode a specific table has been established where each link part is described by one data set (row). The link can be identified by one identifier for ports, airports and terminals and by a combination of characteristics for inland waterways, railways and roads. The construction of these identifiers and the content of the technical tables are described in the Plantis manual.

The investment cost data as well as the source of financing is organised in a separate table which provides information concerning projects related to a specific link and measures the project consists of. The measures have been determined mode specific and amount up to 15 different measures per link. The aggregation of the measures result in the costs of the project. For each measure the purpose of investment, the period during which the measure is carried out, the source of finance and the actual status and particular remarks are stored in this table. The information which measure (project) belongs to which link is provided by the link identifiers mentioned before, which are added to each measure. The content of the investment data base is also described in the manual mentioned before.

The organisation of the data base has been developed in the framework of this project to facilitate the data editing an to enable any user to easily extract any information needed. However, during the design of the data base the organisation of the network provided by the Commission has been taken into account in order to ensure the establishment of the data base in the Commission's system.

2.5 PLANTIS as presentation tool

The purpose of the development of the PLANTIS tool is not been to collect and edit data in the framework of TEN Invest. The tool has to be enabled to visualise the data for any presentation. The tool is based on an interactive map which displays the TEN-T network with its networks and nodes. The networks and nodes are arranged in layers which means that every single mode of transport is presented in one separate layer. This enables the user to display the different nodes and networks separately or to chose which layers shall be displayed jointly on the map. Apart from the transport modes layers containing cities, Nuts3 regions and countries are provided.

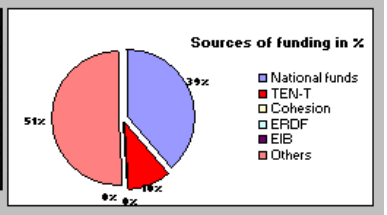
Figure 2-2: Possibilities to display information

Information on link/ node basis

Railways from Paris to Reims

TECHNICAL INFORMATION

	1996	2001	2010	2015
status			existing	existing
length of link (km)			109.0	109.0
type			Highspeed	Highspeed
activity			Passenger	Passenger
kind of traction			Electrified	Electrified
gauge			1435	1435
number of tracks			2	2



MEASURES, INVESTMENTS AND FUNDING

Measures	start year	end year	Status of implementation	Investments in million EURO	Sources of funding in %					
					National funds	TEN-T	Cohe-sion	ERDF	EIB	Others
PROJECT	2000	2007	Under Construction	3125.0	39%	10%				51%
Other line measure										
TOTAL INVESTMENTS				3125.0	39%	10%				51%

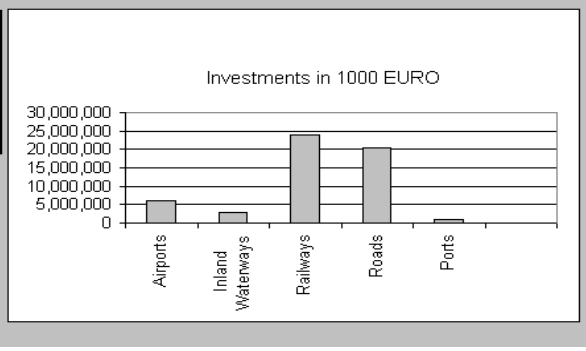
Information on selected links

Link	From	To	Status	Type	Length	Traction	Max. speed	Tracks	Total investment 1000 Euro	from	to
1	TGV Junction to Valenton and to the triable de Coubert	TGV Sud-Est Junction to Dijon	Existing	Highspeed	162.1	Electrified	160	3		1998	2001
2	TGV Sud-Est Junction to Dijon	Macon-Ville	Existing	Highspeed	171.7	Electrified	300	2	64000	1998	2001
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
	Total				333.7		160	2	64000	1998	2001

Country: France

Total Investments in 1000 EURO

Mode of Transport	1000 EURO
Airports	6128005.2
Inland Waterways	2746817.4
Railways	23832480.5
Roads	20423351.3
Ports	1016658.7



Examples for the application of PLANTIS as a visualisation tool are shown in Figure 2-2. For a marked link on the interactive map specific technical details as well as information on measures and investments of the link will be extracted from the data base and inserted in an excel file. Using this template file tables and figures can be defined by the user himself. Hence, the template can be modified according to the user's needs.

The example shows the railway link Paris – Reims. It is possible to display the entire data collected for every link or node in the course of TEN Invest. The information is extracted from the data base and displayed in an excel file. The kind of presentation can be determined by the user himself. This provides the utmost achievable flexibility for user who are familiar with excel.

For a selection of links, which have to be marked, the technical status and the investments can also be displayed as presented in the second example. For regions – countries or Nuts3 areas – the investments can be shown per mode as presented as example.

3 Changes in the technical status of the Trans-European Transport Network

The mode-specific networks are described by technical features, which are relevant for the respective network. The links (link parts) of the road network are characterised, e.g. by the type of road, the number of lanes in each direction, the recommended speed limits and the administrative responsibility. Among other features, each link of the railway network is described by the type of traffic, the kind of traction, the number of tracks, the track gauge, the axle load, the maximum length of trains and the speed limit. The links forming the inland waterway network are characterised e.g. by the maximum draught, the number of locks, the ECMT class etc. The ports and airports, which were included in the data collection procedure, were requested to indicate, inter alia, capacity and inter-modality.

For all modes the link length in kilometres was calculated by aggregating information contained in the network, data for which were provided by the Commission. In instances where this information was not available, distances were estimated. Technical information was collected for the years 1996, 2001, 2010 and 2015. However, it should be mentioned that the ministries contacted were in some cases not able to provide data beyond 2004. In many instances the long-term outlook is based on on-going or executed studies covering measures that have not yet been finally decided.

3.1 The development of the TEN-T road network

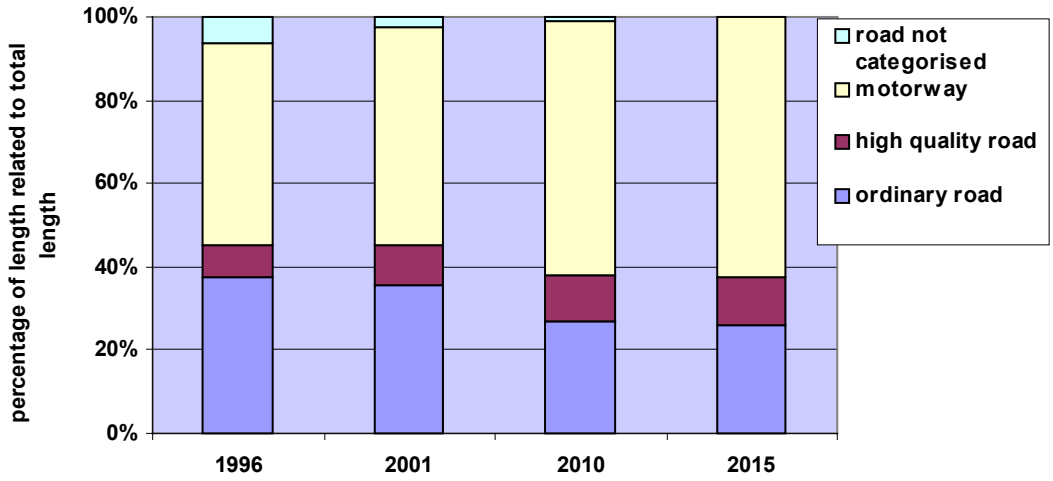
3.1.1 Road link type

Considering the type of roads, the situation in the Member States in 1996 was very different from that in the Candidate Countries. In the former, approximately 55% of the Trans- European Transport network consisted of motorways. If high quality roads were included the share increased to over 60%. In the Candidate Countries the ordinary roads formed 60% of the network.

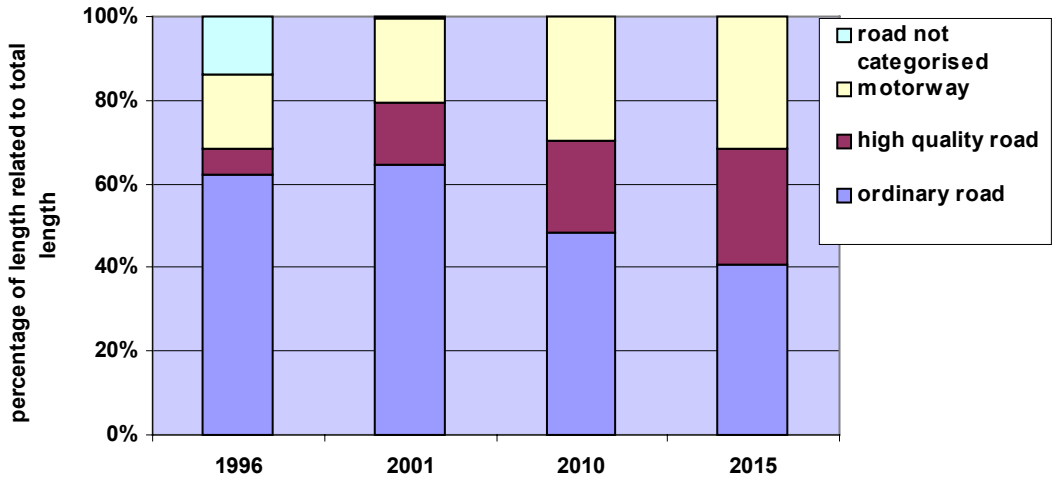
However in both parts of the study area, the relationship between ordinary roads and motorways is expected to change significantly in the period to 2010. In the Member States the share of links of the TEN-T road network considered as ordinary roads will decrease to less than 30% and in the Candidate Countries to approximately 40 %. Whereas the role of high quality roads will not gain in importance in the Member States, in the Candidate Countries this type of road will become more important. The development of the road types in the TEN-T road network is presented in the following figure as well as in Annex 3-1.

Figure 3-1: Quality development in the TEN-T road network

Development ot TEN-T network in Member States according to road types



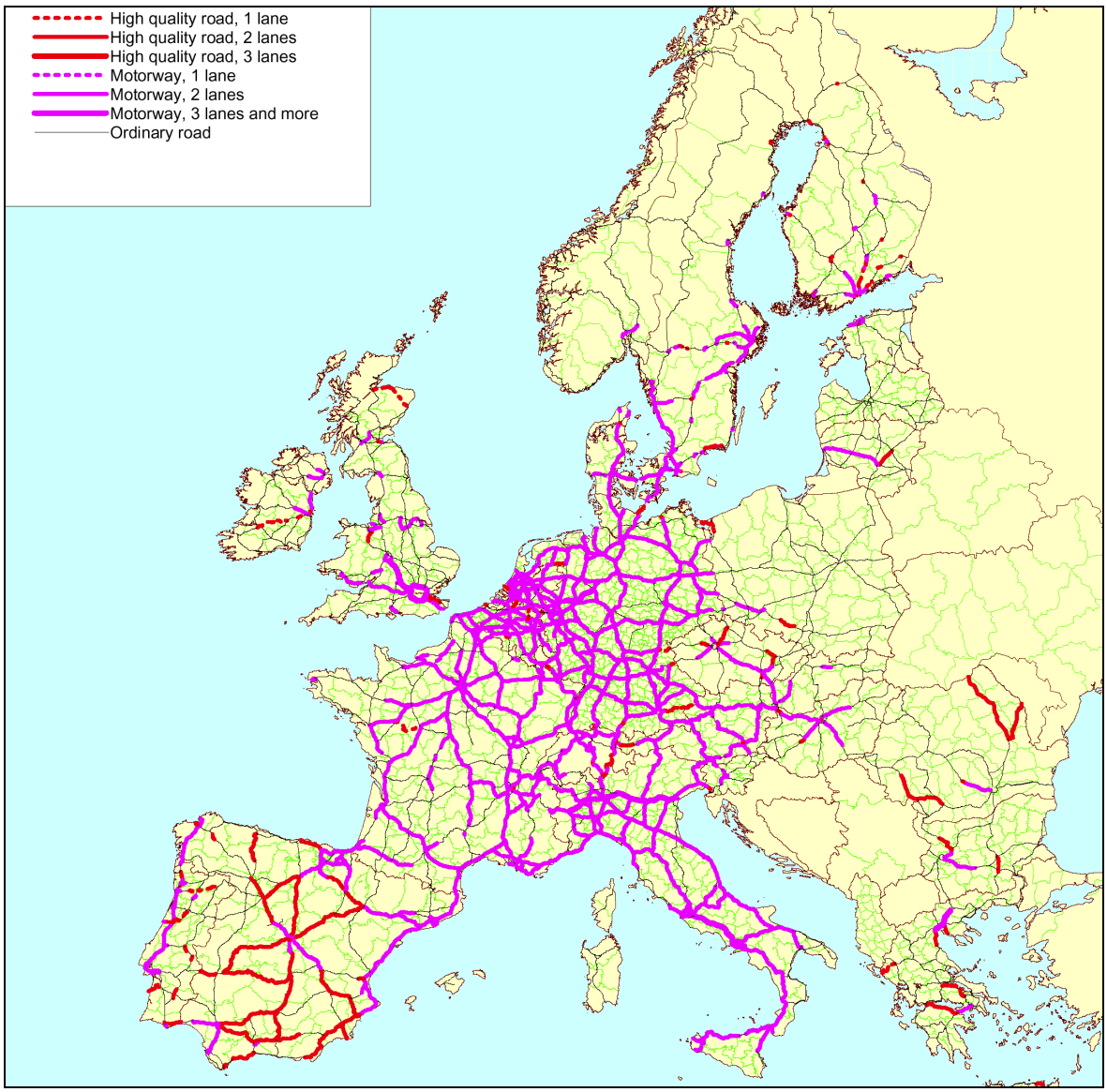
Development ot TEN-T network in Candidat Countries according to road types



3.1.2 Network

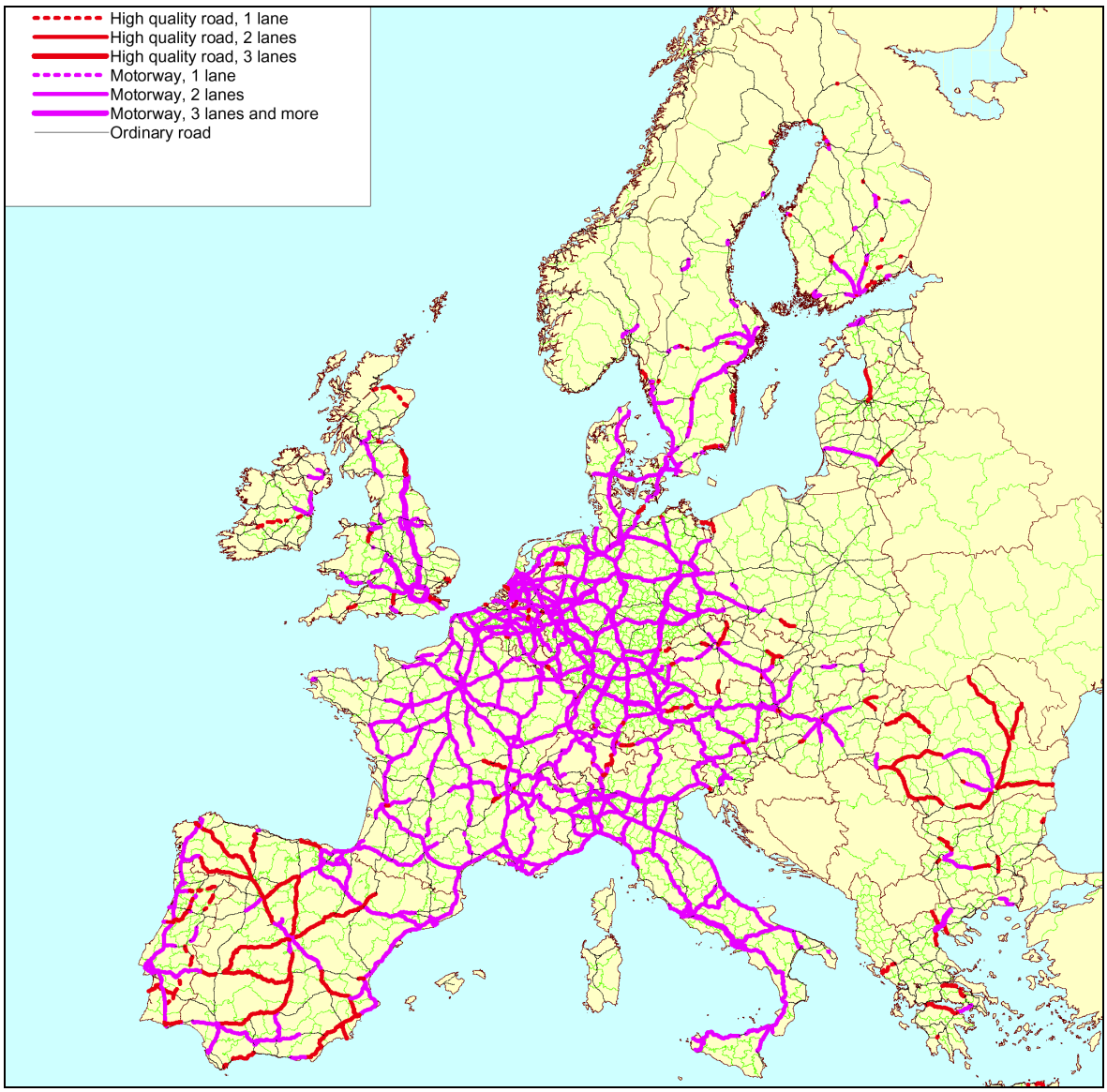
Apart from changes in the shares of different road types, the development of the road network can be characterised by new links and the expansion of the number of lanes for different road types. With the assistance of the PLANTis tool these developments have been analysed for the years 1996, 2001, 2010 and 2015 for each country. The general changes can be illustrated by presenting the Trans-European Transport road network for the whole study area for the different years.

Map 3-1: TEN-T road network 1996 according to link types



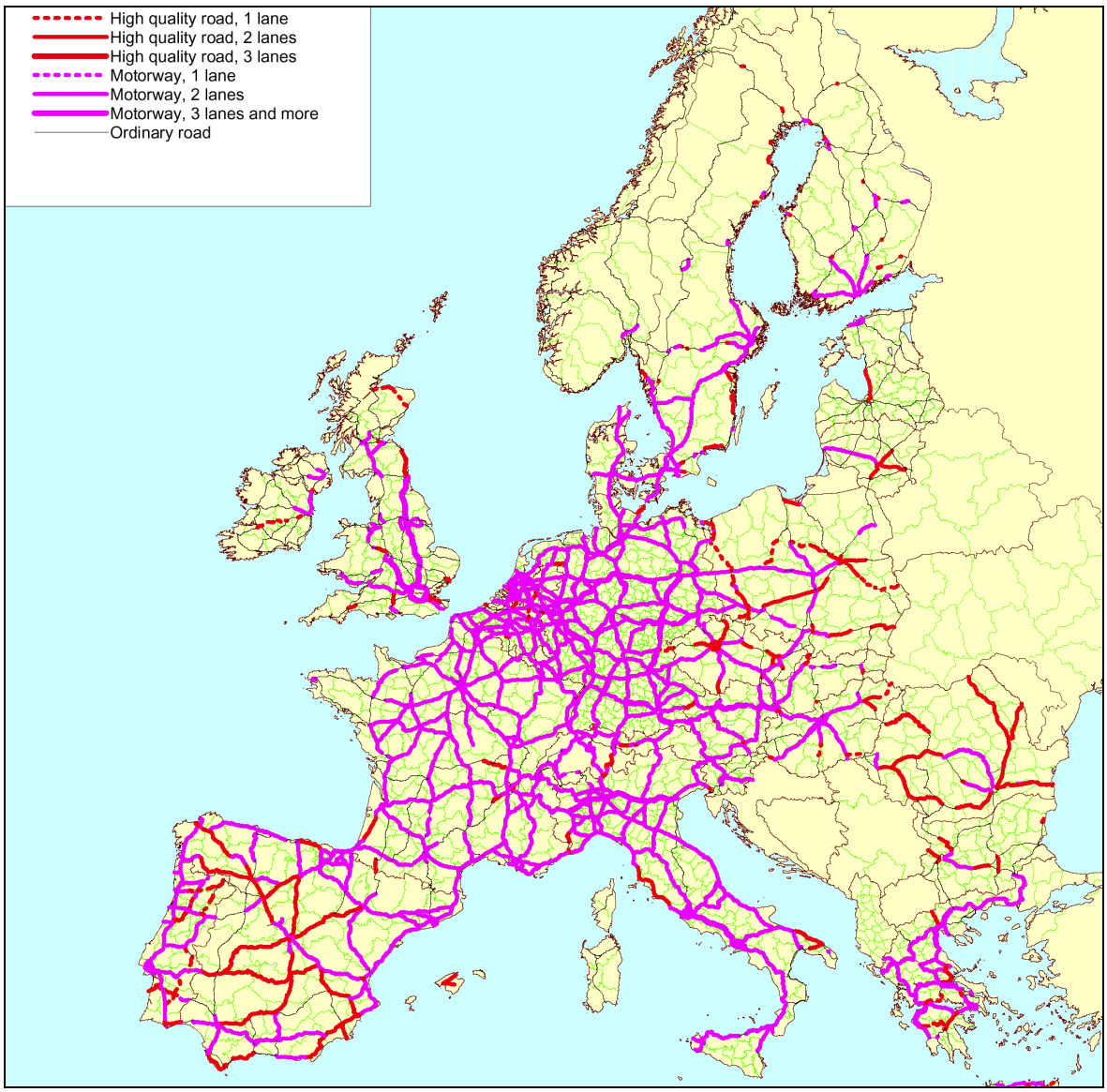
Within Member States, between 1996 and 2001 significant network extension was realised in United Kingdom, Southern France, Spain, Portugal Sweden and Finland. Further, substantial extensions, mainly by the increase of high quality roads, can be seen in the southern Candidate Countries. Developments in Central Europe are not so visible.

Map 3-2: TEN-T road network 2001 according to link types



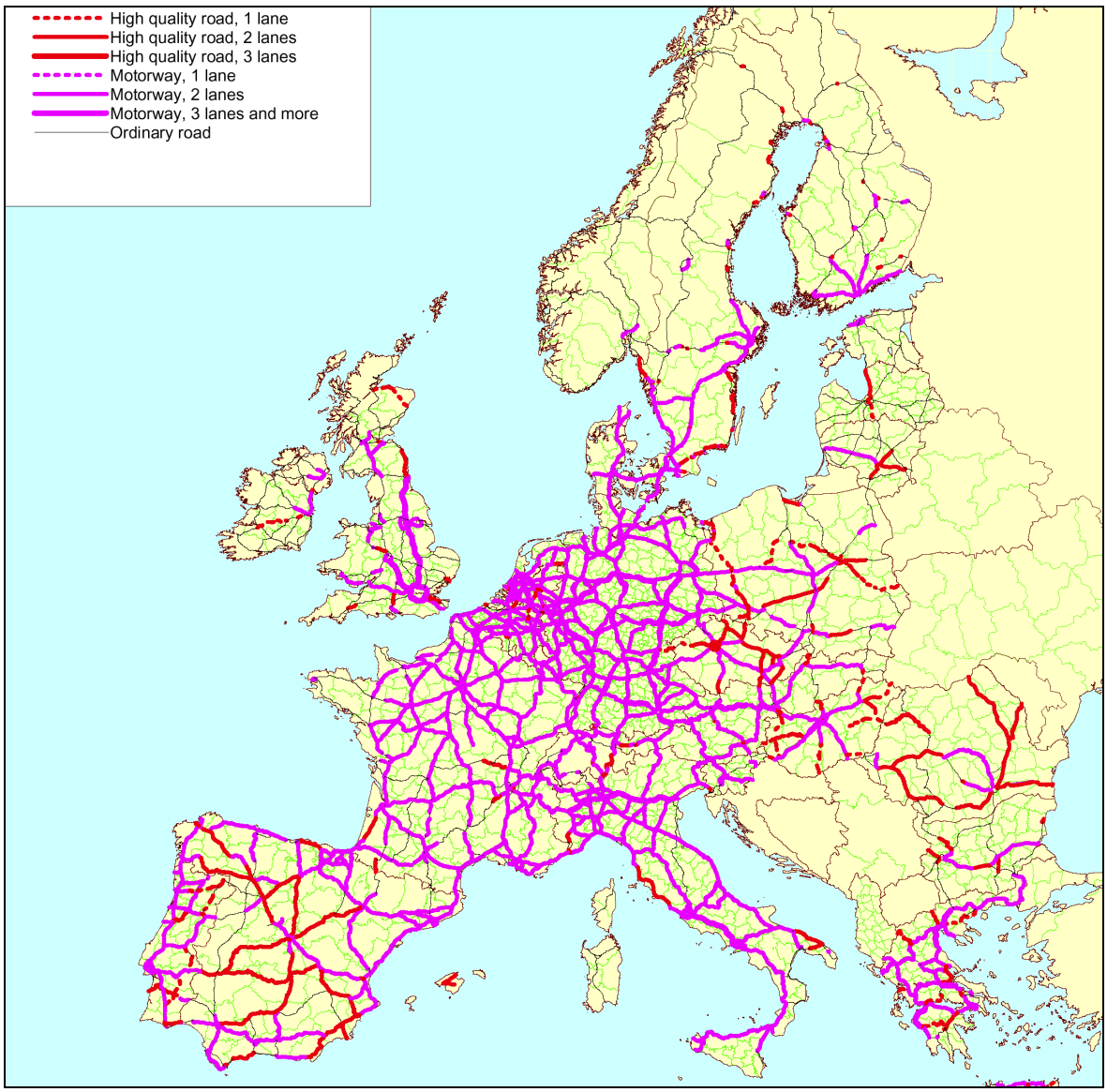
Between 2001 and 2010, network development will continue in Portugal and Spain. In the eastern part of Germany, the motorway network will be become denser. Significant efforts will be achieved in Greece. In the Candidate Countries, Poland and its neighbours will significantly improve the road network.

Map 3-3: TEN-T road network anticipated for 2010 according to link types



Developments after 2010 are more difficult to forecast. However, the results of the data collection show that in Hungary, the Czech Republic and Slovakia the network is expected to be extended by high quality roads. In the Member States, a smaller completion of the network is foreseen. However, decisions concerning network extensions between 2010 and 2015 have not yet been taken and therefore have largely not been recorded.

Map 3-4: TEN-T road network anticipated for 2015 according to link types

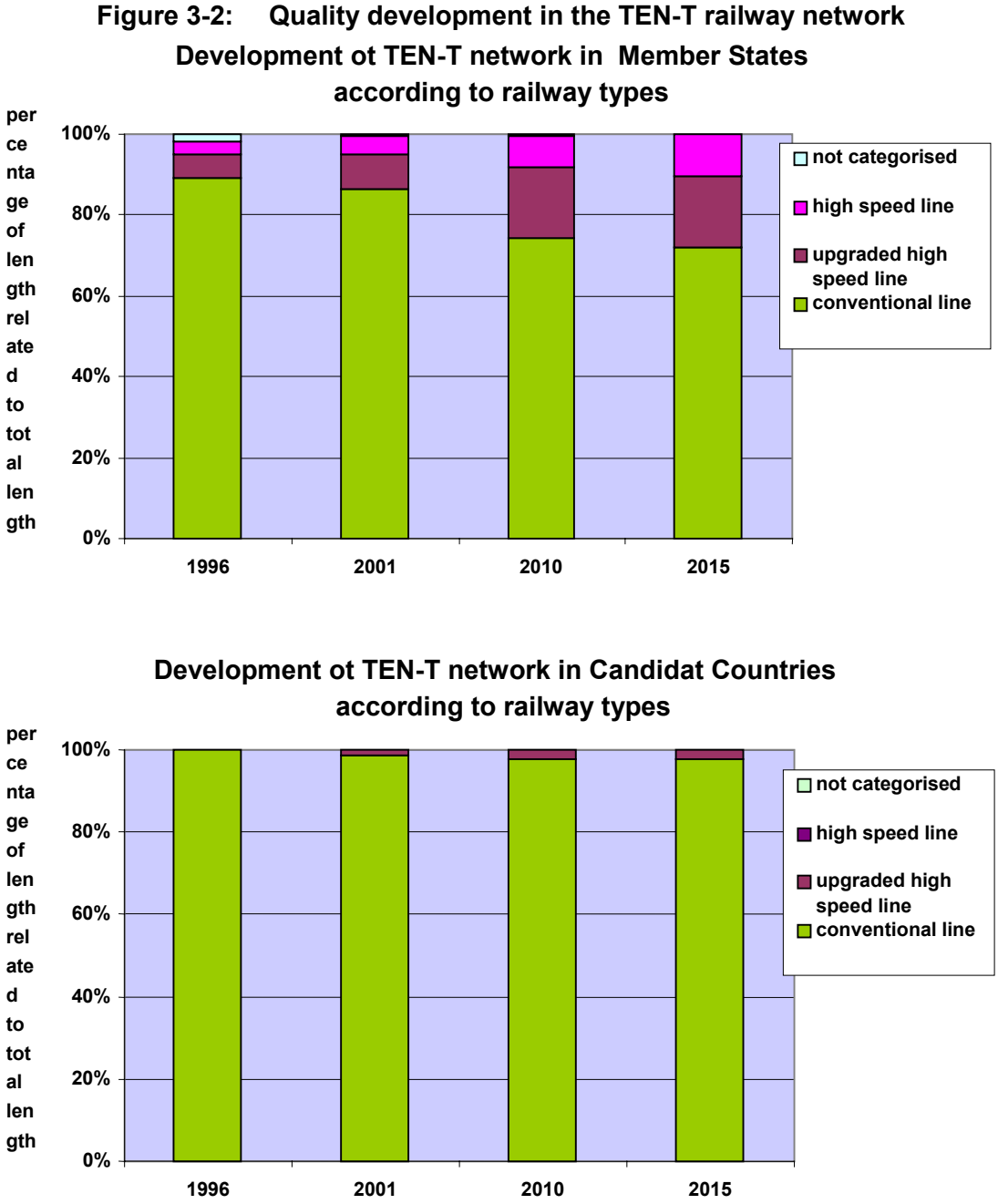


3.2 The development of the TEN-T railway network

3.2.1 Railway link type

At first glance, considering the type of railways the situation in the Member States in 1996 was not that much different from that in the Candidate Countries. In the former, the Trans-European Transport network comprised approximately 90% of conventional lines. Only 10% of the length of the railway links was up-graded high-speed lines or high-speed lines. In the Candidate Countries, almost 100% was conventional lines. However, it can be assumed that there were differences between the operational characteristics of the conventional lines in the Candidate Countries. The development of the railway types in the TEN-T railway network is presented in the following figure and in Annex 3-1.

Figure 3-2: Quality development in the TEN-T railway network

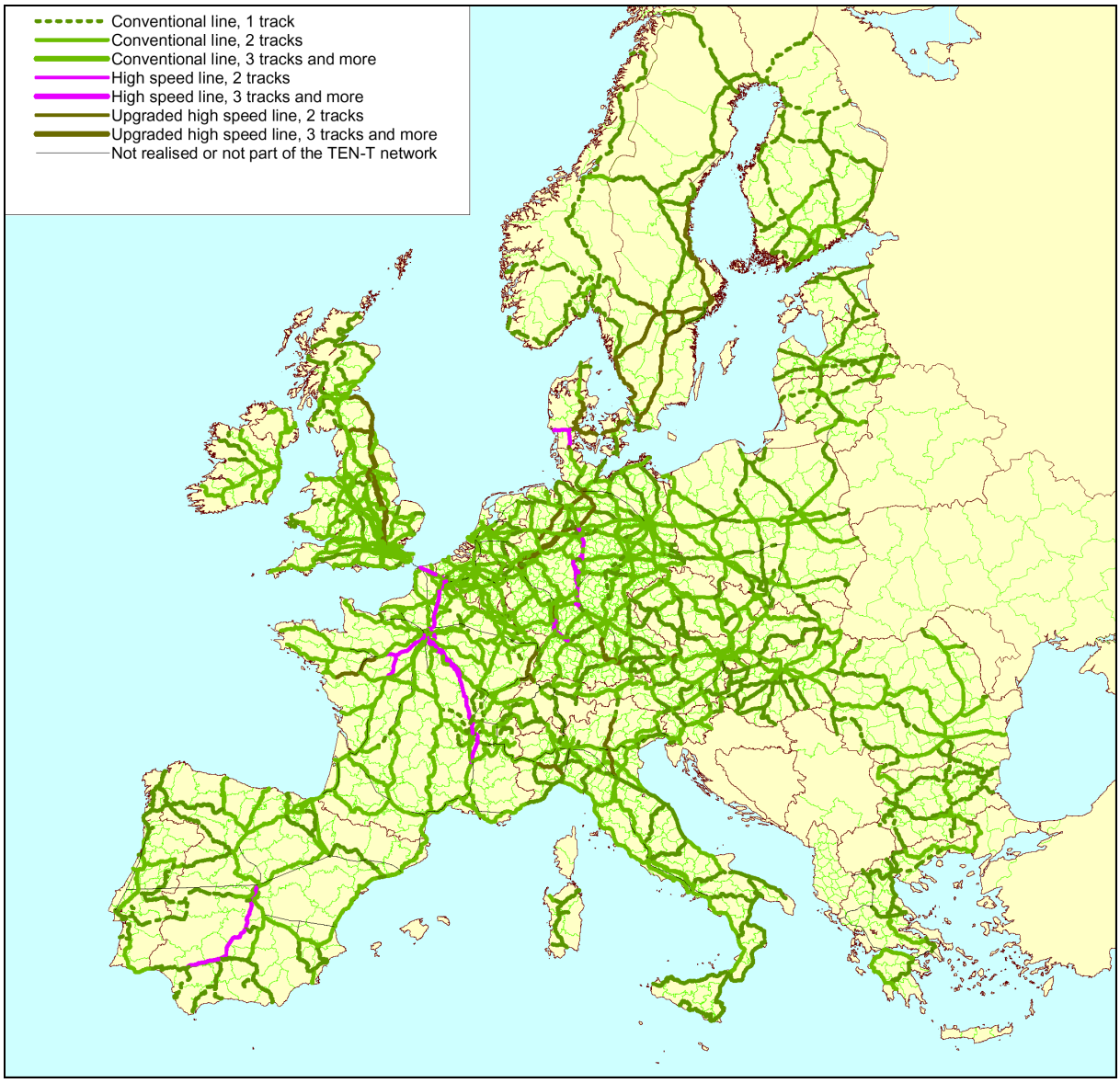


Up to the year 2001, the share of up-graded high-speed lines and high-speed lines increased to almost 15 % in the Member States, whereas in the Candidate Countries no significant developments took place. In the Member States between 2010 and 2015 the share of up-graded high-speed lines is expected to increase considerably, to approximately 17.5% and that of high-speed lines to almost 8% in 2010 and to more than 10% in 2015. Accordingly the share of conventional lines will decrease to 72% in 2015. In the Candidate Countries, the share of up-graded high-speed lines is expected to amount only to 2% both in 2010 and 2015. Efforts are expected to be made to rehabilitate existing conventional lines.

3.2.2 Network

Apart from changes in the shares of different railway types the development of the railway network can be characterised by new links and expansion of the number of tracks.

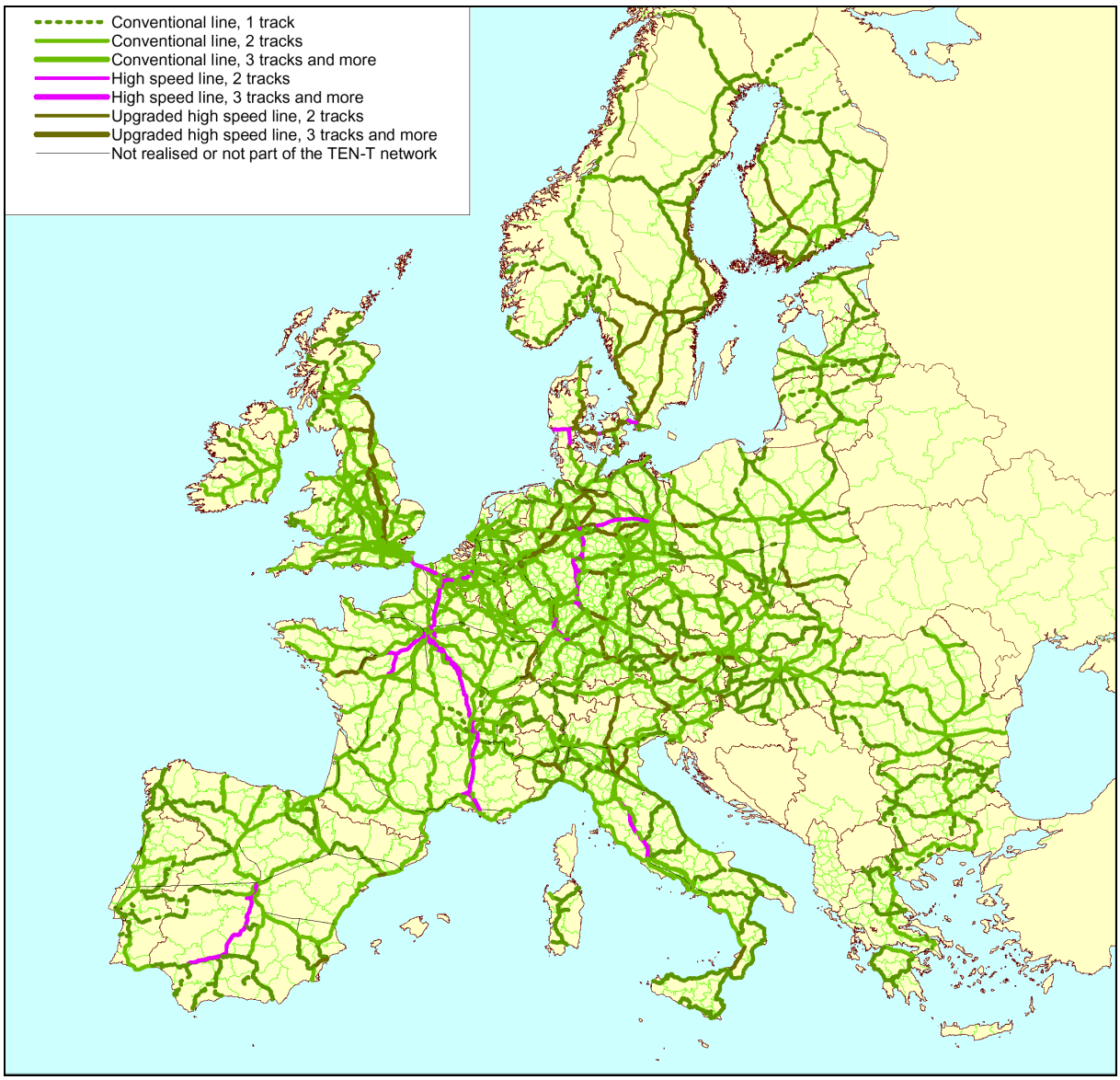
Map 3-5: TEN-T railway network 1996 according to link types



With the assistance of the “PLANTis” tool these developments have been analysed for the years 1996, 2001, 2010 and 2015 for each country. The general changes can be illustrated by presenting the Trans-European Transport railway network for the whole study area for the different years.

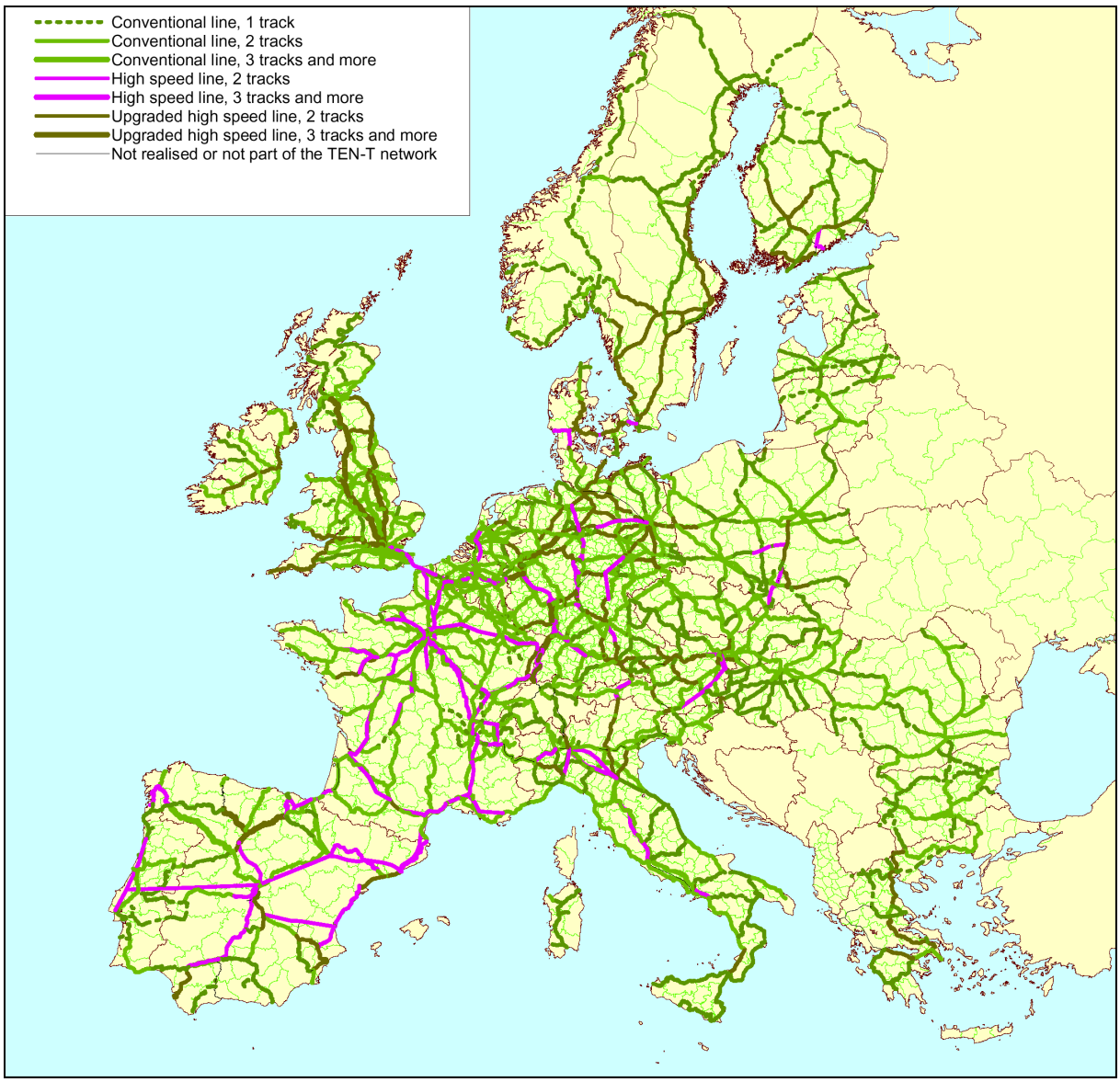
In 1996, high-speed trunk lines existed in Germany, Spain, Italy, Denmark and France. The most developed system was observed in France. Up-graded high-speed lines were found in Germany, Sweden, Denmark, Italy, United Kingdom and France.

Map 3-6: TEN-T railway network in 2001 according to link types



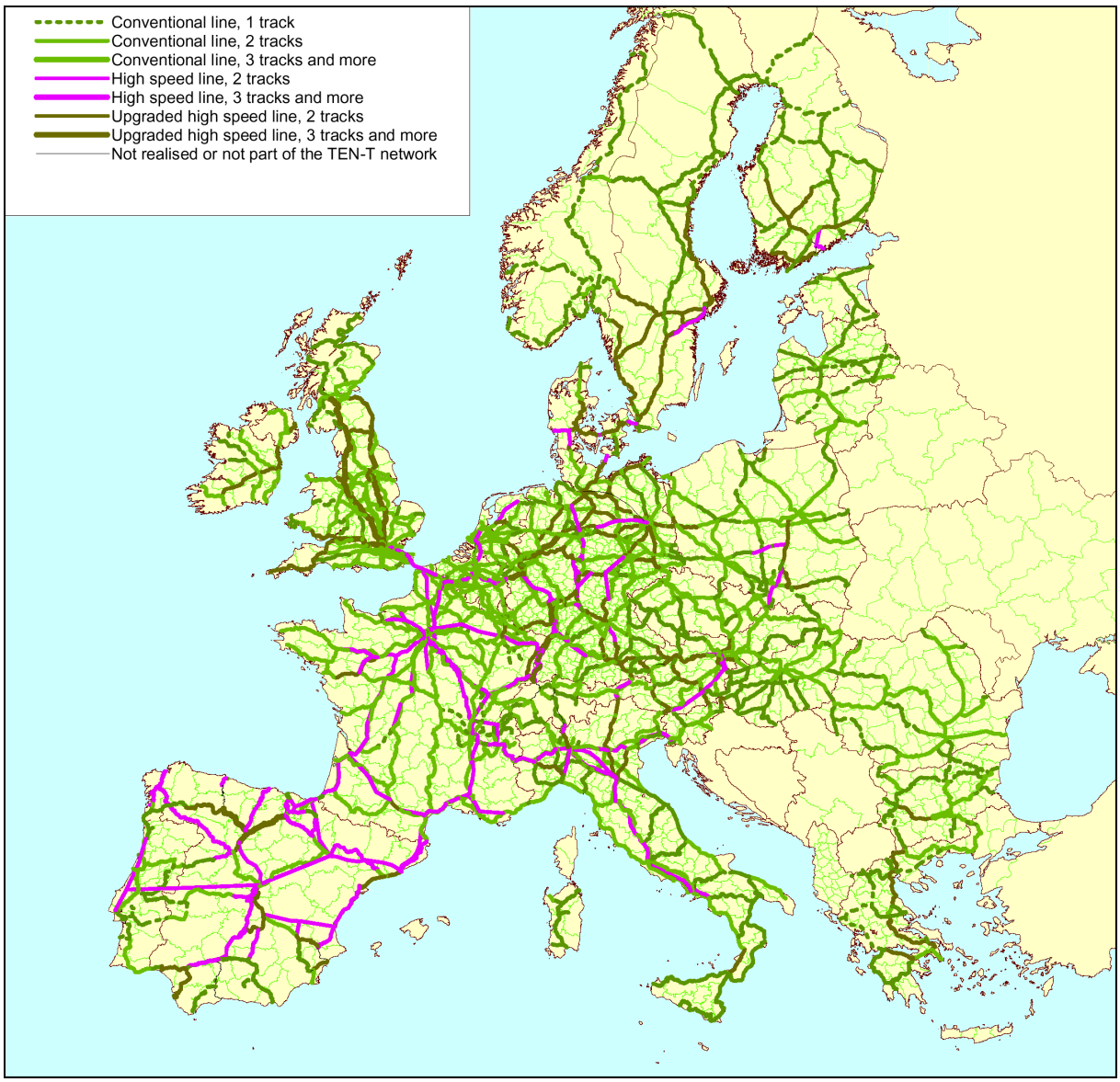
Up to 2001, in the northern and eastern regions of Germany, the network was improved via new up-graded high-speed lines and by a new high-speed line between Hanover and Berlin. In France, the high-speed network was extended north to the channel tunnel, which was completed within this period, and to the south as far as Marseilles. Also, in Austria and Italy conventional lines were converted to up-graded high-speed lines.

Map 3-7: TEN-T railway network anticipated for 2010 according to link types



During the period from 2001 to 2010 up-grading is expected to be realised in the United Kingdom (West Coast Main Line and London-Cardiff), in Greece, Germany and in Finland. In Ireland the Cork-Dublin-Belfast line will become operational as an up-graded high-speed line. The extension of a European high-speed network will continue, e.g. in Germany the link from Cologne to Frankfurt will become operational as a high-speed line and in Central Europe the connection between Paris via Brussels to Cologne and Amsterdam will be partially operational. In France, the Atlantic line will be extended and the boarder crossing to Spain improved. In Spain and Portugal up-grading and construction of new high-speed lines will continue. Between Denmark and Sweden, the fixed Øresund link will be established.

Map 3-8: TEN-T railway network anticipated for 2015 according to link types



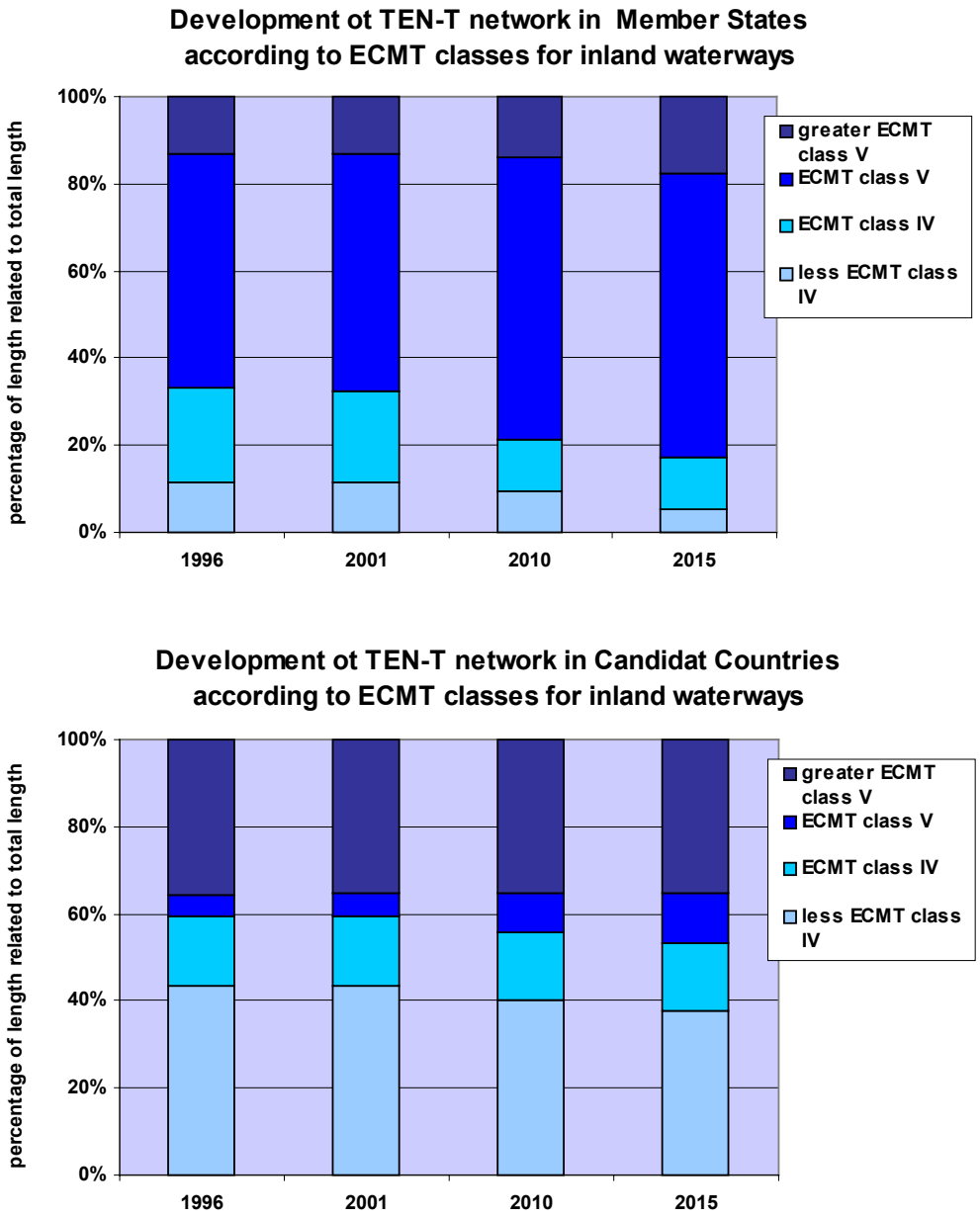
Further developments until 2015 can are difficult to foresee. However, the high-speed network in Spain and Portugal will almost certainly be further developed, the French high-speed network will be extended and connected to Italy and Spain and the high-speed network will be extended to the East via Germany and Austria.

3.3 The development of the TEN-T inland waterway network

3.3.1 Inland waterway link type

Link types in the inland waterway network distinguish between ECMT classes. The development of the inland waterway types in the TEN-T network is presented in the following figure.

Figure 3-3: Quality development in the TEN-T inland waterway network



The length according to the different classes are presented in Annex 3-1. Although the type of an inland waterway being a river, a regulated river or a canal and the maximum draught both influence the operation of vessels, the qualitative assessment of inland waterways has been based on the ECMT classes as they take into account different forms of vessels and vessel operation.

The bulk of the inland waterway network is concentrated on Central Europe with a length of 10,800 km. In the Candidate Countries, the total length amounts to 4,800 km. The Main axis is the Rhine and the Danube. In the Member States, in 1996 the bulk of the links already belonged to ECMT class V and VI.

In the Candidate Countries, the Danube with ECMT class VI and links with ECMT classes IV and lower had a significant share. Whereas during the period until 2015 the share of links with ECMT classes lower than V are expected to decrease significantly in the Member States, in the Candidate Countries changes are anticipated to be marginal.

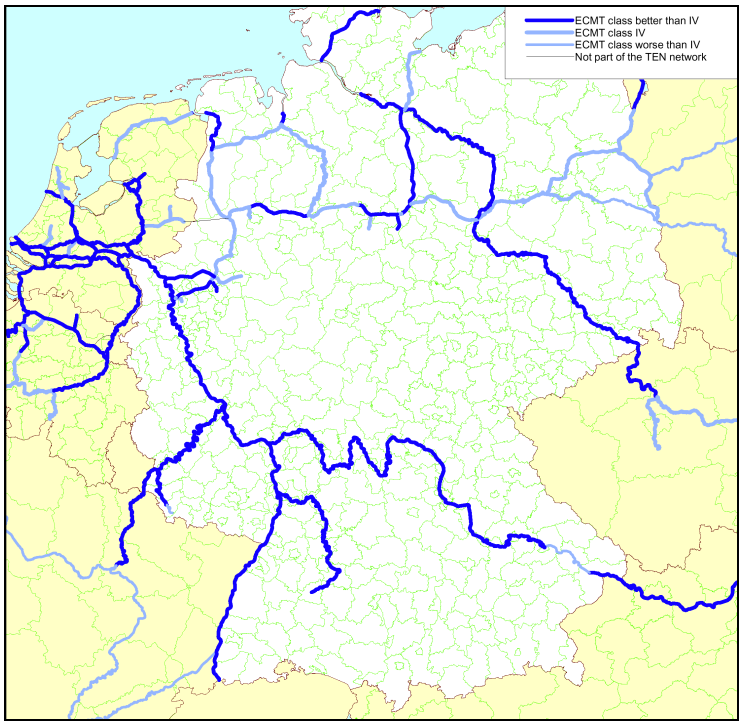
3.3.2 Network

Network developments can be illustrated by presenting the changes in Germany and its neighbouring countries, although developments are also expected to take place along the Danube, the Po, in Finland and in Portugal.

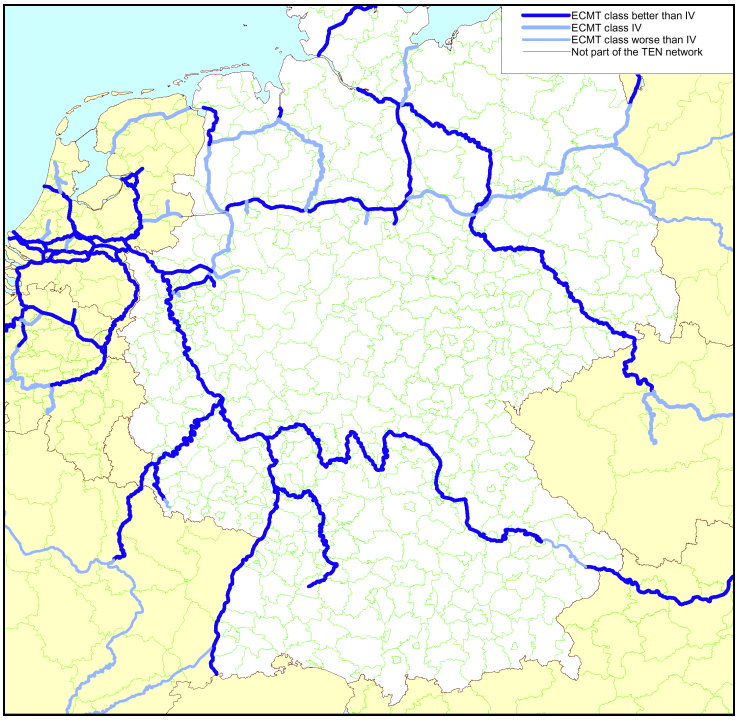
Principal improvements between 1996 and 2001 in Germany were carried out along the Mittellandkanal. By 2010, the East-West connection through Germany is expected to be improved. Furthermore, elimination of the bottleneck on the Danube between Straubing and Vilshofen is also anticipated.

A forecast of improvements to 2015 is almost impossible, as further projects are under discussion but not yet decided. Most probably, the waterways in France around Nancy and Metz will be up-graded. It would also be desirable to improve the situation in Poland and at some portions along the Danube. Concrete indications as to whether and when these measures will be implemented have not yet been expressed. The existing network and the anticipated developments are presented in the following maps.

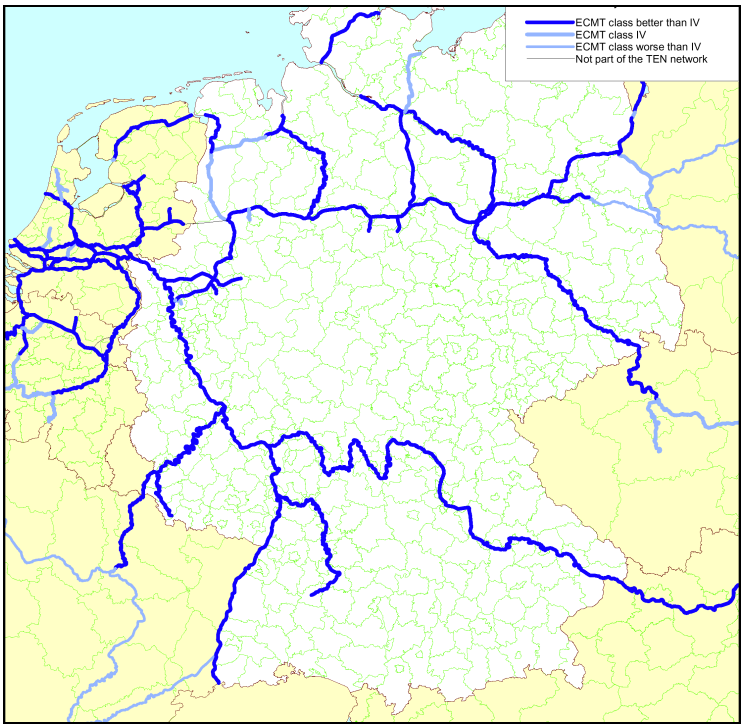
Map 3-9: The TEN-T inland waterway network in Germany and neighbouring countries in 1996



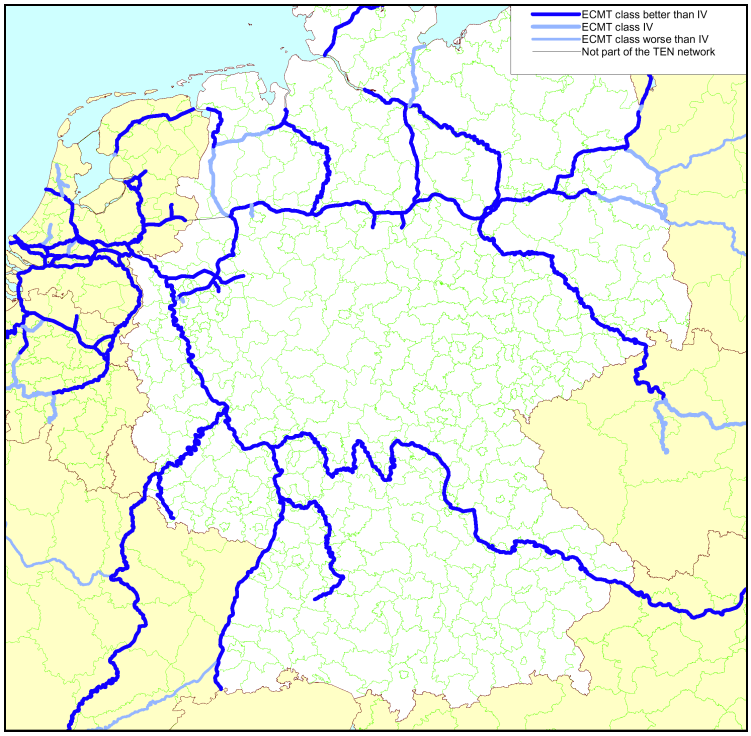
Map 3-10: The TEN-T inland waterway network in Germany and neighbouring countries in 2001



Map 3-11: The TEN-T inland waterway network in Germany and neighbouring countries in 2010



Map 3-12: The TEN-T inland waterway network in Germany and neighbouring countries in 2015



3.4 The development of TEN-T ports

The TEN-T network in the enlarged European Union as defined in the 1996 Guidelines and based on the TINA study contains 480 ports, 407 in the Member States and 73 in the Candidate Countries. The table below shows the types of the TEN-T ports in the Member States and Candidate Countries.

Table 3-1: Number and type of ports part of the TEN-T

Port Type	Member States	Candidate Countries	**Total**
Inland Ports	49	49	**98**
Martitime/ Inland Ports	31	9	**40**
Maritime Ports	327	15	**342**
Total	**407**	**73**	**480**

As most of these are privately operated and in most Member States information concerning port developments and development strategies was not available centrally, ports were contacted individually. Activities were concentrated on maritime ports.

Technical information was received from 420 ports – 82 inland and 338 maritime ports. Out of the 338 maritime ports, only five considered themselves as pure passenger ports and 68

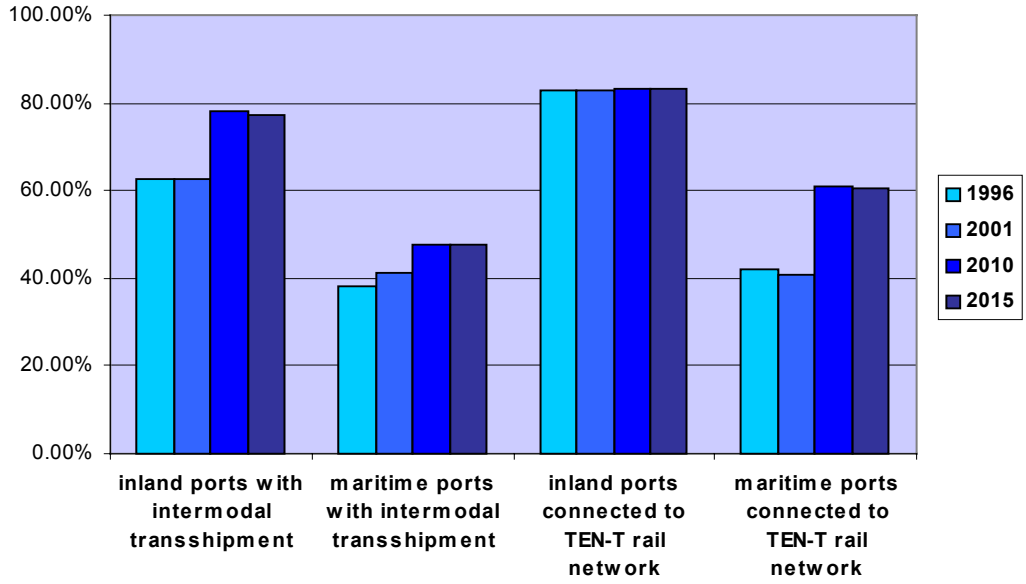
as pure freight ports. Pure passenger inland ports were not contacted. 68 of the inland ports handle freight and 11 both freight and passengers.

Information was requested covering turnover (divided into different freight categories) and physical characteristics, such as the maximum draught and the conditions of the access channel. The data received were extracted from the database using the “PLANTis” tool.

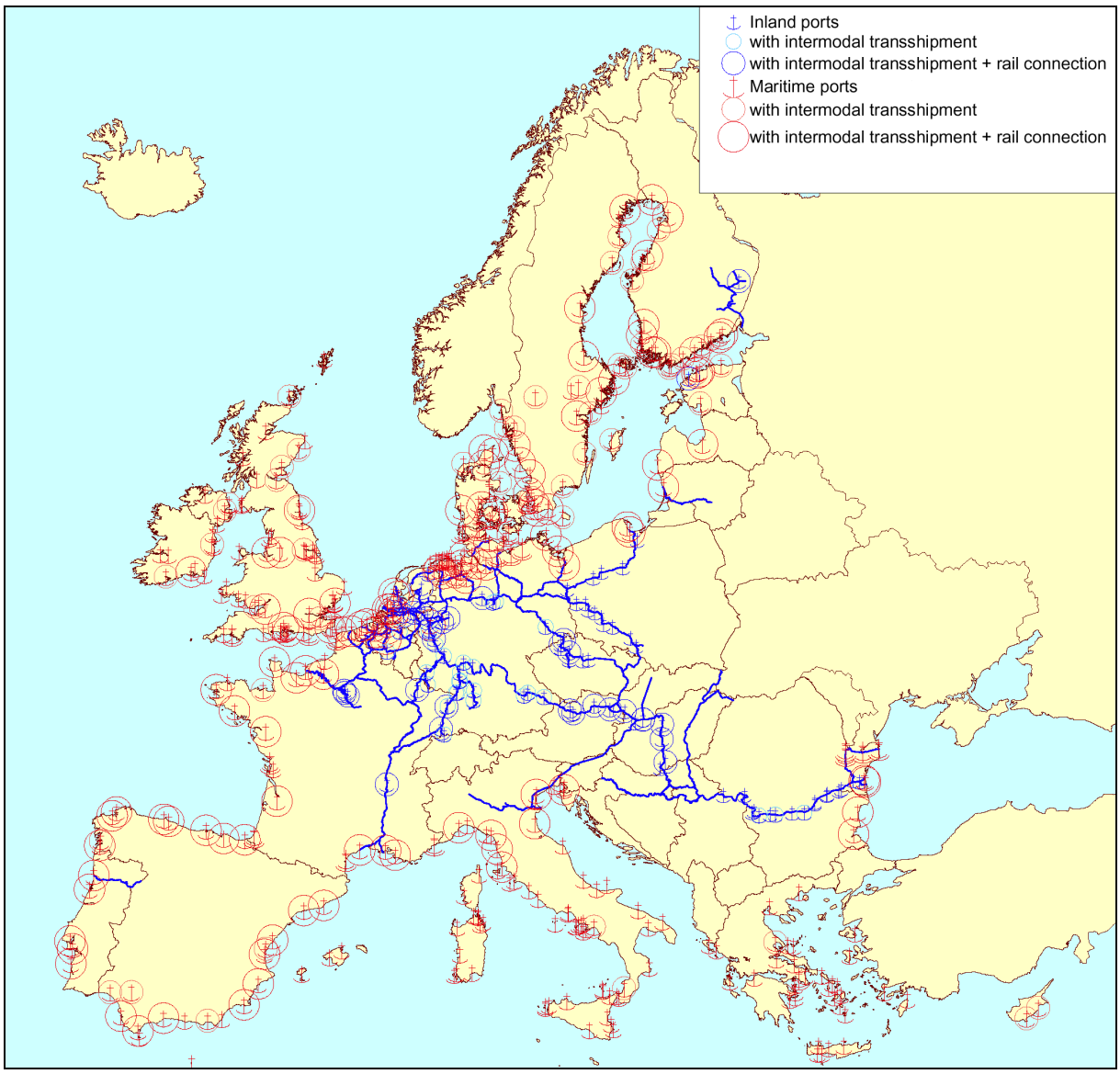
In the framework of this study, the capability of intermodal activities and the connection to the TEN-T network was considered as the most interesting. The following figure presents the actual situation as well as the expected development concerning intermodal transhipment facilities and the connection to the TEN-T railway network for inland and maritime ports in the study area. The figure shows that around 70% of the inland ports contacted and 40% of maritime ports provide intermodal transhipment facilities.

The situation is not expected to change significantly in the period to 2010/15. Further, almost 80% of the inland ports contacted and 60% of the maritime ports are connected to the TEN-T railway network. Clearly, the maritime ports intend to improve this situation between now and 2010. However, most of the ports contacted did not provide long-term strategies concerning their development.

Figure 3-4: Development of the intermodal capability of contacted ports



Map 3-13: TEN-T ports and their intermodality in 2001



3.5 The development of TEN-T airports

The TEN-T network in the enlarged European Union as defined in the 1996 Guidelines and based on the TINA study contains 379 airports, whereas 335 are located in the Member States and 44 in the Candidate Countries as shown in the table below.

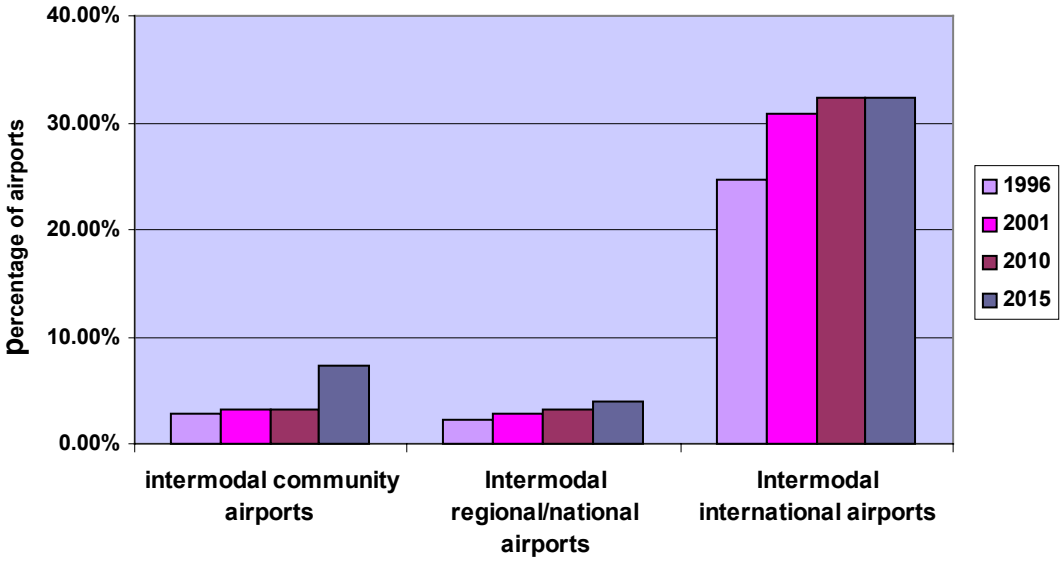
Table 3-2: Number and type of TEN-T airports

Airport Type	Member States	Candidate Countries	Total
International	46	17	**63**
Community connection points	78	24	**102**
Regional	211	3	**214**
Total	**335**	**44**	**379**

Due to the high number of airports it had been agreed to focus on the international airports. In total technical information has been collected for 308 airports. Information was requested covering capacity, length and number of runways, the maximum size of plane and operational hours. The data received were extracted from the database using the “PLANTis” tool.

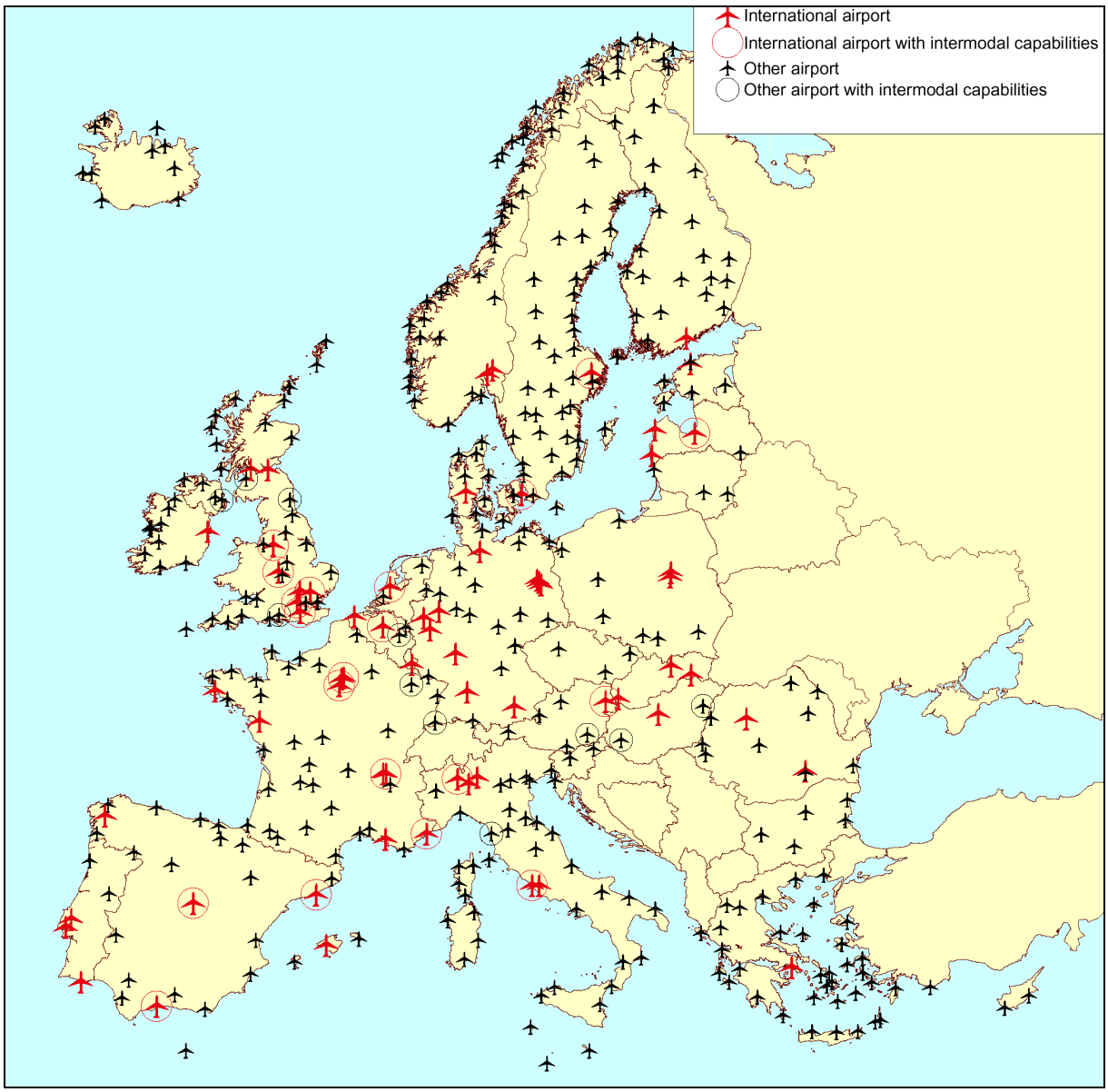
Concerning the TEN-T network, the intermodal capability of airports was interesting. The following figure presents the actual situation and the expected development of the intermodal capability of the different types of airports. It is clear that neither community, neither regional nor national airports place emphasis on intermodality. Also, only 30% of the international airports contacted provided intermodal facilities. A significant change in this situation is not expected. However, as in the case of ports, long-term strategies were, in many cases, not provided.

Figure 3-5: Development of intermodal capability of contacted airports



The location of the TEN-T airports and their intermodal capability is presented at the following map.

Map 3-14: TEN-T airports and their intermodal capability in 2001



4 Background to decision taking concerning investments in the Trans-European Transport network

4.1 Methodologies of Transport Forecasting

4.1.1 General remarks

Forecasting future trends and developments in the field of transport is a difficult task. Transport is sensitive to all those parameters affecting “trip-making desires” such as economic development, social trends and habits. Major periodic changes in technological or regulatory regimes can also significantly influence future developments. These changes can scarcely be anticipated by analysing past and present developments. However, this does not negate the fact that the future (especially the short and mid-term) is never independent of the present, or of the past.

The following elements generally influence transport demand:

- The current socio-political environment relies upon market forces as a means of regulating supply and demand of transport services. Competition within the markets influences transport demand.
- Satisfaction of individual rather than collective desires has a direct influence for all kinds of transportation.
- New, flexible, lean, just-in-time production techniques impose different requirements upon freight transport, both quantitatively and qualitatively
- New forms of spatial organisation – more than 80% of the European population lives in medium to large sized urban areas – affect the transport demand.

From the supply side the availability of a Trans-European Transport Network as well as new technological possibilities will affect transport demand.

4.1.2 Traffic forecast methods

In general, traffic forecasting attempts to predict the volume of traffic, inside one area, between a number of zones or along a corridor, by one or more modes of transport on one or more routes. Generation, distribution, modal split and assignment can all be considered as linked components. Nevertheless, it is useful to divide the four steps into two stages: generation - distribution and modal split -assignment. While the forecast of modal split and assignment has as its main input the changes in transport supply, generation and distribution deal with a number of socio-economic, land-use and regional development variables that have to be forecast by the model users. In practice, the stages are not clear-cut and discrete, but despite their interdependence the two stages are best considered individually.

There are a number of approaches to generate and distribute transport demand, from conventional gravity models to complex integrated regional economics and transport models. The main issue summarised here is the type of variables that are most commonly used in this step of transport modelling.

Trip generation depends on a number or characteristics either of population and/or households: age, sex, employment status, income, car ownership, and is different for the various trip purposes.

Many of the Trans European Corridors are aimed to handle freight as well as passengers, and the former seems to be more relevant. There are many factors of freight demand modelling that make it more difficult to model than passenger movements: the movement of freight involves more players (firms, shippers, carriers etc.) and more activities (storage, custom facilities, transhipment facilities, logistic etc.). Furthermore, freight demand is more segmented. The most common approaches for estimating freight movements are to use macroeconomic models such as production/consumption or input/output matrices, at regional rather than national levels.

Each approach employs a specific set of explanatory variables as inputs. Without any ambition of being exhaustive the main ones, both for passengers and freight, are the following:

- travel costs (vehicle operating costs, fares, perceived costs for car users),
- vehicle occupancy ratio,
- value of time,
- description of the network (length, capacity, speed, interchange time etc.).

There are difficulties attached to the collection of comprehensive data for the purposes of forecast modelling at the regional and the strategic level, in particular there is a lack of observed matrix data at this scale. From several Member states such as the UK, Netherlands, Denmark, Finland, France, Germany and Sweden National Travel Surveys (NTS) have been obtained as these countries undertook such exercises recently.

4.1.3 Scenarios

A second approach to assess future transportation requirements is to determine scenarios. A scenario is a set of hypothesis that describes the ‘image’ of the transport system. There are internal scenarios, which determine the development of the infrastructure variants, and also external scenario, which affect the impact of infrastructure development on costs etc.

A complicating factor when developing scenarios for the extended European area is that there are still many uncertainties concerning transition and integration processes. For the Member States, it is possible to adopt a trend scenario as the reference scenario since the

element of uncertainty involved is lower. The existence of a series and a relatively stable economic context over the past period allows trends to be determined.

The recent situation in the Candidate Countries is characterised by oscillating production and transport demand patterns, and makes it difficult to define a reference scenario, especially considering the major political and economic changes through the European Union expected in future. The lack of consistent data complicates the problem even further. Various trajectories are possible.

Poland, which engaged quickly in its economic transition, is an example of high growth in volume. Other countries will progressively fall in line with this growth with the help of cohesion policies, although at a slower pace. The Candidate Countries might also gain from further European integration, facilitating the opening of all markets in Europe, the free traffic of freight and travellers and the suppression of all border constraints. But growth could also result from a strong domestic demand from local companies or from a surplus in the trade balance because of competitive advantages due to lower salaries and higher education levels. On the other hand, it can be assumed that structural reforms are not firmly established and that transition takes more time than expected. Concerning macro-economic balances, either the restrictive budgetary policies lead to a decrease of domestic demand or the domestic supply cannot come up to demand and the countries have to import, which is a detriment to the trade balance. When looking at the evolution of the GDP index, the Candidate Countries can be classified into several groups as regards their speed recovery and rate of growth. These are:

- Group I – Poland, Hungary, Czech Republic and Slovenia
- Group II – Slovak Republic, Latvia, Lithuania, Estonia
- Group III – Bulgaria and Romania

In recent studies, the following basic scenarios have been defined:

1. The high growth and quick integration scenario, “European Renaissance”, represents an idealistic situation which is not impossible to reach when we refer to the history of integration in European Union. The integration of Ireland, Portugal, Spain and also of Greece, which was more isolated geographically with a more important gap in development, show indeed that this has been possible. Difficulties of integration have been overcome more easily than was feared initially.
2. The high growth and slow integration scenario, “European Dilution”, is more difficult to describe and less probable than the former one. Under this scenario, reforms will be successful and European integration becomes a free trade zone with extended co-operation agreements. Globalisation would be effective under strong influence of new information technologies.

3. In the low growth and quick integration scenario, “European solidarity”, transition takes more time having in mind that the reference scenario for European Union members is assumed to remain almost the same.
4. The low growth and slow integration scenario, “European Fragmentation”, supposes also a longer transition and a limited European support to development of Candidate Countries. This means also that Europe loses some of its substance for present EU members.

4.1.4 Information concerning forecasts in the Member States and Candidate Countries

The Federal Transport Investment Plan in Germany is based on a scenario approach. Three scenarios are taken into account, a trend scenario, an integration scenario and a laisser-faire scenario. This forecast was published in September 2000 by the consortium BVU, ifo, ITP and PLANCO. The forecast period is to 2015. As population growth, development of GDP and motorization do not differ between the scenarios, different assumptions concerning prices of fuel, fuel consumption, road pricing, productivity of road transport, cost of utilisation of roads, railways and inland waterways are taken into account. For the evaluation and selection of investments in the transport infrastructure the integration scenario was used.

Cyprus uses for the urban areas the conventional type of forecast. For all the large urban areas (towns) in Cyprus (Nicosia, Limassol, Larnaka, and Pafos) comprehensive land-use transport studies have been prepared. The travel estimation models were developed (trip generation, trip distribution, modal split and traffic assignment), using software packages such as TRIPS and VISSUM.

The title of the forecast under preparation in the Czech Republic is “Determination of Forecast Methodology for Transportation Performance and Transportation Relations.” It will be available in 2002 and will cover rail, road, air and inland waterways for passengers and goods. The time horizon is 2010. The following methods are used:

- extrapolated time series, revised by experts,
- methods based on predictions (tabular form with coefficients),
- methods based on scenarios derived from regression analysis,
- transportation model based on PTV VISION software,

In Finland the forecast is not published. It is treated as a memorandum by the Ministry of Transport and Communications (and is dated 31.10.2001.) This transport forecast is used in the Ministry for the medium term plan for the years 2003 – 2006 and covers all modes.

In Greece the forecast has influenced the Operational Programme of Community Support Framework 2000 – 2006 “Railways – Airports - Public Transport” as well as the Operational

Programme of Community Support Framework 2000 – 2006 “Road Axes – Ports – Urban Development”

In Ireland the forecast of the National Development Plan will form the basis of the projections for the period 2003 – 2006. Beyond 2006, however, it is very difficult to make any estimates.

In Romania, decisions are based on the General Transport Master Plan Study for Romania, which covers road, railway and river transportation. The time horizon is 2015. The transport-planning program POLIDROM is based on:

- Transport type,
- Economy development (GDP),
- Transport means,
- Infrastructure,
- Transport supply and demand,
- Transport effort (total costs).

For road transport, an isolated forecast "Forecast of Road Traffic Evolution for 2000-2020 Period" is available. This forecast is a projection of trends based on:

- Economic increase (GDP),
- Vehicle’s park evolution,
- Traffic evolution,
- Vehicle mileage evolution.

The forecast used in Slovakia is called “Integration of Transport and Economic Infrastructure and Utilisation of Logistic Procedures at Quality Improvement of Transferring Processes”. It covers rail, road, inland waterways and airports. The time horizon is 2015.

In Sweden, Banverket and Vägverket (the Swedish National Railway and Road Administrations) are currently working on the railway and road investment plans for the period 2004-2015, which also means a revision of the existing long-term investment plans 1997-2008.

In France, a national transport plan based on the law "Loi d'Orientation pour l'Aménagement et le Développement Durable du Territoire" from June 1999 determines future activities concerning transport investment planning. This plan covers passenger and freight transport on all modes and the forecast horizon is 2010. This plan was completed in 2001 and will form the background for all investments in the transport system.

4.2 Selection procedures

Methods of the selection of investments in the transport network considerably differ between the various Member States. One of the common bases for an appraisal framework is Cost-Benefit Analysis (CBA). Its main characteristics can be summarised as follows: both the potential benefits and the potential costs of a particular project are estimated across a set of impacts and converted into monetary terms by multiplying impact units by prices (market values) per unit. An alternative approach to appraisal is objective led, with the goal of maximising with respect to a set of socially based objectives rather than market values. Multi-Criteria Analysis (MCA) typifies this approach and a number of techniques fall within this category. MCA very often competes with CBA but the two approaches can also be used in a complementary manner.

Taking into account a selection of European countries for which detailed information was available, three points are apparent (see the following table). Firstly, all appraisal frameworks contain a mixture of impacts that are assessed in qualitative terms, impacts that are expressed in monetary terms and impacts that are measured in physical terms. Secondly, practices in different countries are not uniform. Although the direct transport impact tends to have monetary values, and the environmental and socio-economic impacts tend not to be expressed in monetary terms, there is a variation between countries. Thirdly, the details of the framework within which the impacts are brought together also vary across the CBA/MCA spectrum.

Figure 4-1: Selection Procedures in different Countries

Direct Impacts		AT	BE	DK	FI	FR	DE	GR	IE	IT	NL	PT	ES	SE	UK
Capital	Construction Costs	CBA+MCA	CBA+MCA	CBA	CBA	CBA	CBA	CBA+MCA	CBA	CBA	MCA	CBA	CBA	CBA	CBA
	Disruption Costs		CBA+MCA					CBA+MCA	CBA	CBA			CBA		CBA
	Land and Property Costs		CBA+MCA	CBA	CBA		CBA	CBA+MCA	CBA	CBA		CBA	CBA	CBA	CBA
Recurring	Maintenance Costs	CBA+MCA	CBA	CBA	CBA		CBA	CBA+MCA	CBA	CBA	MCA	CBA	CBA	CBA	CBA
	Operating Costs				CBA		CBA	CBA+MCA	CBA	CBA	MCA	CBA			
	Vehicle Operating Costs	CBA+MCA	CBA+MCA	CBA	CBA	CBA	CBA	CBA+MCA	CBA	CBA	MCA	CBA	CBA	CBA	CBA
	Revenues	CBA+MCA			CBA			CBA+MCA	CBA	CBA		CBA	CBA		
	Passenger Cost Savings							CBA+MCA							
	Time Savings	CBA+MCA	CBA+MCA	CBA	CBA	CBA	CBA	CBA+MCA	CBA	CBA	MCA	CBA	CBA	CBA	CBA
	Safety	CBA+MCA	CBA+MCA	CBA	CBA	CBA	CBA	CBA+MCA	CBA	CBA	MCA	CBA	CBA	CBA	CBA
	Service Level	MCA						MCA		CBA			CBA	CBA	
	Information							CBA+MCA		CBA					
	Enforcement														
	Financing/Taxation							CBA+MCA							
Environment	Noise	MCA	CBA+MCA	CBA	CBA	CBA	CBA	MCA			MCA				
	Vibration		MCA												
	Air-pollution Local	MCA	CBA+MCA	CBA	CBA	CBA	CBA	MCA			MCA	CBA			
	Air-pollution Global	MCA	CBA+MCA	CBA	CBA	CBA	CBA	MCA				CBA			
	Severance	MCA		CBA			CBA								
	Visual Intrusion							MCA							
	Loss of Important Sites		MCA												
	Ressource Consumption							MCA							
	Landscape	MCA													
	Ground/Water Pollution	MCA						MCA							
Socio-Economy	Land Use	MCA						MCA			MCA				
	Economic Development	MCA	MCA				CBA	MCA			MCA				
	Employment		MCA				CBA	MCA							
	Economic & Social Cohesion							MCA							
	International Traffic						CBA	MCA							
	Interoperability							MCA							
	Regional Policy		MCA				CBA	MCA			MCA				
	Conformity to Sector Plans		MCA												
	Peripherality/Distribution							MCA							

CBA Cost-Benefit Analysis | MCA Multi-Criteria Analysis | CBA+MCA Combination CBA+MCA | measured impacts

Within the broad framework spectrum, ranging from CBA dominated through to a largely MCA or qualitative approach, it is clear that most national frameworks have CBA at the core.

Most of the TINA countries also belong to this category. TINA itself bases the selection of projects more or less on CBA dominated appraisal methods. In Germany, Denmark and Sweden only a few (or no) impacts are measured qualitatively in addition to CBA. In UK, Netherlands and Finland it appears that the CBA is a part of a more holistic approach encompassing further impacts, which are either measured, formally included in the MCA, or on which a qualitative report is required.

The number of impacts ranges from a relatively small number (ten in Denmark) to a comprehensive list of over thirty in Greece. However, it must be stated that in all countries, appraisal is used for prioritising projects, making recommendations and for evaluating alternative options but not for making a final decision, which is always political.

5 Methods to Estimate Missing Data

5.1 Calculation of Unit Costs

5.1.1 Unit cost information from available studies

Where financial data for technical measures were not provided, investments were estimated using unit costs. The general questionnaire sent out to all Member states and Candidate Countries contained questions concerning country specific unit costs contained in relevant studies. However, apart from information on unit costs that is contained in a study "Updating of Transport Costs in Acceding Countries" carried out by COWI Consult, in the framework of the PHARE programme no further figures were received. For the Candidate Countries Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia and Slovakia, unit cost for rail and road are provided by this study. The price level is 1997 and the costs do not include VAT. General costs are included and allowances for design and supervision are expressed as percentages of total construction costs. The figures distinguish between projects in rural areas with flat, hilly and mountainous character and in urban areas with flat or hilly character. Total costs are sub-divided into characteristic activities for road and railways. They comprise:

- motorways – 4 lanes,
- major new engineering structures,
- rehabilitation/upgrading of existing 2 lane roads,
- motorway, service facilities,
- modernisation of a double railway line – 160 km/h,
- modernisation of a single railway line – 100 km/h,
- building of an additional track along the existing track,
- construction of a new double railway line – 160 km/h
- construction of a new single railway line – 100 km/h
- electrification of a single track,
- electrification of a double track.

The recommended unit costs are also presented in digital form and can be used after updating.

Interesting information on unit costs at the county level is provided by the European Conference of Ministers of Transport (ECMT). The ECMT published in 1999 a study dealing with "Investment in Transport Infrastructure 1985 – 1995". Volume 1 of this study presents an overview concerning these investments. Volume 2 contains country studies reporting statistical coverage, transport policy and transport infrastructure and the investments between 1987 and 1995 for roads, railways, inland waterways, urban and suburban railways, metro, tramways, oil pipelines, maritime ports and airports. All figures presented in current prices at 1995

levels. At present, the ECMT is preparing this information at the country level, though it is not yet available.

The anticipated unit costs will distinguish between construction costs for road, rail and inland waterways and those for maintenance. For some countries limited information is available from data collected in the framework of the EUNET research project, covering road, railway and inland waterways. These data are expressed in local currencies and the costs are expressed using different price levels. The information is presented in Annex 5-1.In Germany, unit costs are provided by the analysis of construction measures carried out within the last decade and presented in the road construction report published annually.[6] The total construction cost for road construction in different regional types and for two types of roads are presented in Annex 2-1. The regional types are representative for Germany and derived from a cluster analysis at the district level. For one typical region characterised by a very high settlement density in a topographically flat area no road construction measures could be found. Therefore this area has been ignored. Unfortunately, for railways construction the database in Germany is less concentrated. However, efforts were made to obtain some data concerning railway construction costs. The information obtained distinguishes between high-speed and conventional lines. The unit selected to base the cost was the track kilometre. As fewer railway construction measures have been not all types of region could be covered. The unit costs for land acquisition and for total construction are presented in Annex 5-1. As far as inland waterways are concerned, only a few projects have recently been implemented in Germany. Furthermore, the type of construction varies between these projects. However, a distinction can be made between costs for deepening and improvement of a waterway, cost of rehabilitation of bridges and locks, cost of land acquisition, supervision and planning costs (see Annex 5-1).

5.1.2 Unit cost estimation based on the collected data

The above mentioned unit cost developed by COWI consult are related to projects and are not applicable to the links of the network as projects do not necessarily comply with the length of a link. Projects can cover only a part of a link or can comprise several links. Unit values per kilometre based on costs gained by the analysis of projects, therefore cannot simply be used to quantify any upgrading of the network. Any cost based only on this project related approach is supposed to overestimate an upgrading cost assessment or requires the exact determination of the projects necessary to upgrade a link. This information, however, cannot be supplied for future projects. By a mode and country specific unit cost assessment,

[6] Usually the length of the measure in kilometres is considered as the appropriate unit to determine unit cost. As the length does not cover works necessary at intersections the square meter of newly constructed road surface has been selected as unit as far roads are concerned.

which is based on the results of the data collection exercise, missing costs for investments can roughly be estimated. Compared to the above-mentioned unit costs these cost are related to the length of a link (link part) and not to the length of a specific project. This approach has been selected, as measures to grade a link will vary from case to case. By relating the cost to a link (link part) the average costs have been estimated and can be used to assess the cost of upgrading or improving a link. For new construction the project length is in any case the same as the link length. The following tables show the investments mentioned during the data collection for railways, roads and inland waterways in the Member States and the Candidate Countries.

Table 5-1: Average unit cost for road measures

Countries	Member States		
Measures	Length in km	Investments in Mio Euro	Mio Euro per km
4-L motorway to 6-L motorway	4223.8	17092381.9	4046.7
Ordinary/high-quality to 4-L motorway	2204.4	8982750.4	4074.9
Ordinary to high-quality	2063.3	1797687	871.3
other upgrading	5759.7	24303539.2	4219.6
Intersection improvement	2772.7	4822602	1739.3
traffic management	661	215118.2	325.4
New 6-lane motorway	43.8	516984	11803.3
New 4-lane motorway	5157.4	35171462.4	6819.6
New ordinary or high-quality road	2310.3	6224804.9	2694.4
Other new link	644.3	6084294.7	9443.3
Total	25840.7	105211625	4071.5

Countries	Candidate Countries		
Measures	Length in km	Investments in Mio Euro	Mio Euro per km
4-L motorway to 6-L motorway	114.3	381968	3341.8
Ordinary/high-quality to 4-L motorway	377.8	207886.9	550.3
Ordinary to high-quality	2195.8	3110580	1416.6
other upgrading	4436.4	2299434.3	518.3
Intersection improvement	220.3	4580	20.8
traffic management	0	0	
New 6-lane motorway	0	0	
New 4-lane motorway	2247.4	20405350.2	9079.5
New ordinary or high-quality road	3631.6	8845085.4	2435.6
Other new link	537.9	1946887.8	3619.4
Total	13761.5	37201772.6	2703.3

Table 5-2: Average unit cost for railway measures

Countries	Member States		
Measure	Length in km	Investments in Mio. Euro	Mio. Euro per km
Line improvement	36319.5	163041904.3	4489.1
Track changes	1576.7	5975369.1	3789.8
Signalling	2591.6	5341162.5	2061.0
Station Improvement	2589.3	14679873.9	5669.4
Communication/Traffic Control	3738.9	2326218.8	622.2
Total	46816	191364528.6	4087.6

Countries	Candidat Countries		
Measure	Length in km	Investments in Mio. Euro	Mio. Euro per km
Line improvement	5723	4515021	788.9
Track changes	73.2	29376.5	401.3
Signalling	302.6	202926.2	670.6
Station Improvement	462.7	29792.3	64.4
Communication/Traffic Control	762.4	276782.5	363.0
Total	7323.9	5053898.5	690.1

Table 5-3: Average unit cost for inland waterway measures

Countries	Member States		
Measures	Length in km	Investments in Mio. Euro	Mio. Euro per km
New link	285.8	62500	218.7
Deepening and widening	609.5	590329.2	968.5
Height under bridges	103.9	17568.1	169.1
Other new measure	423.1	544786	1287.6
Other upgrading measure	1852.1	2502957.4	1351.4
River crossing	59	12961	219.7
New lock	5	592000	118400.0
Enlargement of locks	294.7	224148.2	760.6
Other improvements on locks	396.3	69454.4	175.3
Automatic identification systems of vessels	136.2	2237.9	16.4
Total	4165.6	4618942.2	1108.8

Table 5-4: Average unit cost for inland waterway measures(continued)

Countries	Candidate Countries		
Measures	Length in km	Investments in Mio. Euro	Mio. Euro per km
New link	102	9561	93.7
Deepening and widening	0	0	
Height under bridges	0	0	
Other new measure	0	0	
Other upgrading measure	102	20000	196.1
River crossing	0	0	
New lock	147	235924	1604.9
Enlargement of locks	45	33216	738.1
Other improvements on locks	0	0	
Automatic identification systems of vessels	0	0	
Total	396	298701	754.3

During the unit cost estimation some measures have been aggregated. For railways measures to increase axle load, to add tracks, to change the alignment, electrification, to improve intersections and other line measures have been summarised under line improvement and all measures concerning stations under station improvement. For roads under traffic management information services, emergency and incident management and control activities have been put together.

Such unit cost approach is not generally applicable to ports, airports, terminals or even inland waterways as measures usually are individual engineering projects such as berths, runways, terminal buildings, locks, etc.

The cost provided by the experts of the related ministries or establishments in the Member States and the Candidate Countries varies significantly. This depends on the different price levels and on different manners to estimate the cost of the foreseen projects. Many of the investments anticipated by the experts in the contacted ministries or establishments are based on preliminary studies which do not provide detailed planning as basis for a reliable cost estimation. However, the cost of different measures have been derived from this information according to the following country groups:

- Germany, Netherlands, Belgium, Luxembourg, France, Austria,
- Spain, Portugal, Italy, Greece,
- Denmark, Sweden, Finland, United Kingdom, Ireland,
- Lithuania, Estonia, Latvia, Poland, Czech Republic,
- Slovakia, Slovenia, Hungary,
- Bulgaria, Romania, Malta, Cyprus.

Furthermore by plausibility tests some inconsistencies have been eliminated resulting from different understanding about what is a new link and what is upgrading from an existing link quality to a higher link quality. The cost by country groups are presented in Annex 5-1.

5.2 Assessment of investment structure

Unfortunately, the results of the data collection exercise are to some extent incomplete. Although it can be assumed that information for all relevant measures either already decided or anticipated to be initiated until 2010 were made available by the experts employed by the respective ministries in both the Member States and the Candidate Countries, data concerning the distribution of costs between components such as studies, planning and construction were available only for a few projects. Furthermore, some projects were not yet decided but studies concerning the implementation costs had already been executed. In these instances the total cost of the projects were mentioned but not the cost of the studies.

However, based on experience a general pattern concerning the percentage of the components can be assumed. The cost of studies usually ranges between 3% and 5%, the cost of planning between 12% and 15% and the construction cost range between 80% and 83% of the total cost of a project. The higher share applies for the construction of new links, for additional lanes or tracks and for all measures related to ports, airports or to the inland waterways. The lower share for studies and planning is related to rehabilitation measures. However the costs occurring in the public administrations and in the political bodies concerning decision taking are not included in these estimations.

Based on the information gained during the data collection and based on general experience a time schedule pattern for mode specific investments can be neglected as most of the investment are executed continuously as far as budget is available. Investment can be distributed on implementation years with constant shares. This approach assumes that financing usually will provided at he beginning of the year and will be used as soon as possible. The case that a project cannot be terminated at the end of the year and a smaller portion will be executed in the following year happens quite often, but to anticipate such a development will create bigger faults than to neglect this effect. However for the past, until 2001 and in many cases until 2003 the investment are known year by year.

6 Investment in the Trans-European Transport Network

6.1 Investments in the countries

Investments have been aggregated on the basis of the data collected in the course of the project. Where expenditure information was provided for a period of time instead of indicating figures for each single year, the investments were distributed equally across the number of years covered. This method was selected since execution plans for different infrastructure projects for the single countries were in some cases lacking. Some of the information on future investments was estimated and these figures should be treated with caution. They were derived from future investment plans or provided by national ministerial experts. Data covers the modes rail, road, inland waterways, ports and airports of the TEN-T network in the enlarged European Union.

6.1.1 Member States

Investments in the TEN-T network in the Member States between 1996 and 2001 amounted to 178.6 billion Euro. Between 2002 and 2005, expenditure of a further 159 billion Euro is foreseen, while the corresponding spend between 2006 and 2010 is put at 97.6 billion Euro.

Table 6-1: Total Investments in TEN-T Infrastructure, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	881.6	1,352.5	853.5	1735.6	1414.6	2428.1	**8,666.0**
Belgium	5,077.1	5,673.1	3,514.6	2,270.3	2,144.0	4,310.2	**22,989.3**
Denmark	2,715.1	4,474.0	1,365.8	145.1	77.2	71.7	**8,848.8**
Finland	747.7	911.6	700.2	1,014.9	1,129.5	1,747.9	**6,251.8**
France	6,199.3	11,243.2	8,756.6	10,794.3	8,042.8	9,435.2	**54,471.4**
Germany	12,561.8	14,251.0	9,654.5	13,087.7	8,851.8	13,187.5	**71,594.3**
Greece	2,216.1	2,507.5	2,797.7	2,603.7	2,521.2	1,679.5	**14,325.7**
Ireland	514.6	837.8	1,964.0	3,470.5	2,671.2	1,509.1	**10,967.3**
Italy	3,764.6	8,826.3	9,422.3	15,825.4	11,834.5	16,448.6	**66,121.6**
Luxembourg	79.9	59.6	109.7	159.8	159.8	399.6	**968.5**
Netherlands	3,953.4	5,273.8	9,863.9	10,689.8	8,551.3	6,188.8	**44,521.0**
Portugal	1,128.3	1,187.4	1,280.6	1,101.3	533.5	216.8	**5,448.0**
Spain	3,084.6	5,183.2	5,077.4	9,457.5	9,471.6	16,803.0	**49,077.3**
Sweden	1,558.7	1,283.2	631.5	1,700.9	1,953.8	2,548.0	**9,676.2**
United Kingdom	1,318.0	6,095.2	7,697.4	12,335.7	13,554.0	20,629.8	**61,630.2**
Total	**45,800.8**	**69,159.4**	**63,689.8**	**86,392.6**	**72,911.0**	**97,603.8**	**435,557.4**

Investments increased from 1996 until 1999 and were then slightly lower in the years 2000/2001. For the period 2002-2003 an increase of 30% over the previous period is estimated followed by a further decrease until 2005. From 1996 until 2001 Germany had the highest share of the total (20%) followed by France (15%) and Italy (12%). From 2002 until 2005 the highest investments were reported for Italy (17%) followed the UK (16%), Germany

(14), the Netherlands and France (12% each). With regard to Denmark only limited future investments were reported, due to the fact that future plans have not yet been made public.

6.1.2 Candidate Countries

In the Candidate Countries, investments of 7.8 billion Euro were reported between 1996 and 2001. The highest share was in the Czech Republic (29%), followed by Poland (19%), Slovenia (16%) and Hungary (13%).

Future expenditure of 20 billion Euro is projected for the period 2002 to 2005, of which Poland accounts for 29% and the Czech Republic for 27%. Another 20.7 billion Euro are estimated from 2006 until 2010. For the period 2011 to 2015, expenditure totalling 4.5 billion Euro was reported. The actual sums are likely to be much higher, but information on a long-term basis was not available.

It has to be noted that no road investment data were available for Bulgaria and Romania. For inland waterways, Bulgaria, Poland and Romania are missing, for ports Slovakia and Slovenia, and for airports, Poland.

Table 6-2: Total Investments in TEN-T Infrastructure, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	27.0	147.7	263.5	291.1	264.3	312.5	261.5	**1,567.6**
Cyprus	18.7	74.2	129.7	168.5	214.4	231.2	0.0	**836.6**
Czech Republic	356.6	468.3	1,467.6	2,650.2	2,936.1	4,125.1	1,537.5	**13,541.5**
Estonia	2.9	118.8	106.2	169.3	177.5	195.9	0.0	**770.7**
Hungary	25.1	168.2	823.3	1,563.2	1,365.6	2,016.2	469.9	**6,431.5**
Latvia	14.0	63.4	39.1	37.6	68.0	149.2	37.1	**408.4**
Lithuania	1.2	147.6	117.7	234.3	379.9	642.2	441.9	**1,964.8**
Malta	0.0	51.5	15.5	63.6	81.0	77.6	20.0	**309.2**
Poland	162.3	490.4	833.8	1,463.3	4,365.7	9,503.1	39.8	**16,858.4**
Romania	42.7	106.3	155.3	135.4	173.9	195.8	192.6	**1,002.0**
Slovakia	56.9	48.7	18.5	885.6	1,312.3	2,459.2	1,313.0	**6,094.3**
Slovenia	291.7	412.3	572.2	680.2	717.1	846.2	174.4	**3,694.2**
Total	**999.0**	**2,297.4**	**4,542.5**	**8,342.3**	**12,056.0**	**20,754.3**	**4,487.6**	**53,479.2**

6.2 Investments by Mode

During the indicated time periods the highest share of investments in the Member States was assigned to rail infrastructure (33% - 55%), followed by road infrastructure (22% - 34%). The lowest share was invested in inland waterways (1% - 2%), though it should be noted that there are only six out of 15 Member States with river systems which are interconnected: Austria, Belgium, France, Germany, Luxembourg and the Netherlands.

Between 1996 and 2001, investments in airports accounted for 17% to 13% of the total, while port expenditure ranged from 14% to 11%. Their decreasing share in the future is due to the fact that it was difficult to receive figures related to long-term investments.

Figure 6-1: Share of investments by mode, Member States

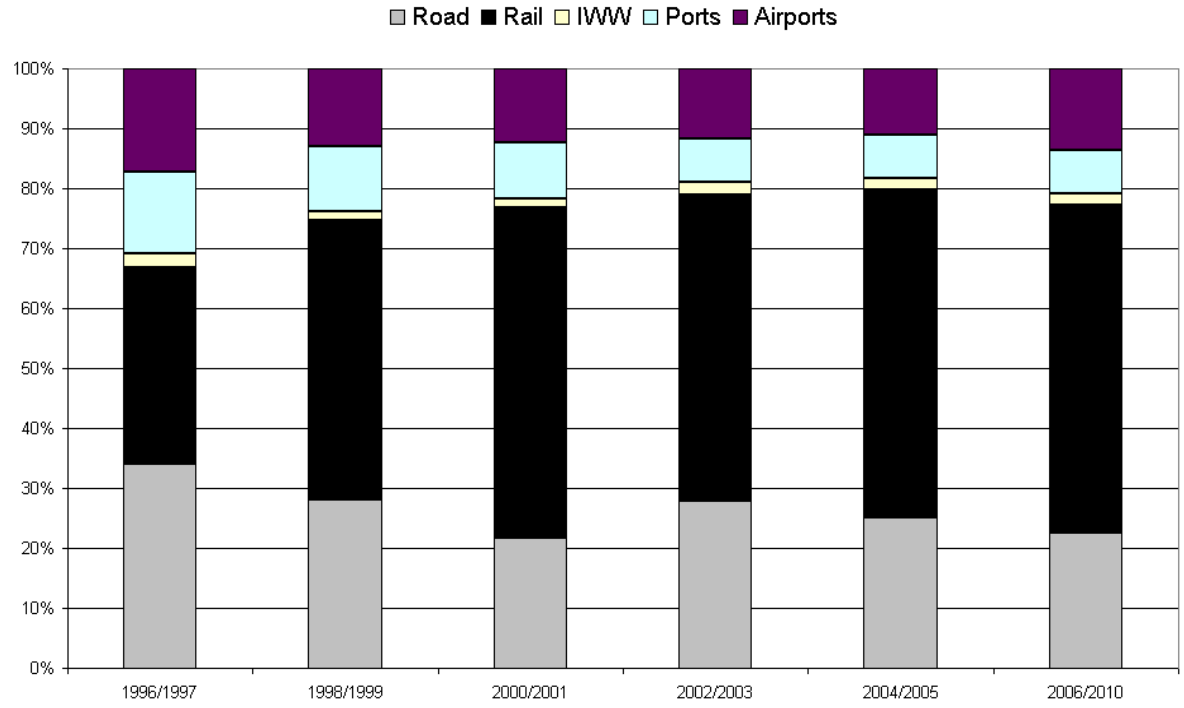


Table 6-3: Investments by mode, Member States, million Euro

	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Road	15,595.2	19,433.2	13820.7	24,078.8	18,271.7	21,996.9	**113,196.5**
Rail	15,025.3	32,257.2	35,033.0	44,035.2	39,932.9	53,465.8	**219,749.3**
IWW	1,068.6	1,016.9	1,066.4	1,975.0	1,331.4	1,779.1	**8,237.4**
Ports	6,218.6	7,534.4	5,917.4	6,121.4	5,305.2	7,062.5	**38,159.5**
Airports	7,893.1	8,917.7	7,852.3	10,182.3	8,069.7	13,299.6	**56,214.6**
Total	**45,800.8**	**69,159.4**	**63,689.8**	**86,392.6**	**72,911.0**	**97,603.8**	**435,557.4**

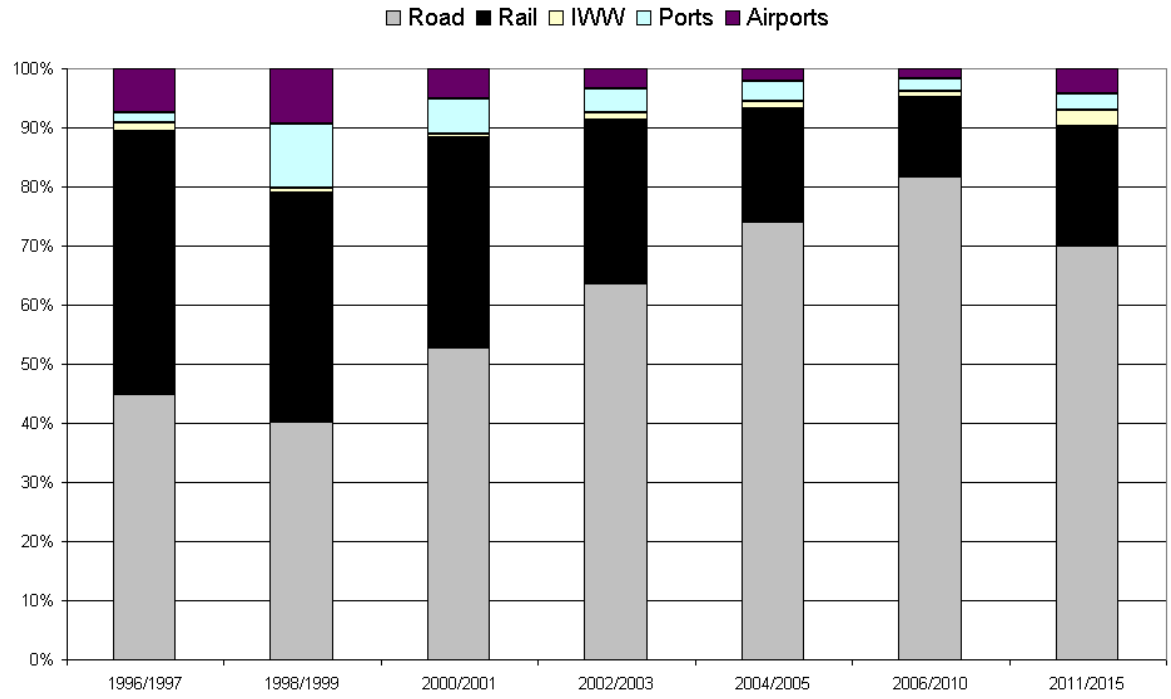
In the Member States the total reported investments ranged between 45.7 billion Euro in 1996 and 1997 and estimated expenditure of 97.1 billion Euro between 2006 and 2010. The total amount of future investments in the TEN-T foreseen between 2002 and 2010 amounted to 256,2 billion Euro. In practice these latter figures are likely to be higher since information from 2005 onwards was less readily available.

Table 6-4: Investments by mode, Candidate Countries, million Euro

	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Road	448.2	925.1	2,397.9	5,300.3	8,920.7	16,978.1	3,146.0	**38,116.2**
Rail	445.5	890.3	1,611.1	2,320.4	2,324.2	2,751.6	903.8	**11,246.9**
IWW	14.2	16.6	32.2	99.0	141.3	225.3	125.1	**653.6**
Ports	16.4	252.6	269.2	341.4	418.3	448.1	120.1	**1,866.2**
Airports	74.7	212.9	232.0	281.3	251.6	351.2	192.6	**1,596.2**
Total	**999.0**	**2,297.4**	**4,542.5**	**8,342.3**	**12,056.0**	**20,754.3**	**4,487.6**	**48,991.5**

The total investments that have been recorded by the Candidate Countries amounted to 50 billion Euro. Between 1996 and 2001 7.8 billion Euro were invested in the TEN-T. Future expenditure of 45.6 billion Euro is envisaged between 2002 and 2015. Investments will increase towards the year 2010. The amount doubles from 2000/2001 to 2002/2003 and intensive expenditure is foreseen in the road sector in the period between 2006 and 2010. For the period from 2011 until 2015 investments of 4.5 billion Euro have been reported, but again in practice this is likely to be higher.

Figure 6-2: Share of investments by mode, Candidate Countries



By far the largest amount, 61% on average, was/will be invested into road infrastructure between 1996 and 2015. Rail infrastructure accounts for 28% of the total. Funds attached to airports and ports total 5% and 4 % respectively. Inland waterways account for an average of only1% of the total investment.

The table shows that relative shares of total investments have changed over time. Whereas between 1996 and 1999 road and rail had almost equal shares, 45% between 1996 and

1997 and 40% between 1998 and 1999, from 2000 onwards investments in road infrastructure are increasing significantly at the expense of rail, which drops to 13% between 2006 and 2010.

6.2.1 Road Infrastructure

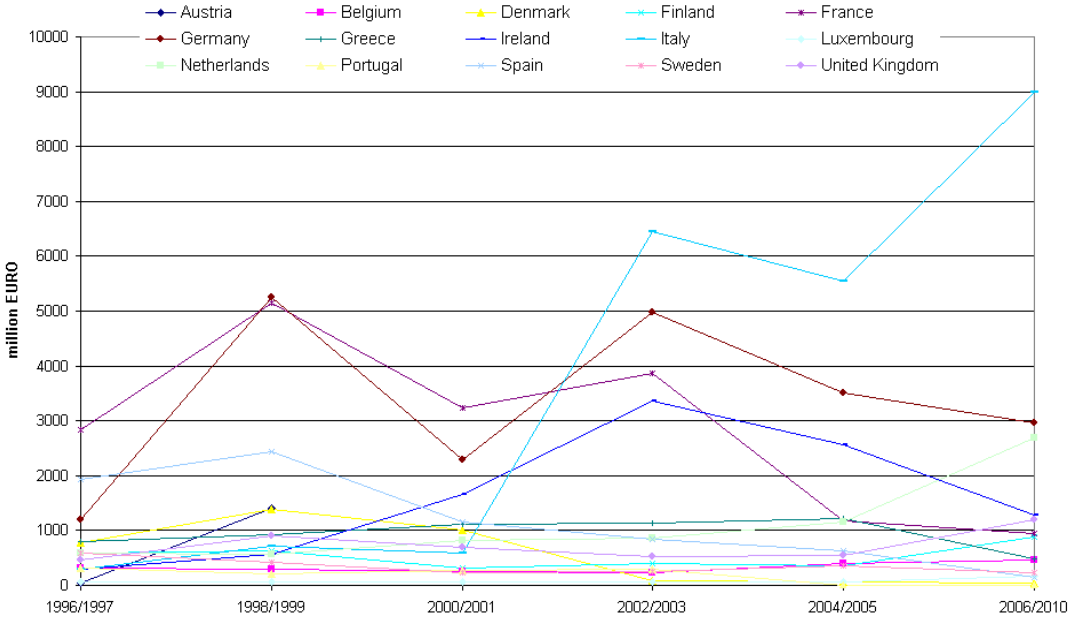
Road infrastructure expenditure makes up the second largest share of total investment in the Trans-European Transport Network in the Member States. Between 1996 and 2003 this investment is steadily increasing, except for the period between 2000 and 2001.

Table 6-5: Investments in TEN-T Road Infrastructure, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	50.0	221.2	406.7	971.8	843.1	1,400.6	**3,893.3**
Belgium	316.6	296.4	258.1	220.9	395.6	465.7	**1,953.2**
Denmark	1,110.8	1,218.0	831.6	87.8	59.9	37.0	**3,345.2**
Finland	262.2	286.6	181.9	225.6	285.4	725.5	**1,967.2**
France	3,432.1	5,141.1	3,232.1	3,858.4	1,166.3	940.0	**17,770.0**
Germany	3,787.8	5,266.0	2,300.6	4,984.6	3,520.2	3,112.8	**22,972.0**
Greece	1,328.0	1,078.2	1,144.7	1,139.7	1,213.6	490.8	**6,395.0**
Ireland	285.5	557.5	1,658.7	3,359.1	2,557.1	1,287.3	**9,705.1**
Italy	1,035.7	575.9	439.3	6,305.1	5,406.6	8,995.0	**22,757.7**
Luxembourg	5.7	5.7	56.4	107.0	107.0	267.5	**549.3**
Netherlands	342.5	649.2	901.1	915.3	1,179.6	2,694.0	**6,681.7**
Portugal	734.1	348.4	273.1	286.5	0.0	0.0	**1,642.2**
Spain	1,923.5	2,428.8	1,164.8	840.4	636.9	156.7	**7,151.0**
Sweden	581.7	413.7	220.9	250.1	356.9	224.2	**2,047.5**
United Kingdom	398.9	946.6	750.7	526.5	543.5	1,199.9	**4,366.1**
Total	**15,595.2**	**19,433.2**	**13,820.7**	**24,078.8**	**18,271.7**	**21,996.9**	**113,196.5**

One quarter of the total investment between 1996 and 2001 was made in France while 23% was invested in Germany and 11% in Spain. With regard to future expenditure, the highest share was reported for Italy (28%), followed by Germany (21%) and Ireland (14%).

Figure 6-3: Investments in TEN-T Road Infrastructure, Member States, million Euro



The figure above shows the investments in road infrastructure from 1996 to 2010 by individual Member States. The largest shares were reported for Italy, Germany and France. Particularly in Italy, relatively high future investments were indicated. The general trend shows that road investments are decreasing towards the end of the decade, with the exception of Italy. Investments can be divided into those designated in the Guidelines of 1996 as motorways, ordinary roads or high quality roads.

Table 6-6: Investments in TEN-T Motorways in the Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	6.0	89.3	177.7	409.9	522.7	982.2	**2,187.7**
Belgium	205.7	207.8	156.5	90.4	130.9	208.2	**999.4**
Denmark	894.7	852.0	608.0	65.0	54.8	37.0	**2,511.5**
Finland	103.6	89.7	29.6	49.0	68.0	86.9	**426.8**
France	2,252.7	2,608.0	1,057.6	810.0	80.0	364.6	**7,172.9**
Germany	3,747.9	5,247.1	2,155.9	4,772.5	3,453.4	2,994.7	**22,371.4**
Greece	1,153.2	1,014.4	1,064.4	1,110.9	576.2	490.3	**5,409.4**
Ireland	63.7	137.4	200.0	408.1	281.7	0.0	**1,091.0**
Italy	638.7	299.1	195.9	5,833.4	5,065.2	8,191.6	**20,224.0**
Luxembourg	5.7	5.7	39.4	73.0	73.0	182.5	**379.3**
Netherlands	314.7	445.7	697.6	592.5	825.4	2,455.5	**5,331.3**
Portugal	721.4	314.0	0.0	0.0	0.0	0.0	**1,035.4**
Spain	486.6	709.4	120.4	445.5	445.5	135.1	**2,342.5**
Sweden	432.0	68.0	34.0	32.6	35.9	3.2	**605.7**
United Kingdom	68.9	109.4	56.4	51.2	88.9	86.5	**461.3**
Total	**11,095.6**	**12,196.9**	**6,593.4**	**14,744.0**	**11,701.6**	**16,218.3**	**72,549.7**

Table 6-7: Investments in TEN-T Ordinary/ High Quality Roads, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	43.0	121.1	173.4	462.8	257.6	387.1	**1,444.9**
Belgium	108.5	86.2	99.2	128.1	262.3	256.3	**940.6**
Denmark	191.5	341.4	198.7	17.5	2.5	0.0	**751.6**
Finland	113.0	159.7	127.3	132.3	143.5	413.2	**1,089.0**
France	1,179.4	2,533.1	2,174.5	3,048.4	1,086.3	575.4	**10,597.0**
Germany	40.0	18.9	16.2	25.2	66.8	118.1	**285.2**
Greece	41.6	38.7	57.4	28.7	637.4	0.5	**804.4**
Ireland	207.2	390.9	1,407.4	2,906.8	2,253.3	1,287.3	**8,452.9**
Italy	397.0	276.8	243.5	150.3	20.0	0.0	**1,087.7**
Luxembourg	0.0	0.0	17.0	34.0	34.0	85.0	**170.0**
Netherlands	27.8	203.5	203.5	203.5	115.7	0.0	**754.1**
Portugal	12.7	29.1	252.4	261.0	0.0	0.0	**555.2**
Spain	831.6	1,054.5	629.5	259.0	126.5	21.6	**2,922.6**
Sweden	149.7	345.7	186.9	206.0	309.6	221.0	**1,418.9**
United Kingdom	328.4	835.6	685.3	455.6	452.6	1,113.4	**3,870.8**
Total	**3,671.4**	**6,435.2**	**6,472.2**	**8,319.6**	**5,767.9**	**4,478.8**	**35,145.1**

Of the total expenditure, 64% was related to motorways, with the highest levels recorded in Italy and Germany[7]. Total investments from 1996 until 2001 in TEN-T motorways in the Member States totalled 30 billion Euro. The investments in ordinary roads and high quality roads are shown in the tables Table 6-6 and Table 6-7.

Table 6-8: Investments in TEN-T road infrastructure, Candidate Countries, million Euro[8]

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a**
Cyprus	18.7	34.0	49.2	86.1	86.1	176.9	0.0	**450.8**
Czech Republic	0.0	0.0	558.4	1,524.4	2,070.8	2,805.1	1,537.5	**8,496.3**
Estonia	0.0	11.3	46.2	91.2	105.0	128.2	0.0	**381.9**
Hungary	17.0	33.5	462.9	1,227.3	1,127.1	1,873.1	469.9	**5,210.6**
Latvia	4.4	4.4	17.1	31.4	68.0	149.2	37.1	**311.6**
Lithuania	1.2	66.6	55.6	39.2	104.7	43.4	0.0	**310.7**
Malta	0.0	0.0	2.8	0.4	57.4	43.7	0.0	**104.3**
Poland	120.5	368.3	639.1	1,124.7	3,805.2	9,094.8	39.8	**15,192.4**
Romania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a**
Slovakia	0.0	0.0	0.0	523.5	834.3	1,826.0	887.4	**4,071.2**
Slovenia	286.4	407.0	566.6	652.1	662.2	837.7	174.4	**3,586.4**
Total	**448.2**	**925.1**	**2,397.9**	**5,300.3**	**8,920.7**	**16,978.1**	**3,146.0**	**38,116.2**

n.a. = data not available

[7] This data has been handed over by the EC. Unfortunately in four EU countries (Ireland, Spain, The Netherlands and Greece) the TEN types are often lacking. This explains also the slight differences when adding up investments of the road types compared to the total investments. Hence the figures have to be treated with caution.

[8] n.a. = data not available; # = mode of transport does not exist in the specific country

Table 6-9: Investments in TEN-T Motorways, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a
Cyprus	0.0	11.2	26.4	80.4	80.4	173.0	0.0	371.6
Czech Republic	0.0	0.0	506.5	987.4	1,217.8	1,249.0	0.0	3,960.7
Estonia	0.0	0.0	0.0	0.0	4.6	9.3	0.0	13.9
Hungary	0.0	0.0	370.2	757.6	575.2	449.1	0.0	2,152.0
Latvia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithuania	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Poland	72.8	313.8	536.8	595.6	2,091.4	3,588.3	0.0	7,198.8
Romania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a
Slovakia	0.0	0.0	0.0	135.2	313.5	677.3	198.5	1,324.5
Slovenia	55.3	70.4	85.9	114.8	114.8	0.0	0.0	441.4
Total	128.1	395.5	1,525.8	2,671.1	4,397.8	6,146.0	198.5	15,462.8

n.a. = data not available

Table 6-10: Investments in TEN-T Ordinary/ High Quality Roads, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a
Cyprus	18.7	22.8	22.8	5.6	5.6	3.8	0.0	79.3
Czech Republic	0.0	0.0	52.0	537.0	853.0	1,499.5	1,480.9	4,422.4
Estonia	0.0	11.3	46.2	91.2	100.3	118.9	0.0	368.0
Hungary	17.0	33.5	92.7	469.7	551.8	1,424.0	469.9	3,058.6
Latvia	4.4	4.4	17.1	31.4	68.0	149.2	37.1	311.6
Lithuania	1.2	58.9	55.5	39.2	104.7	43.4	0.0	302.9
Malta	0.0	0.0	2.8	0.4	57.4	43.7	0.0	104.3
Poland	40.8	44.5	95.8	472.4	1,632.5	5,397.3	39.8	7,723.1
Romania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.0
Slovakia	0.0	0.0	0.0	388.3	520.8	1,148.7	688.9	2,746.7
Slovenia	231.1	336.6	480.7	537.3	547.3	835.2	171.9	3,139.9
Total	313.1	511.9	865.5	2,572.5	4,441.6	10,663.8	2,888.4	22,256.7

n.a. = data not available

Investment in road infrastructure in the Candidate Countries was/will be 38 billion Euro from 1996 until 2015. Future expenditure (post 2003) of 28.9 billion Euro is envisaged. Nevertheless, as data from some countries was not available, the actual figure is likely to be higher. 58% of the investments is related to high quality and ordinary road, 40% is spend on motorways.

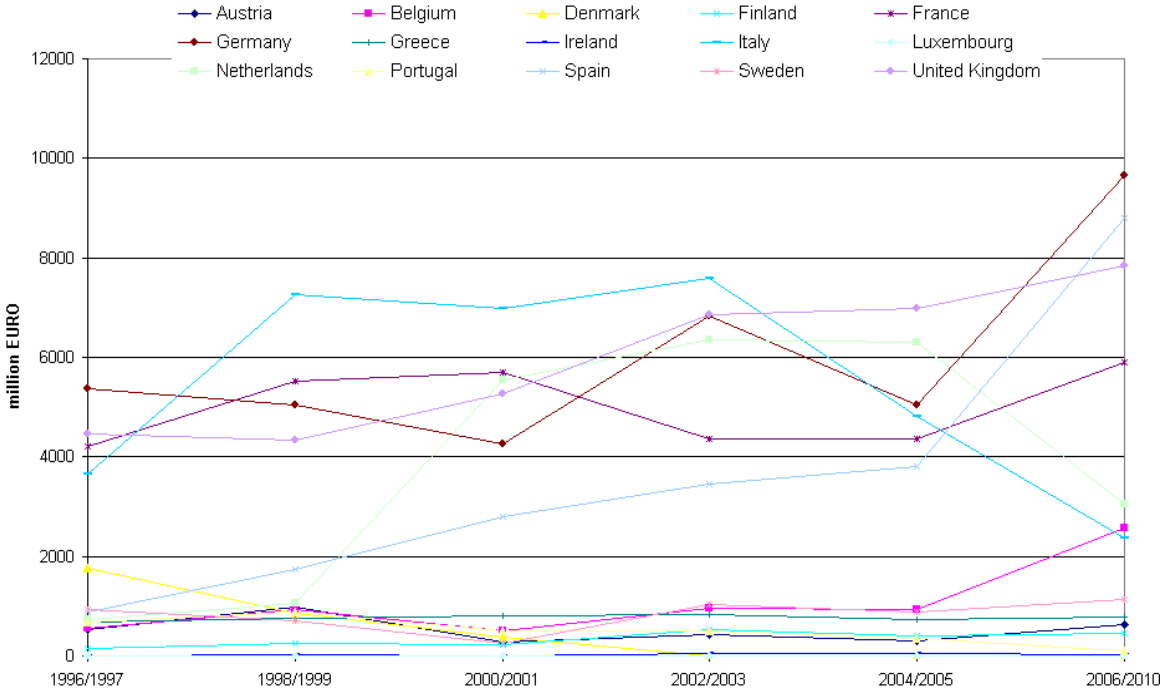
6.2.2 Rail Infrastructure

Large investments have been – and will be - made in railway infrastructure. Between 1996 until 2001 88,5 billion Euro was spent. The highest amounts were recorded in Italy, France and Germany. From 2002 onwards 118 billion Euro are projected for the entire TEN-T railway network.

Table 6-11: Investments in TEN-T Rail Infrastructure, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	669.0	983.8	285.3	432.9	310.9	621.7	**3,303.6**
Belgium	575.0	967.3	539.2	1,135.8	1,088.4	2,934.5	**7,240.1**
Denmark	1,291.3	3,055.4	420.2	5.2	0.0	0.0	**4,772.0**
Finland	188.2	265.2	235.8	551.7	431.3	496.7	**2,168.9**
France	1,730.3	4,402.1	4,599.4	4,636.4	4,810.4	6,793.2	**26,971.8**
Germany	5,371.5	5,032.7	4,270.5	6,823.8	5,033.3	9,643.7	**36,175.5**
Greece	380.3	474.6	569.3	945.1	941.1	984.5	**4,294.8**
Ireland	46.5	103.7	60.0	86.7	86.7	121.1	**504.6**
Italy	1,730.3	7,822.1	8,292.3	8,845.5	6,112.5	6,977.4	**39,780.1**
Luxembourg	31.3	11.0	6.9	2.8	2.8	7.1	**62.0**
Netherlands	625.5	1,429.1	5,724.5	6,342.0	6,364.4	3,152.8	**23,638.2**
Portugal	126.7	580.3	421.8	421.8	329.0	118.1	**1,997.8**
Spain	755.5	1,743.2	2,794.1	4,144.3	4,516.5	10,540.3	**24,493.8**
Sweden	935.0	696.8	382.8	1,303.1	1,209.0	1,511.4	**6,038.0**
United Kingdom	568.8	4,690.1	6,431.0	8,358.2	8,696.6	9,563.2	**38,307.9**
Total	**15,025.3**	**32,257.2**	**35,033.0**	**44,035.2**	**39,932.9**	**53,465.8**	**219,749.3**

Figure 6-4: Investments in TEN-T Rail Infrastructure, Member States, million Euro



There was no general trend within the 15 Members States regarding increasing or decreasing investment in rail infrastructure as the situation differed significantly among the countries.

Table 6-12: Investments in TEN-T High-speed Lines, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	20.3	68.1	119.8	239.7	244.2	621.7	**1,313.8**
Belgium	257.4	337.5	298.1	408.9	251.1	668.6	**2,221.6**
Denmark	901.4	2,648.7	405.4	0.0	0.0	0.0	**3,955.6**
Finland	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
France	1,600.1	4,318.2	4,569.2	4,606.2	4,780.2	6,717.7	**26,591.6**
Germany	1,558.4	1,885.9	1,594.5	2,256.4	1,647.8	3,095.3	**12,038.3**
Greece	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Ireland	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Italy	1,239.3	1,863.1	3,282.4	3,311.1	3,234.6	5,910.1	**18,840.6**
Luxembourg	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Netherlands	0.0	0.0	3,564.0	3,564.0	3,564.0	0.0	**10,692.0**
Portugal	47.5	254.1	0.0	0.0	0.0	0.0	**301.6**
Spain	167.6	1,108.2	2,009.2	3,035.1	3,407.3	8,518.4	**18,245.8**
Sweden	151.6	106.4	99.0	99.0	99.0	324.1	**879.2**
United Kingdom	190.9	0.0	1,740.9	3,023.6	2,565.4	2,565.4	**10,086.3**
Total	**6,134.6**	**12,590.2**	**17,682.6**	**20,544.0**	**19,793.6**	**28,421.3**	**105,166.3**

Investments have been subdivided according to the type of the line as indicated in the 1996 Guidelines. In the Member States, expenditure on high-speed lines accounted for 48% of the total between 1996 and 2001, 30% was allocated to up-graded high-speed lines and approximately one fifth was spent on conventional lines[9]. In the period to 2006 the share for high-speed lines increases slightly, with expenditure in France being highest, followed by Italy, Spain, Germany and the Netherlands.

In the UK, investments in up-graded high-speed lines are by far the highest, while in Germany a total of 6.5 billion Euro will be spent in the period to 2010. Investments in conventional lines add up to 17.5 billion Euro from 1996 until 2001 and another 23.1 billion will be spent from 2002 onwards.

[9] Slight deviations with regard to the total investments occur when adding up the different railway types due to some undefined link types in the database.

Table 6-13: Investments in TEN-T Upgraded High-speed Lines, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	496.4	700.3	0.0	133.3	66.7	0.0	**1,396.7**
Belgium	40.8	55.0	56.1	203.4	214.5	535.9	**1,105.8**
Denmark	389.9	406.6	14.7	5.2	0.0	0.0	**816.4**
Finland	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
France	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Germany	2,699.4	1,875.9	1,867.0	3,375.0	2,212.4	4,509.5	**16,539.1**
Greece	357.1	439.1	465.6	807.4	804.2	916.1	**3,789.5**
Ireland	27.4	33.3	30.0	70.0	70.0	79.5	**310.2**
Italy	339.6	1,213.9	1,478.7	1,676.0	408.8	0.0	**5,117.0**
Luxembourg	2.6	2.6	2.1	1.7	1.7	4.2	**14.8**
Netherlands	0.8	0.0	664.3	713.7	713.7	538.4	**2,630.8**
Portugal	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Spain	353.4	366.8	469.8	497.9	497.9	1,099.0	**3,284.9**
Sweden	676.6	528.1	124.0	884.6	691.5	734.9	**3,639.6**
United Kingdom	325.8	4,671.9	4,671.9	5,293.9	5,797.0	6,537.1	**27,297.5**
Total	**5,709.8**	**10,293.6**	**9,844.3**	**13,662.0**	**11,478.4**	**14,954.5**	**65,942.4**

Table 6-14: Investments in TEN-T Conventional Lines, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	152.4	215.4	165.4	59.9	0.0	0.0	**593.1**
Belgium	275.8	574.8	163.7	336.6	476.0	1,363.0	**3,190.0**
Denmark	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Finland	178.2	262.4	235.8	551.7	431.3	496.7	**2,156.1**
France	130.2	83.9	30.2	30.2	30.2	75.5	**380.3**
Germany	1,113.6	1,271.0	809.0	1,192.5	1,173.1	2,038.9	**7,598.1**
Greece	23.2	35.4	48.6	27.6	26.7	13.4	**174.9**
Ireland	19.1	70.4	30.0	16.7	16.7	41.7	**194.4**
Italy	151.4	2,820.5	2,154.8	2,534.1	1,242.4	502.7	**9,406.0**
Luxembourg	27.3	7.0	3.7	0.3	0.3	0.8	**39.5**
Netherlands	557.2	1,048.1	1,288.6	2,047.2	2,011.5	2,501.6	**9,454.2**
Portugal	79.2	326.2	421.8	421.8	329.0	118.1	**1,696.2**
Spain	234.5	268.2	315.1	611.3	611.3	922.9	**2,963.2**
Sweden	106.8	62.3	28.6	57.1	82.6	79.9	**417.4**
United Kingdom	52.0	18.2	18.2	40.7	334.2	460.7	**924.1**
Total	**3,101.0**	**7,063.8**	**5,713.5**	**7,927.6**	**6,765.5**	**8,616.0**	**39,187.3**

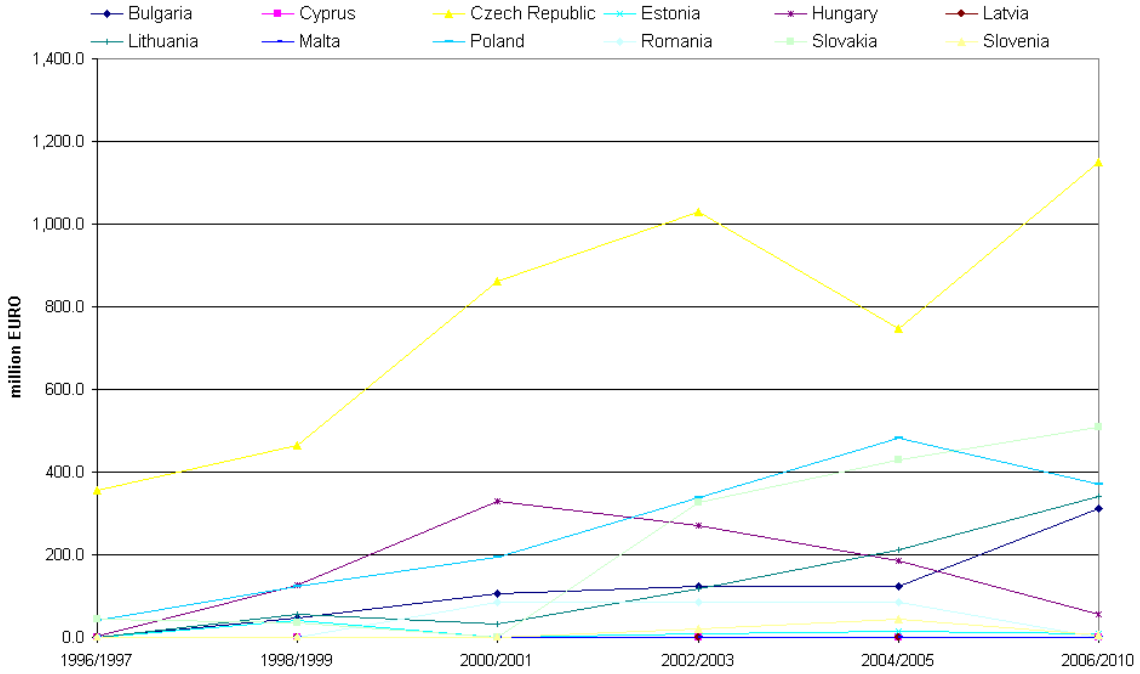
In the Candidate Countries, 2.9 billion Euro were invested between 1996 and 2001, while a further 8.3 billion Euro is forecast up to 2015. The highest amount will be spent in the Czech Republic. Poland and Slovakia are going to invest approximately 1.6 billion Euro each in the period studied. In general, railway investments are forecast to increase towards 2010, but from then on the picture remains uncertain.

Table 6-15: Investments in TEN-T Rail Infrastructure, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	0.0	46.6	106.6	123.2	123.7	312.5	261.5	**974.2**
Cyprus	#	#	#	#	#	#	#	#
Czech Republic	356.6	465.5	863.0	1,030.9	746.0	1,150.4	0.0	**4,612.4**
Estonia	0.0	39.8	0.0	7.5	14.9	7.5	0.0	**69.7**
Hungary	4.4	125.7	328.6	269.7	186.0	55.4	0.0	**969.8**
Latvia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**
Lithuania	0.0	56.0	31.5	116.3	211.0	341.8	341.8	**1,098.4**
Malta	#	#	#	#	#	#	#	#
Poland	41.7	122.1	194.7	338.6	482.4	369.3	0.0	**1,548.9**
Romania	0.0	0.0	86.7	86.7	86.7	0.0	0.0	**260.0**
Slovakia	42.8	34.6	0.0	325.6	428.0	508.0	300.5	**1,639.4**
Slovenia	0.0	0.0	0.0	22.0	45.4	6.7	0.0	**74.1**
Total	**445.5**	**890.3**	**1,611.1**	**2,320.4**	**2,324.2**	**2,751.6**	**903.8**	**11,246.9**

n.a.= data not available; # = mode of transport does not exist in the specific country

Figure 6-5: Investments in TEN-T Rail Infrastructure, Candidate Countries, million Euro



Information on Latvian railways is missing, while neither Cyprus nor Malta possesses any railway infrastructure. In the Candidate Countries nearly all investments are related to conventional lines. Only in Bulgaria and Poland is there significant expenditure on up-graded high-speed lines. (Between 1996 and 2015, 410 million Euro in Bulgaria and 168 million Euro in Poland.)

Table 6-16: Investments in TEN-T Rail Infrastructure, Conventional Lines, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	0.0	30.2	68.2	74.1	73.3	183.3	135.1	**564.1**
Cyprus	#	#	#	#	#	#	#	#
Czech Republic	356.6	465.5	863.0	1,030.9	746.0	1,150.4	0.0	**4,612.4**
Estonia	0.0	39.8	0.0	7.5	14.9	7.5	0.0	**69.7**
Hungary	4.4	125.7	328.6	269.7	186.0	55.4	0.0	**969.8**
Latvia	n.a	n.a	n.a	n.a	n.a	n.a	n.a	**n.a.**
Lithuania	0.0	56.0	31.5	116.3	211.0	341.8	341.8	**1,098.4**
Malta	#	#	#	#	#	#	#	#
Poland	41.7	104.4	159.3	281.0	424.8	369.3	0.0	**1,380.6**
Romania	0.0	0.0	86.7	86.7	86.7	0.0	0.0	**260.0**
Slovakia	42.8	34.6	0.0	325.6	428.0	508.0	300.5	**1,639.4**
Slovenia	0.0	0.0	0.0	22.0	45.4	6.7	0.0	**74.1**
Total	**445.5**	**856.2**	**1,537.3**	**2,213.7**	**2,216.2**	**2,622.3**	**777.4**	**10,668.5**

n.a.= data not available; # = mode of transport does not exist in the specific country

6.2.3 Inland Waterways Infrastructure

In the Member States inland waterways exist in nine out of the total of 15 countries. The Po in Italy and the Duoro in Portugal belong to the revised TEN-T inland waterway network, though no information for these has so far been made available.

Table 6-17: Investments in TEN-T inland waterway infrastructure, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	0.0	3.3	0.0	28.6	28.6	71.4	**131.9**
Belgium	91.4	140.5	179.7	156.2	118.6	245.3	**931.7**
Denmark	#	#	#	#	#	#	#
Finland	0.4	15.5	0.9	22.8	35.9	29.0	**104.5**
France	0.0	0.0	0.0	777.5	777.5	1,166.3	**2,721.4**
Germany	879.1	720.1	740.3	578.1	0.0	0.0	**2,917.6**
Greece	#	#	#	#	#	#	#
Ireland	#	#	#	#	#	#	#
Italy	#	#	#	#	#	#	#
Luxembourg	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**
Netherlands	97.6	137.4	145.5	411.8	370.8	267.0	**1,430.3**
Portugal	#	#	#	#	#	#	#
Spain	#	#	#	#	#	#	#
Sweden	#	#	#	#	#	#	#
United Kingdo	#	#	#	#	#	#	#
Total	**1,068.6**	**1,016.9**	**1,066.4**	**1,975.0**	**1,331.4**	**1,779.1**	**8,237.4**

n.a.= data not available; # = mode of transport does not exist in the specific country

Investments into this mode of transport amounted to three billion Euro between 1996 and 2001. Future expenditure of 5.1 billion Euro is foreseen between 2002 and 2010. The highest investments were made in Germany, totalling 2.9 billion Euro between 1996 and 2003. For

France only future investments were reported, and amounted to 2.7 billion Euro between 2002 and 2010.

Figure 6-6: Investments in TEN-T Inland Waterways, Member States, million Euro

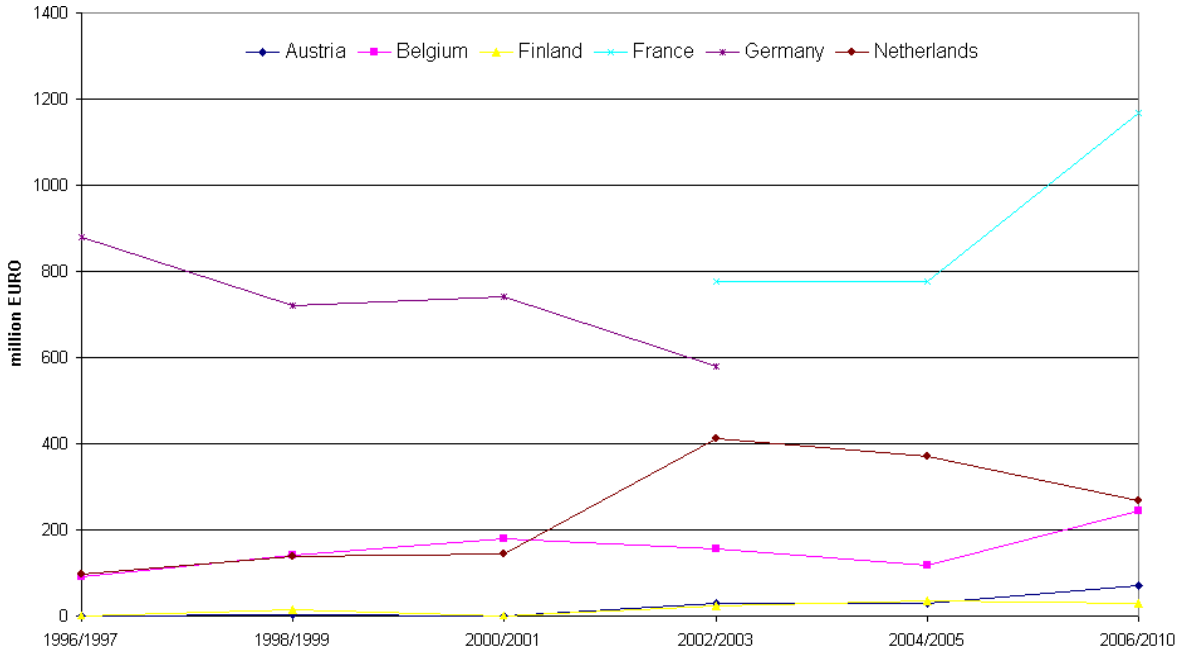


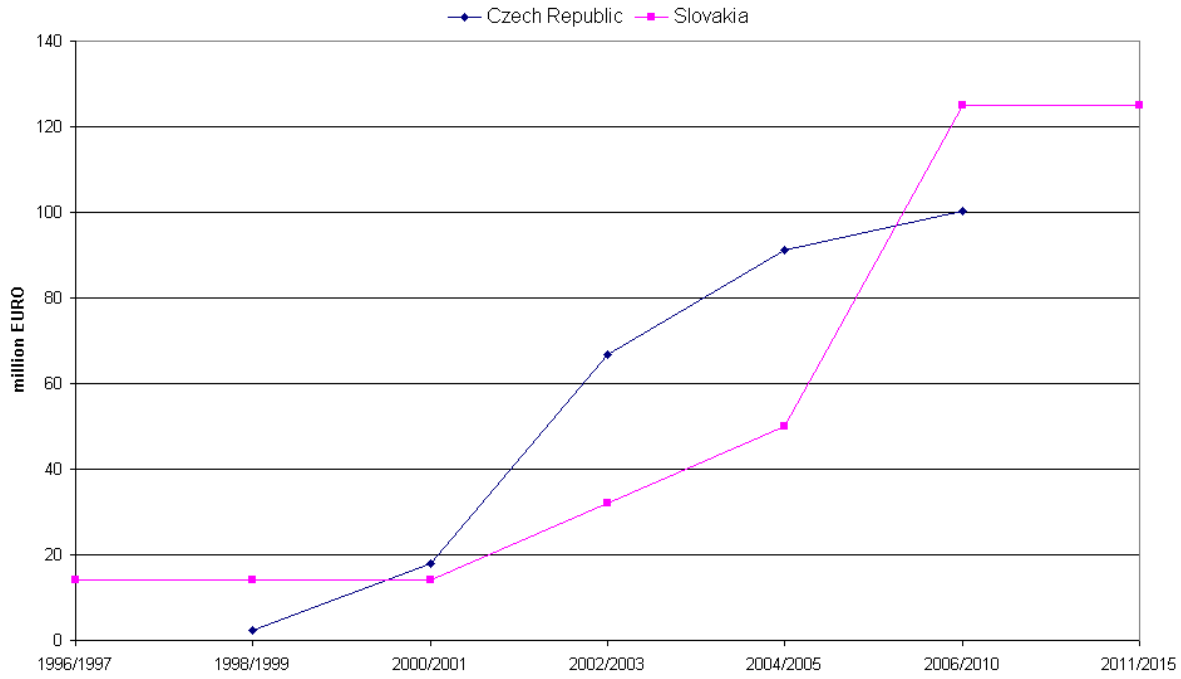
Table 6-18: Investments in TEN-T Inland Waterway Infrastructure, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**
Cyprus	#	#	#	#	#	#	#	#
Czech Republic	0.0	2.4	18.1	66.8	91.2	100.2	0.0	**278.7**
Estonia	#	#	#	#	#	#	#	#
Hungary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Latvia	#	#	#	#	#	#	#	#
Lithuania	#	#	#	#	#	#	#	#
Malta	#	#	#	#	#	#	#	#
Poland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**
Romania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**
Slovakia	14.2	14.2	14.2	32.1	50.1	125.1	125.1	**374.9**
Slovenia	#	#	#	#	#	#	#	**n.a.**
Total	**14.2**	**16.6**	**32.2**	**99.0**	**141.3**	**225.3**	**125.1**	**653.6**

n.a.= data not available; # = mode of transport does not exist in the specific country

Only limited investment data was available relating to inland waterways in the Candidate Countries, the Czech Republic being the sole state to respond. One reason for this was that until the endorsement of a bilateral agreement between Hungary and Slovakia no future investment in this mode of transport is envisaged.

Figure 6-7: Investments in TEN-T Inland Waterways, Candidate Countries, million Euro



6.2.4 Airports

Investments were recorded for 185 airports in the Member States and 51 airports in the Candidate Countries.

Between 1996 and 2001 22.3 billion Euro were invested in the Member States (40 international, 62 community connecting points and 114 regional airports). The largest amount was recorded in the Netherlands, and was related to the development of Amsterdam Schiphol. The second largest expenditure during the period was in Germany. Future investment information was incomplete, since long-term development plans were often regarded as commercially sensitive and thus not made public.

The following table sets out details of the investments indicated by the different airports. Future expenditure is estimated to be approximately eight billion Euro in 2002 and 2003 and another 21 billion between 2004 and 2010 inclusive. Reported future investments in the UK were the highest among the Member States. For the other countries only limited information was available.

Table 6-19: Investments in TEN-T airports, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	158.1	132.7	137.5	270.7	214.5	330.8	**1,244.3**
Belgium	52.9	425.5	514.0	247.8	152.3	223.2	**1,615.7**
Denmark	265.9	143.4	49.5	16.7	4.2	1.9	**481.6**
Finland	98.3	145.8	83.1	16.7	0.4	1.1	**345.5**
France	1,036.9	1,475.6	663.1	1,223.3	1,105.5	489.8	**5,994.2**
Germany	1,754.2	2,189.2	1,332.6	0.0	0.0	0.0	**5,276.0**
Greece	462.5	899.0	1,005.1	429.3	311.3	190.9	**3,298.1**
Ireland	97.5	99.0	187.1	0.1	0.0	0.0	**383.7**
Italy	998.5	428.3	486.6	197.8	24.0	0.0	**2,135.2**
Luxembourg	42.9	42.9	46.4	50.0	50.0	125.0	**357.1**
Netherlands	2,209.1	2,371.3	21.3	71.1	44.2	0.0	**4,716.9**
Portugal	240.2	94.6	372.4	195.4	7.2	0.0	**909.8**
Spain	405.6	200.5	332.8	2,193.5	2,033.0	2,400.3	**7,565.8**
Sweden	42.1	172.7	27.8	29.8	279.7	761.8	**1,313.9**
United Kingdom	28.5	97.3	229.8	2,961.8	3,843.4	8,774.7	**15,935.4**
Total	**7,893.1**	**8,917.7**	**5,489.3**	**7,904.0**	**8,069.7**	**13,299.6**	**51,573.3**

Approximately 56% of the total expenditure is related to International and 33% to Community Airports (as defined in the Guidelines in the Member States.)

Table 6-20: Investments in TEN-T international airports, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	140.4	77.0	121.7	240.6	187.1	328.8	**1,095.6**
Belgium	20.5	386.6	492.1	178.5	74.4	185.9	**1,337.9**
Denmark	231.1	109.4	0.0	0.0	0.0	0.0	**340.6**
Finland	56.4	86.2	46.4	16.3	0.0	0.0	**205.4**
France	905.0	1,287.1	577.8	1,033.6	952.2	229.9	**4,985.5**
Germany	1,197.1	1,552.1	973.6	0.0	0.0	0.0	**3,722.8**
Greece	428.8	857.6	857.6	0.0	0.0	0.0	**2,144.0**
Ireland	76.3	76.3	38.1	0.0	0.0	0.0	**190.7**
Italy	917.6	344.6	236.1	101.6	0.0	0.0	**1,600.0**
Luxembourg	42.9	42.9	46.4	50.0	50.0	125.0	**357.1**
Netherlands	1,307.3	2,370.2	7.2	32.6	0.0	0.0	**3,717.3**
Portugal	76.2	80.1	13.7	13.7	6.8	0.0	**190.5**
Spain	325.9	98.6	204.5	1,214.9	956.7	513.5	**3,314.0**
Sweden	21.7	154.8	10.3	10.3	217.0	538.5	**952.5**
United Kingdom	0.0	16.5	48.5	917.2	1,312.3	2,474.2	**4,768.8**
Total	**5,747.0**	**7,540.0**	**3,674.1**	**3,809.3**	**3,756.5**	**4,395.8**	**28,922.7**

Table 6-21: Investments in TEN-T community airports, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	0.0	17.8	0.0	12.5	12.5	0.0	**42.8**
Belgium	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Denmark	32.7	32.7	32.7	16.4	0.0	0.0	**114.5**
Finland	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
France	119.5	154.6	59.5	159.8	139.0	247.6	**880.0**
Germany	517.1	577.2	200.6	0.0	0.0	0.0	**1,295.0**
Greece	12.6	20.3	125.6	405.4	287.4	175.7	**1,027.0**
Ireland	21.1	21.1	18.4	0.0	0.0	0.0	**60.6**
Italy	78.0	79.5	178.7	62.2	24.0	0.0	**422.4**
Luxembourg	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Netherlands	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Portugal	163.2	13.7	354.2	176.7	0.0	0.0	**707.8**
Spain	74.9	55.7	60.5	261.5	332.6	495.3	**1,280.4**
Sweden	0.0	7.7	0.0	4.4	40.0	194.8	**246.9**
United Kingdom	21.0	73.4	84.8	1,936.0	2,492.9	6,262.4	**10,870.5**
Total	**1,040.2**	**1,053.8**	**1,114.9**	**3,034.8**	**3,328.4**	**7,375.9**	**16,947.9**

Looking at the Candidate Countries, the availability of investment data for airports was, in some cases, incomplete. The project covered 11 international, 8 community connecting points and 1 regional airports.

In 1996 and 1997 69 million Euro were spent. Between 1996 and 2001 investments of 519.7 million Euro were reported. Future expenditure of 1.1 billion Euro is projected in the period to 2015. (Investment between 2011 and 2015 was provided only provided by Romania and amounted to 192.6 million Euro.)

Table 6-22: Investments in TEN-T airports, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	25.7	51.3	51.3	51.3	25.7	0.0	0.0	**205.4**
Cyprus	0.0	40.2	80.5	80.5	80.5	32.4	0.0	**314.0**
Czech Republic	0.0	0.4	28.1	28.1	28.1	69.4	0.0	**154.1**
Estonia	1.1	19.5	7.7	0.2	0.4	0.9	0.0	**29.9**
Hungary	0.0	0.0	0.7	4.8	1.8	5.3	0.0	**12.6**
Latvia	0.0	12.4	12.4	6.2	0.0	0.0	0.0	**31.0**
Lithuania	0.0	12.4	0.5	18.3	18.3	45.7	0.0	**95.0**
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Poland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Romania	42.7	71.3	33.6	48.7	87.3	195.8	192.6	**672.0**
Slovakia	0.0	0.0	4.4	4.4	0.0	0.0	0.0	**8.7**
Slovenia	5.3	5.3	5.6	6.1	9.6	1.7	0.0	**33.7**
Total	**74.7**	**212.9**	**224.8**	**248.7**	**251.6**	**351.2**	**192.6**	**1,556.4**

Three-quarters of total investment expenditure in Candidate Countries in the period to 2015, 1.1 billion Euro, is allocated to International Airports; the remaining sum - 401 million Euro - being spent on the development of Community Connecting Points.

Table 6-23: Investments in TEN-T airports, International Airports, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	25.7	51.3	51.3	51.3	25.7	0.0	0.0	**205.4**
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Czech Republic	0.0	0.0	25.7	25.7	25.7	64.1	0.0	**141.1**
Estonia	1.1	18.7	7.4	0.0	0.0	0.0	0.0	**27.3**
Hungary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Latvia	0.0	12.4	12.4	6.2	0.0	0.0	0.0	**31.0**
Lithuania	0.0	7.2	0.0	11.1	11.1	27.7	0.0	**57.0**
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Poland	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Romania	41.4	69.2	32.3	47.4	86.0	192.6	192.6	**661.4**
Slovakia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Slovenia	5.3	5.3	5.6	0.0	0.0	0.0	0.0	**16.2**
Total	**73.4**	**164.2**	**134.7**	**141.7**	**148.3**	**284.4**	**192.6**	**1,139.3**

6.2.5 Ports

Investments into ports have been reported for 230 ports, 204 located in the Member States and the remaining in the Candidate Countries.

Table 6-24: Investments in TEN-T ports, Member States, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	TOTAL
Austria	4.5	11.6	24.0	31.7	17.6	3.6	**92.9**
Belgium	4,041.3	3,843.5	2,023.6	509.6	389.1	441.5	**11,248.6**
Denmark	47.0	57.2	64.5	35.4	13.1	32.8	**249.9**
Finland	198.5	198.5	198.5	198.2	376.5	495.6	**1,665.8**
France	0.0	224.4	262.0	298.6	183.1	45.9	**1,014.0**
Germany	769.1	1,043.0	1,010.5	701.2	298.4	431.0	**4,253.1**
Greece	45.2	55.7	78.6	89.7	55.2	13.2	**337.7**
Ireland	85.2	77.7	58.3	24.6	27.4	100.7	**373.9**
Italy	0.0	0.0	204.1	477.0	291.4	476.1	**1,448.6**
Luxembourg	#	#	#	#	#	#	#
Netherlands	678.7	686.8	708.5	671.2	592.4	75.0	**3,412.6**
Portugal	27.3	164.1	213.3	197.6	197.2	98.6	**898.2**
Spain	0.0	810.8	785.7	2,279.3	2,285.1	3,705.8	**9,866.7**
Sweden	0.0	0.0	0.0	117.8	108.2	50.7	**276.8**
United Kingdom	321.9	361.2	285.9	489.3	470.5	1,091.9	**3,020.7**
Total	**6,218.6**	**7,534.4**	**5,917.4**	**6,121.4**	**5,305.2**	**7,062.5**	**38,159.5**

does not apply

Investments in port infrastructure in the Member States (175 maritime ports and 29 maritime/ inland and inland ports) amounted to 19.6 billion Euro between 1996 and 2001. Future expenditure in the period between 2002 and 2010 are estimated to be 18.5 billion Euro. The total investment amounts to 38 billion Euro. Very high figures were reported for Belgium, where the Port of Antwerp accounted for the majority of expenditure.

In the Candidate Countries, port investment (13 maritime ports and 13 maritime/ inland and inland ports) totalled 1.7 billion Euro between 1996 and 2015, though it must be stated that data proved difficult to obtain. For the period 1996 until 2001, expenditure of 481 million Euro was reported and between 2002 and 2010 1.2 billion Euro. Only Lithuania provided data beyond 2010.

Table 6-25: Investments in TEN-T ports, Candidate Countries, million Euro

Country	1996/1997	1998/1999	2000/2001	2002/2003	2004/2005	2006/2010	2011/2015	TOTAL
Bulgaria	1.3	49.7	105.6	116.5	114.9	0.0	0.0	**388.1**
Cyprus	0.0	0.0	0.0	2.0	47.9	21.9	0.0	**71.8**
Czech Republic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Estonia	1.8	48.2	52.2	70.4	57.2	59.4	0.0	**289.2**
Hungary	3.8	9.0	31.1	61.3	50.8	82.5	0.0	**238.4**
Latvia	9.6	46.6	9.6	0.0	0.0	0.0	0.0	**65.8**
Lithuania	0.0	12.6	30.2	60.6	45.9	211.4	100.1	**460.7**
Malta	0.0	51.5	5.5	30.6	23.6	33.9	20.0	**165.1**
Poland	0.0	0.0	0.0	0.0	78.1	39.0	0.0	**117.1**
Romania	0.0	35.0	35.0	0.0	0.0	0.0	0.0	**70.0**
Slovakia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Slovenia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**n.a.**
Total	**16.4**	**252.6**	**269.2**	**341.4**	**418.3**	**448.1**	**120.1**	**1,866.2**

n.a. data not available

6.3 Specific Projects

The specific project play a vital role for the implementation of the TEN-T network. Investments have been collected for the entire network, so that the data for the specific projects is also on hand as far as it has been made available. Investments indicated in tables below encompass past investments as well as future investments indicated in national investments plans or supplied by the experts from the national ministries.

The proposal for the revision of the 1996 guidelines has also indicated proposed extensions of certain specific projects. The investments of the proposed extensions have been indicated separately.

The PLANTIS tool has been used to extract the data on a link by link basis. For the ongoing specific projects the results are presented in this chapter in an aggregated manner. The investments stated in this chapter refer to already decided investments or budget allocations as well as estimated future investments as provided by the experts from national ministries. Information on a link by link basis can be found in Annex 6-2. The length indicated in the tables refers to the entire length of the specific project encompassing completed as well as uncompleted sections.

6.3.1 Highspeed train / combined transport north – south

The project aims at the improvement of the north- south rail corridor from Berlin (Germany) to Naples (Italy). The initial project covered the link from Berlin to Verona. An extension has been proposed by the EC, which continues to Naples and also encompasses a Milan – Bologna branch. The project will help to reduce travel times and improve the capacity also for freight traffic. The following investments have been reported for the countries involved.

Table 6-26: Specific project 1

Country	Measure	Length	from	to	Investments in million Euro
Germany	upgrading/ new line	631.2	1992	2010	6,642
Austria	new line	103.3	1998	2010	1,238
Italy	upgrading/ new line	151.0	1996	2004	362.8
Italy	*proposed extension*	536.5	1994	2010	16,190.6
TOTAL		**1431.0**	**1992**	**2010**	**24,433.4**

6.3.2 Highspeed train PBKAL

The highspeed train PBKAL was the first multi-country highspeed train undertaking in Europe. It connects central European capitals as well as major cities and constitutes an alternative to passenger air traffic since journey times are reduced significantly. The entire project is likely to be terminated in 2007.

Table 6-27: Specific project 2

Country	Measure	Length	from	to	Investments in million Euro
UK	new line	166.4	1994	2007	10,086
Belgium	upgrading/ new line	297.3	1994	2012	3,308
Netherlands	upgrading/ new line	107.6	1988	2008	6,375
Germany	upgrading/ new line	338.3	1994	2007	5,693
TOTAL		**909.6**	**1998**	**2012**	**25,462**

6.3.3 Highspeed train south

The highspeed train south links Madrid to the French city of Montepellier. An extension of the link to Nimes has been proposed by the EC, on order to to connect it to the high speed line Marseilles – Paris. The line heading from Madrid to the north runs via Valladolid and Burgos to the French – Spanish border. This line is connected to the priority project 8 (multimodal link Portugal-Spain-Central Europe). The major results after the implementation of this project is the drastic reduction of journey times.

Table 6-28: Specific project 3

Country	Measure	Length	from	to	Investments in million Euro
Spain	new line	1,217.9	1996	2010	16,415
France	upgrading/ new line	180.8	1996	2005	2,316
France	*proposed extension*	54.4	2004	2012	783
TOTAL		**1,453.1**	**1996**	**2010**	**19,514**

6.3.4 Highspeed train east

This project has been set up in order to connect the French and the German highspeed railway networks. The highspeed link runs from Paris via Saarbrücken to Mannheim. The link from Luxembourg to Strasbourg is also part of the project. Journey times will be reduced considerably.

The project also constitutes the basis for an east west corridor spanning from Central Europe to the Candidate Countries.

Table 6-29: Specific project 4

Country	Measure	Length	from	to	Investments in million Euro
France	new line	449.9	2000	2010	5,353
Germany	upgrading	130.1	1996	2006	446
TOTAL		**580.0**	**1996**	**2010**	**5,799**

6.3.5 Conventional rail/ combined transport: Betuwe line

The Betuwe line is a freight transport line, which links the Port of Rotterdam with Europe's economic centres. The line runs through the Netherlands and connects to the German railway system. The aim of the project is to strengthen the Port of Rotterdam as a major European freight transport hub and to shift freight traffic from road to rail thus contributing to the reduction of pollution and enhancing road safety.

Table 6-30: Specific project 5

Country	Measure	Length	from	to	Investments in million Euro
Netherlands	upgrade/ new line	159.5	1984	2010	1,057
TOTAL		**159.5**	**1984**	**2010**	**1,057**

6.3.6 Highspeed train/ combined transport France – Italy

The highspeed line moves along all the way from Lyon in France via Torino, Milano, Verona and Venezia to Triest. Its purpose is to release the congested road links running through the Alps and shift freight traffic from road to rail. Capacities for both passenger and freight traffic

will be increased considerably and journey times are going to be reduced drastically. The line also constitutes a link to the Accession Countries.

Table 6-31: Specific project 6

Country	Measure	Length	from	to	Investments in million Euro
France	new line	200	1996	2006	1,900
Italy	Upgrading/ new line	597	1992	2011	4,838
TOTAL		**797**	**1992**	**2011**	**6,738**

6.3.7 Greek motorways, Pathe and Via Egnatia

This motorway project will reduce journey times by car significantly and link Greece efficiently to its neighbouring countries. It is also envisaged that economic and regional development is fostered.

Table 6-32: Specific project 7

Country	Measure	Length	from	to	Investments in million Euro
Greece	upgrade/ new construction	1,686.2	1995	2007	3,693
TOTAL		**1,686.2**	**1995**	**2007**	**3,693**

6.3.8 Multimodal link Portugal- Spain- Central Europe

The multimodal link improves the road and rail traffic in Spain and Portugal and connects these two countries to Central Europe, thus improving their position as Europe's maritime entryway. Furthermore, the project contributes to the White Paper's goal to shift road to rail traffic by improving the capacity of the rail network in both countries. The upgrading of the road links will enhance road safety and cut journey times.

Table 6-33: Specific project 8

Country	Measure	Length	from	to	Investments in million Euro
Portugal	road	1,218	1996	2003	1,190
Spain	Road	432	1996	1999	160
Total	*Road*	*1,650*	*1996*	*2003*	*1,350*
Portugal	Rail	1,257	1993	2006	3,123
Spain	Rail	236	1996	1999	830
Total	*Rail*	*1,493*	*1993*	*2006*	*3,953*
TOTAL		**3,143**	**1993**	**2006**	**5,303**

6.3.9 Conventional rail link Cork – Stranraer

This entire specific project has been terminated in 2001. An conventional rail link has been upgraded in order to connect the major cities of Ireland. The line serves freight as well as

passenger traffic. The project has substantially reduced travel times and contributed to the relocation of freight flows towards rail traffic.

Table 6-34: Specific project 9

Country	Measure	Length	from	to	Investments in million Euro
UK	upgrade	220	1989	2001	117
Ireland	upgrade	440	1996	2010	351
TOTAL		**660**	**1989**	**2010**	**468**

6.3.10 Malpensa Airport

Malpensa airport has been upgraded in order to meet the growing traffic demand, which could not be served by Milan's other airports. A new passenger terminal has been build with direct link to access roads, airport car parks and the local railway station. The two existing runways have been upgraded and expanded to serve wide-bodied aircrafts. The new Malpensa Cargo City will act as a multi-modal logistic platform to serve consumers and industry from Italy and across southern Europe.

Table 6-35: Specific project 10

Country	Measure	from	to	Investments in million Euro
Italy	extension/ new terminal	1996	2002	747
TOTAL		**1996**	**2002**	**747**

6.3.11 Fixed rail/ road link between Denmark an Sweden

The Øresund fixed link connects Sweden and Denmark by road and rail reducing travel times for road and rail significantly. It is the fundament for the development of the cross-border region of Copenhagen and Skane.

Table 6-36: Specific project 11

Country	Measure	Length	from	to	Investments in million Euro
Denmark/ Sweden	road	46.5	1998	2001	1,618
Denmark/ Sweden	rail	15.8	1996	2001	1,539
TOTAL		**62.3**	**1996**	**2001**	**3,157**

6.3.12 Nordic triangle (rail/ road)

The Nordic Triangle will improve rail and road traffic in Sweden and Finland for both passenger and freight traffic. Journey times will be reduced regarding road and rail traffic. Road safety will be enhanced and the project brings relief to congested roads especially in the vicinity of major urban centres.

Table 6-37: Specific project 12

Country	Measure	Length	from	to	Investments in million Euro
Sweden	road	1329	1997	2015	940
Finland	road	304	1995	2015	814
Total	*road*	*1633*	*1995*	*2015*	*1,754*
Sweden	rail	1,157	1996	2015	3,772
Finland	rail	743	1979	2015	1,514
Total	*rail*	*1,900*	*1979*	*2015*	*5,286*
TOTAL		**3,533**	**1979**	**2015**	**7,040**

6.3.13 Ireland / United Kingdom/ Benelux road link

On Ireland the road link runs from Cork via Dublin to Belfast. Ferry links connect it with Wales and Scotland. The motorways in England link the main industrial centre with the ports of Felixstowe and Harwich. The projects encompasses the building of new links as wells as the upgrading of sections. Purpose of the project is to cut travel times and reduce congestion along major routes. The improvement of the road links brings the region closer to the European mainland and fosters economic development.

Table 6-38: Specific project 13

Country	Measure	Length	from	to	Investments in million Euro
Ireland	upgrade/ new construction	336	1994	2006	2,455
UK	upgrade/ new construction	1293	1994	2010	1,311
TOTAL		**1,629**	**1994**	**2010**	**3,766**

6.3.14 West coast main line (rail)

The main goal of the project is the reduction of journey times for passenger and freight traffic and improving the capacity of the lines. A shift of traffic from road to rail is envisaged. The line runs from Glasgow and Edinburg via Liverpool and Birmingham to London. The project connects to the highspeed line PBKAL across the channel to the European heartland.

Table 6-39: Specific project 14

Country	Measure	Length	from	to	Investments in million Euro
UK	upgrading	1053	1998	2007	23,616
TOTAL		**1053**	**1998**	**2007**	**23,616**

6.3.15 East European combined transport/ high-speed train

The East European combined transport/ high-speed train is an important connection to the Candidate Countries and strengthens the east-west transport axes. The link runs from Stutt-

gart, via Augsburg and Munich to Salzburg and continues via Linz to Vienna. After its implementation journey times are reduced and capacities especially for freight traffic are increased. The project is connected in the west to project 4, which connects the German and the French highspeed networks.

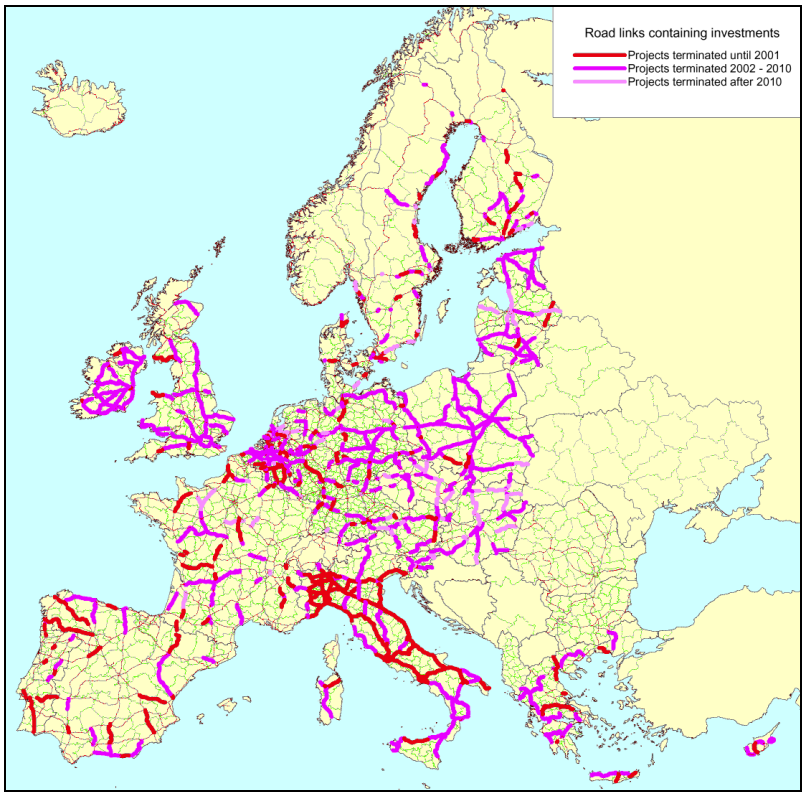
Table 6-40: Specific project 17

Country	Measure	Length	from	to	Investments in million Euro
Germany	upgrading/ new line	345	1990	2004	525
Austria	upgrading/ new line	289	1996	1999	634
TOTAL		**634**	**1990**	**2004**	**1,159**

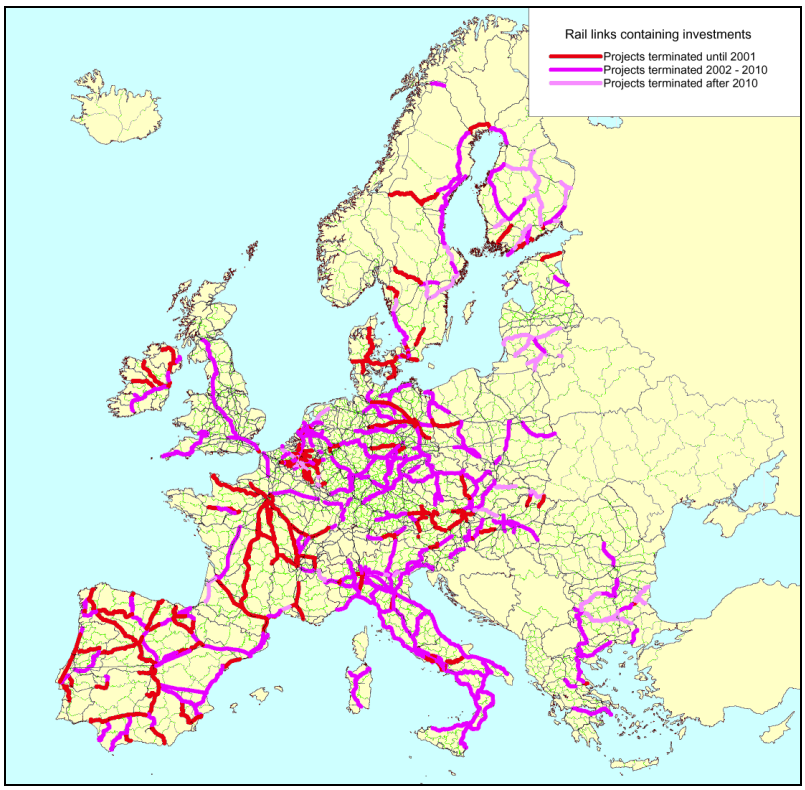
6.4 Regional Distribution of the Investment in the TEN-T network

Having described the investments by country and mode, the purpose of the following maps is to illustrate where and when particular investments will be implemented.

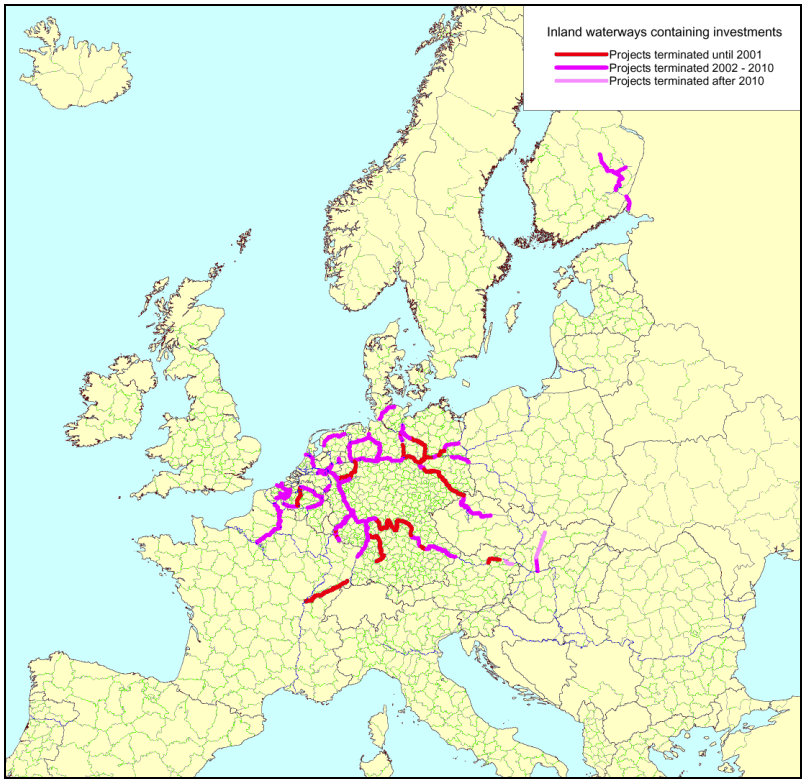
Map 6-1: TEN-T road links with reported investments



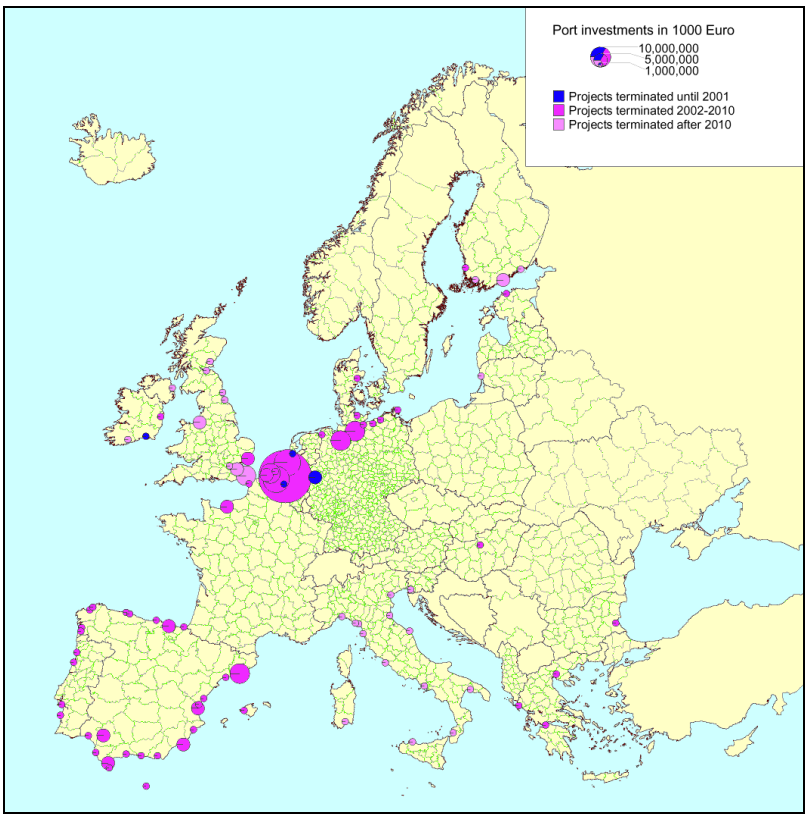
Map 6-2: TEN-T railway links with reported investments



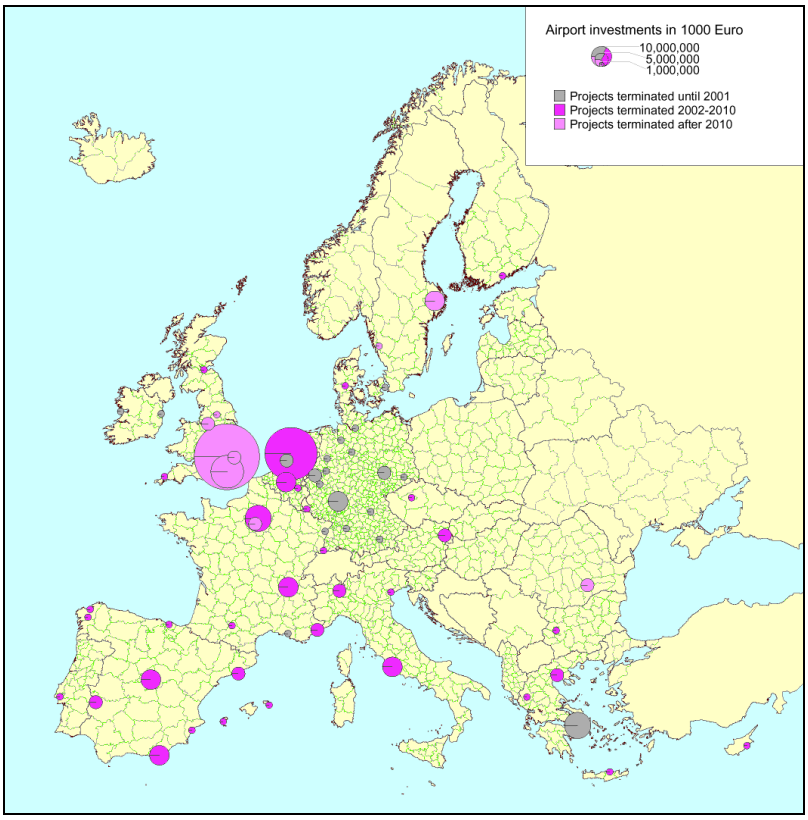
Map 6-3: TEN-T inland waterway links with reported investments



Map 6-4: TEN-T ports with reported investments



Map 6-5: TEN-T airports with reported investments



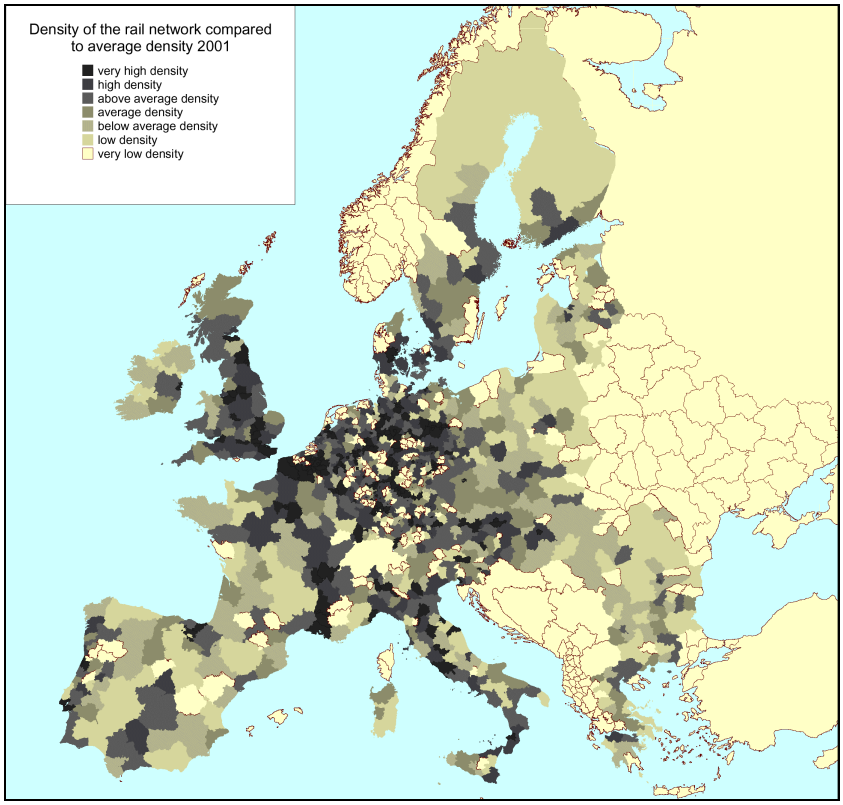
6.5 TEN-T investments on Nuts3 level

6.5.1 TEN-T network density

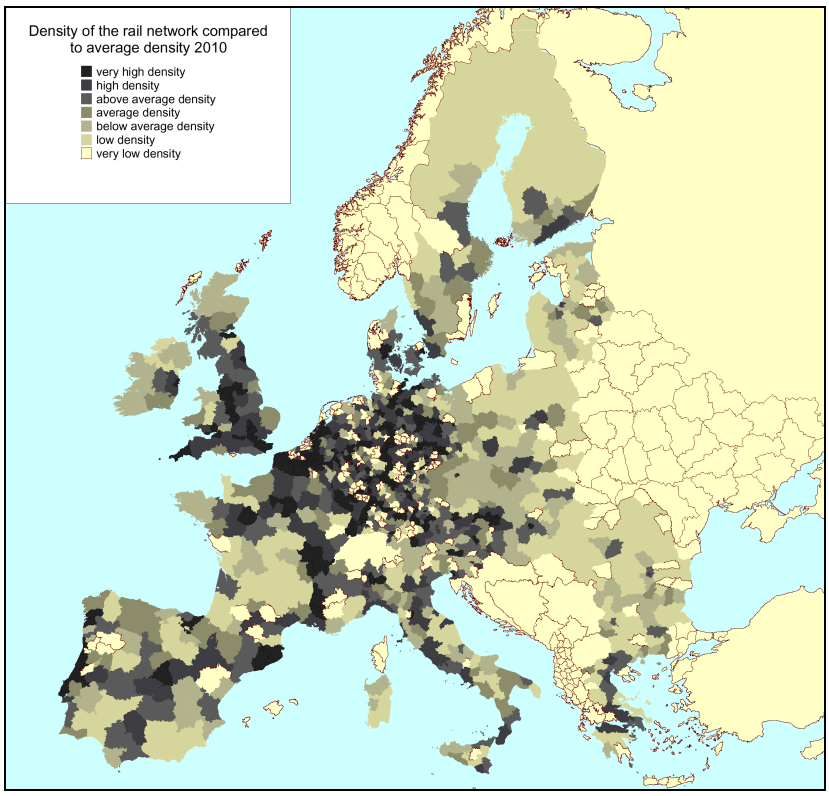
The calculation of the investments at the level of the Nuts3 regions was based on the expenditure per link, information on which was collected in the course of the project. Those links, which ran across borders of Nuts3 regions, were divided at the borders into sub-sections. This was necessary in order to be able to assign each sub-section to a distinct Nuts3 region.

Following this procedure, the length of the TEN-T network in each Nuts3 region could be determined. A software programme was developed which split up the length of the links and allocated them to the Nuts3 regions. As information concerning the area of every region was available, the length of the network assigned to the respective region could be related to the area and provided an indicator of TEN-T network density, for each Nuts3 region and mode. As within modes the links possessed different qualities as e.g. conventional lines, up-graded high-speed lines and high-speed lines, the length of the links in each category was weighted according to the maximum speed. The densities of Nuts3 regions related to the average density for railways, roads and inland waterways of the whole area are presented in the following maps, for the existing situation in 2001 and the anticipated situation in 2010.

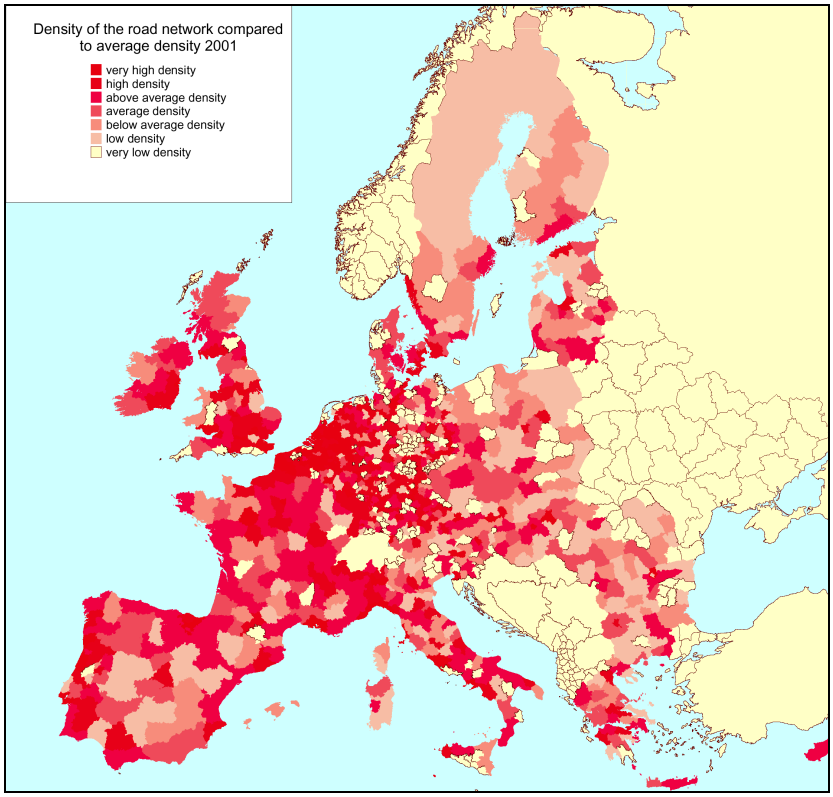
Map 6-6: TEN-T railway network density in 2001 at the Nuts3 level



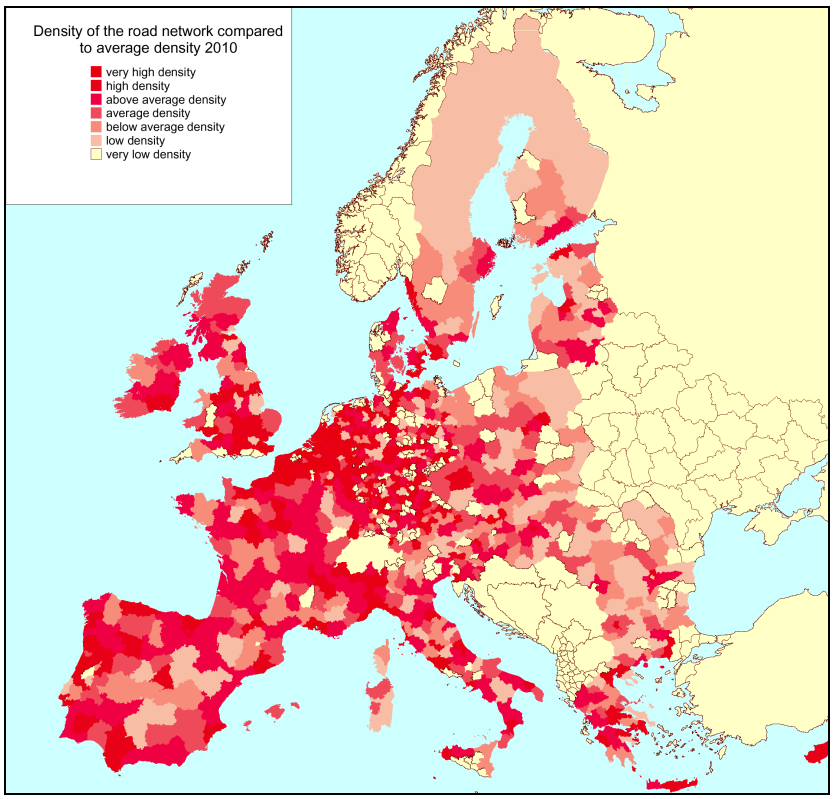
Map 6-7: TEN-T railway network density in 2010 at the Nuts3 level



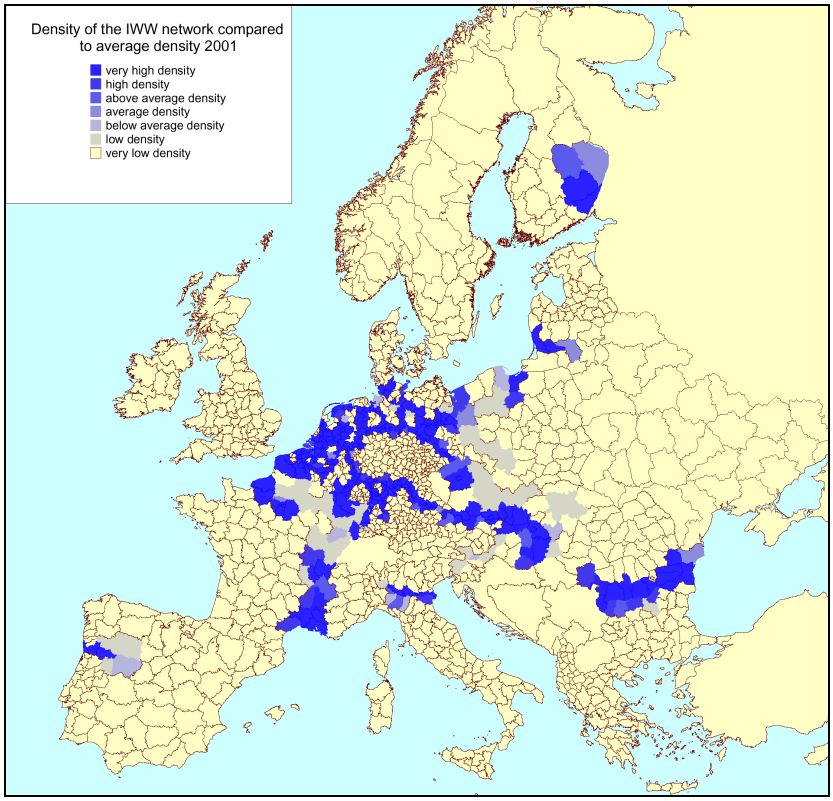
Map 6-8: TEN-T road network density in 2001 at the Nuts3 level



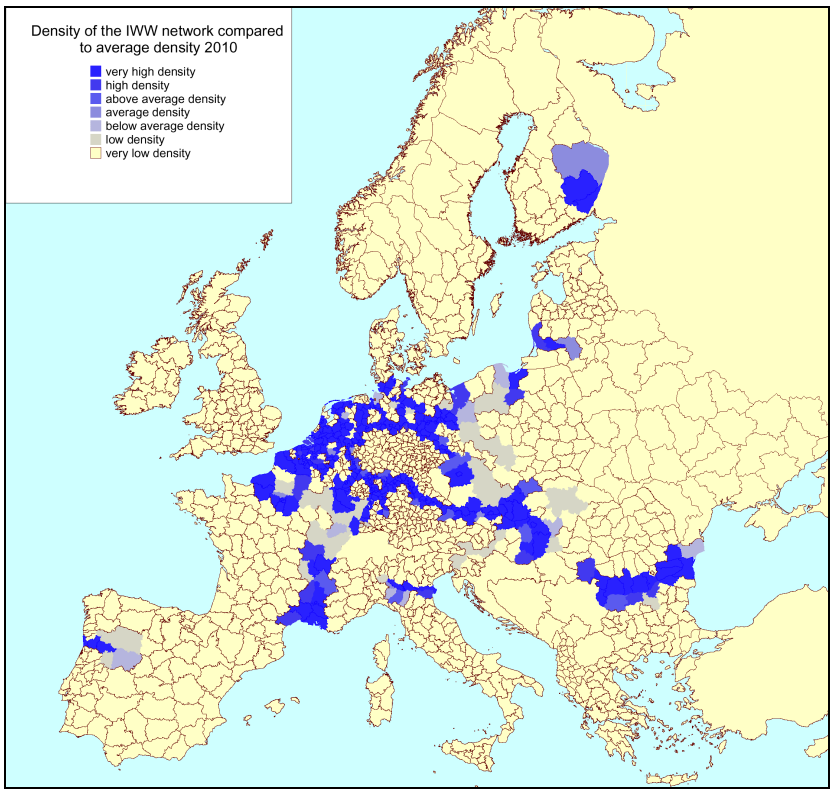
Map 6-9: TEN-T road network density in 2010 at the Nuts3 level



Map 6-10: TEN-T inland waterway network density in 2001 at the Nuts3 level



Map 6-11: TEN-T inland waterway network density in 2010 at the Nuts3 level

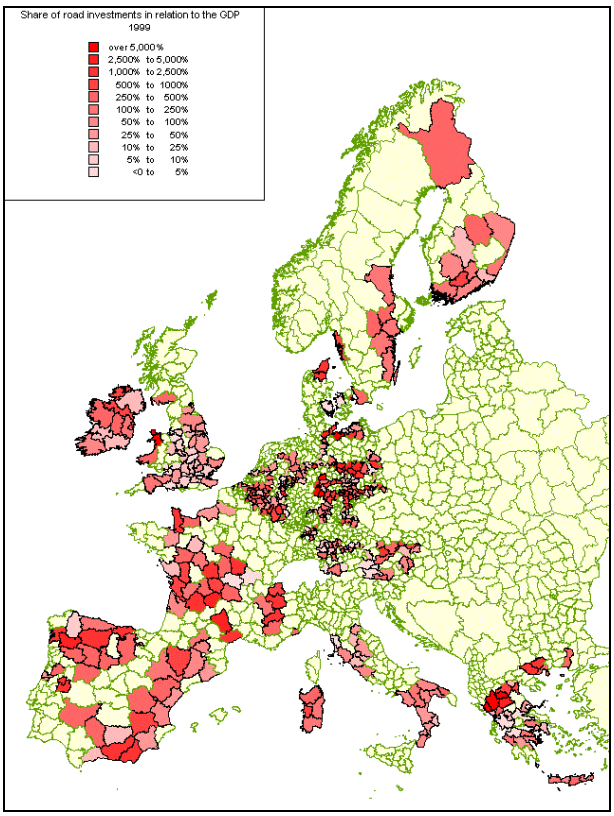


The changes induced by the extension of the railway network are concentrated on several axis in the Member States. In the Candidate Countries the railway network does not change intensively, therefore, related to the increased average density, the railway network density in the Candidate Country decreases, whereas the road network densities increase not only in the Member States but also in several Candidate Countries. The changes in the inland waterway networks are relatively small.

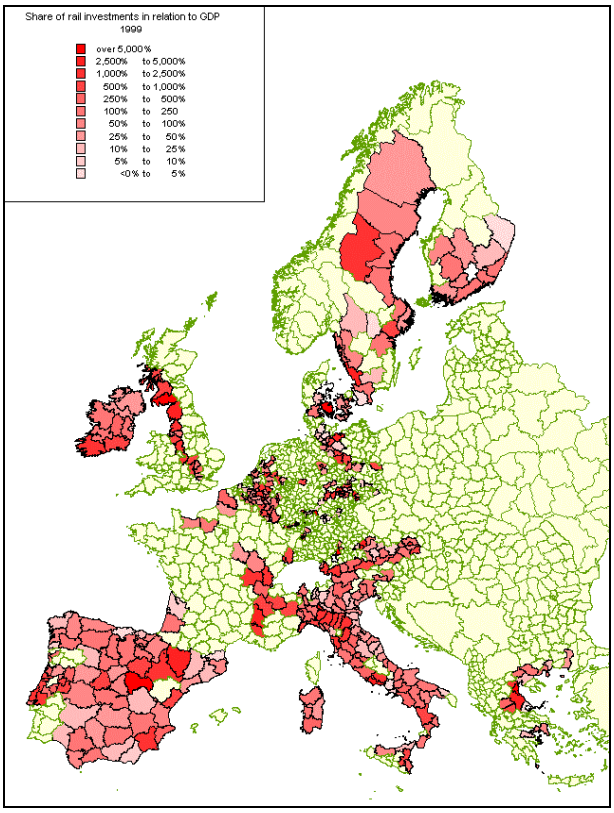
6.5.2 Investments

The investments for complete links were sub-divided accordingly, assigning the share of the length of sub-sections as a proportion of the total length of the link (e.g., if a link crossed a Nuts3 border and 40% of the length was located in region A and 60 % in region B, the link was split into two parts, and 40% of the investments of the link was assigned to region A and 60% to region B). The investments in links located entirely and partly in Nuts3 regions were aggregated to give the investment with regard to the different transport modes. In a second step, the investments in individual sub-sections and nodes were aggregated at the Nuts3 level and related to GDP to present the intensity of the investments. The investments are in 1999 prices and therefore the figures are related to the regional GDP for that year. The following maps demonstrate the intensity of TEN-T investments at the Nuts3 level in 1999.

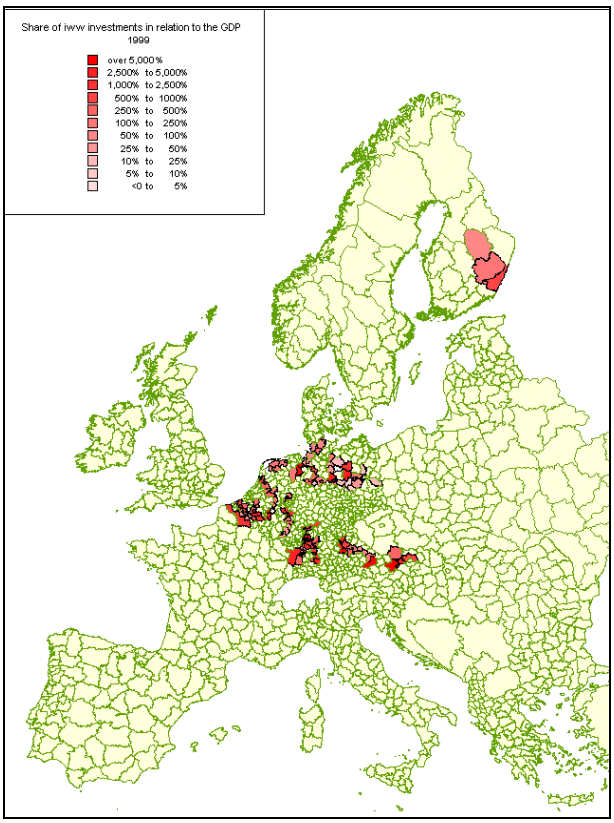
Map 6-12: TEN-T road investment in percentage of Nuts3 GDP 1999



Map 6-13: TEN-T railway investment in percentage of Nuts3 GDP 1999



Map 6-14: TEN-T inland waterway investment in percentage of Nuts3 GDP 1999



7 Sources of Finance

In this chapter the sources of financing for the implementation of the TEN-T network in the enlarged European Union have been reviewed.

For the Member States the financial support from the TEN-budget, the Cohesion Fund as well as loans from the EIB, which are part of the national budget are available. From 1996 until 2001 the TEN-T budget provided 2.8 billion Euro and the Cohesion fund contributed with an amount of 5,2 billion Euro from 1994 –1999. EIB loans totalled 24 billion Euro between 1997 and 2001. Hence in total approximately 32 billion Euro have been provided by these sources between 1994 and 2001.

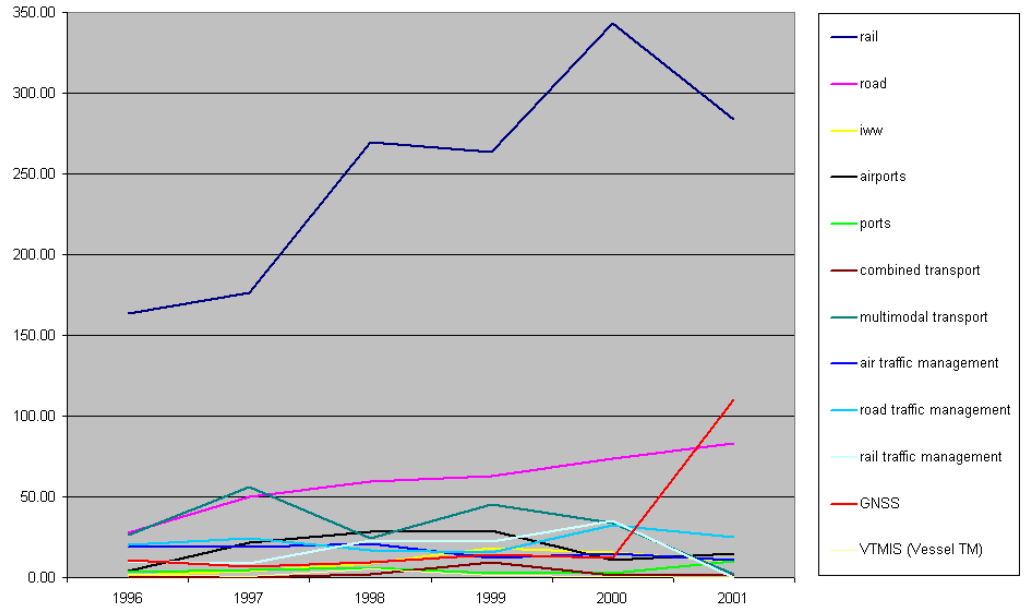
With regard to the Candidate Countries support from the PHARE, ISPA and the EIB contributed to the implementation of transport infrastructure. In the period of 1993 – 1998 1.8 billion Euro were allocated by the PHARE funds, the financial instrument ISPA is going to allocate a total amount of one billion Euro between 2000 and 2006. EIB loans designated for transport infrastructure of the TEN-T added up to 4.8 billion Euro between 1997 and 2001.

The financial sources are described in more detail below.

7.1 Financial support from TEN-T budget (1996-2001)

The financial support from the TEN-T budget provided by the EC is presented in the following figure.

Figure 7-1: TEN- T support in million Euro by mode between 1996 and 2001



After a strong increase from 1996 onwards, total TEN-T support reached its peak in the year 2000 (576.17 million Euro), which was more than twice the amount spent in 1996. In 2001, support was reduced by 5% compared to the previous year. Between 1996 and 2001 more than half of the budget was spent on rail projects. If rail traffic management is also included, the share of rail adds up to 58% (1,599.60 million Euro) of the entire TEN-T budget. The second largest share, although substantially lower, was allocated to roads and amounted to 13% of the total. An additional 4.9% was spent on road traffic management. The road share (without traffic management) was relatively stable up to 2000, but in 2001 it increased to 15% of the total annual support. If road traffic management is included this figure increased to almost 20%.

The expenditure supporting the inland waterway network totalled 57.6 million Euro during the period 1996 – 2001. This represented approximately 4% of the support for rail or 16% of that for road.

Between 1996 and 2001, support for airports and ports amounted to 4 % and 1% of the total budget respectively. Expenditure on multi-modal transport was 6.8% of the total in the same period, ranging from a peak in 1997 (15%) to a modest 0.4% in 2001. Global Navigation Satellite Systems (GNSS) have become important in Europe and the GALILEO programme was launched jointly by the European Union and the European Space Agency. Support for GNSS has increased substantially and amounted to 20% of total TEN-T support in 2001, making it the second largest beneficiary.

41% of total TEN-T support was spent on studies while 59% was paid out for projects.

Table 7-1: Total TEN-T support 1996 - 2001 in million Euro per mode

	1996	1997	1998	1999	2000	2001	TOTAL
rail	163.70	176.29	269.75	263.80	343.13	283.85	**1,500.52**
road	27.77	49.82	59.50	62.96	73.40	83.00	**356.46**
iww	1.50	4.00	8.50	18.24	15.80	9.81	**57.85**
airports	3.78	21.45	28.60	29.36	11.10	14.73	**109.02**
ports	3.10	4.70	6.07	3.04	2.50	10.11	**29.52**
combined transport	0.31	0.00	1.80	9.40	1.50	1.30	**14.31**
multimodal transport	26.20	56.20	24.00	45.27	34.00	2.00	**187.67**
air traffic management	18.97	18.60	21.10	12.39	14.70	10.97	**96.73**
road traffic management	20.50	24.38	16.90	15.68	32.13	25.29	**134.89**
rail traffic management	10.23	9.00	22.80	22.05	35.00	0.00	**99.08**
GNSS	10.80	6.60	9.65	14.10	12.00	110.00	**163.15**
VTMIS (Vessel TM)	2.14	0.96	5.34	1.30	0.90	0.00	**10.64**
TOTAL per year	**289.00**	**372.00**	**474.01**	**497.58**	**576.17**	**551.07**	**2,759.83**

Table 7-2: Total TEN-T support 1996 - 2001 in million Euro, per mode in percent

	1996	1997	1998	1999	2000	2001
rail	56.6%	47.4%	56.9%	53.0%	59.6%	51.5%
road	9.6%	13.4%	12.6%	12.7%	12.7%	15.1%
iww	0.5%	1.1%	1.8%	3.7%	2.7%	1.8%
airports	1.3%	5.8%	6.0%	5.9%	1.9%	2.7%
ports	1.1%	1.3%	1.3%	0.6%	0.4%	1.8%
combined transport	0.1%	0.0%	0.4%	1.9%	0.3%	0.2%
multimodal transport	9.1%	15.1%	5.1%	9.1%	5.9%	0.4%
air traffic management	6.6%	5.0%	4.5%	2.5%	2.6%	2.0%
road traffic management	7.1%	6.6%	3.6%	3.2%	5.6%	4.6%
rail traffic management	3.5%	2.4%	4.8%	4.4%	6.1%	0.0%
GNSS	3.7%	1.8%	2.0%	2.8%	2.1%	20.0%
VTMIS (Vessel TM)	0.7%	0.3%	1.1%	0.3%	0.2%	0.0%
TOTAL per year	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 7-3 shows the TEN-T support from 1996 to 2001 received by individual Member States as well as trans-national projects and studies, by mode.

Table 7-3: TEN-T support 1996 - 2001 in million Euro, all countries and modes

	rail	road	iww	airports	ports	combined transport	multimod. transport	air traffic manag.	road traffic manag.	rail traffic manag.	GNSS	VTMIS (Vessel TM)	TOTAL
AT	82.10	5.00	0.50	1.60	0.00	9.30	0.04	1.64	0.00	0.00	0.00	1.50	**101.68**
BE	75.00	7.00	3.70	3.23	0.50	0.00	0.00	0.00	0.42	0.00	0.00	0.00	**89.85**
DE	326.04	92.76	47.55	28.30	2.75	0.00	2.80	17.13	0.45	0.80	2.51	0.00	**521.09**
DK	30.40	2.15	0.00	0.50	3.05	0.00	84.70	0.00	0.50	0.00	0.00	0.00	**121.30**
ES	87.95	26.25	0.00	2.90	2.15	1.80	0.00	10.95	1.76	0.00	0.00	0.50	**136.76**
FI	42.00	33.45	0.60	2.40	1.49	0.31	10.60	0.00	0.71	0.00	0.00	0.70	**94.75**
FR	174.20	50.30	0.00	3.50	1.37	0.00	0.07	7.60	3.50	0.00	0.00	0.52	**243.27**
GR	13.98	54.49	0.00	0.00	1.74	0.00	2.27	0.55	0.85	0.00	0.00	0.90	**74.77**
IE	3.00	8.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	2.64	**13.80**
IT	169.45	15.40	0.00	29.31	1.14	0.00	0.05	7.00	2.50	0.00	0.60	0.00	**227.45**
LU	4.96	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6.46**
NL	171.00	0.00	4.00	2.55	2.58	0.00	0.00	2.83	0.00	0.00	0.09	1.76	**184.81**
PT	22.15	9.75	0.00	11.99	3.20	1.40	0.00	4.20	0.00	0.00	0.75	0.00	**55.44**
SE	40.05	15.29	0.00	5.03	1.31	1.50	32.00	0.00	0.00	0.00	0.00	0.00	**96.18**
UK	209.00	11.13	0.00	6.21	1.54	0.00	1.15	1.55	2.40	0.00	0.00	1.13	**238.59**
EU	27.25	25.50	0.00	0.00	0.00	0.00	54.00	43.13	121.81	98.28	159.20	2.50	**531.67**
Total per mode	1,478.52	356.46	56.35	109.02	29.52	14.31	187.67	96.73	134.89	99.08	163.15	12.14	2,737.83
% per mode	54.00	13.02	2.06	3.98	1.08	0.52	6.85	3.53	4.93	3.62	5.96	0.44	100.00

These figures show that in most countries the support for rail projects and studies was by far the highest compared to other modes. Denmark was an exception, where the largest support was given to the construction of the Øresund fixed link, which fell into the category of multi-modal transport. In Greece, primarily road projects were supported.

Table 7-4: TEN-T support 1996 - 2001 in million Euro by country

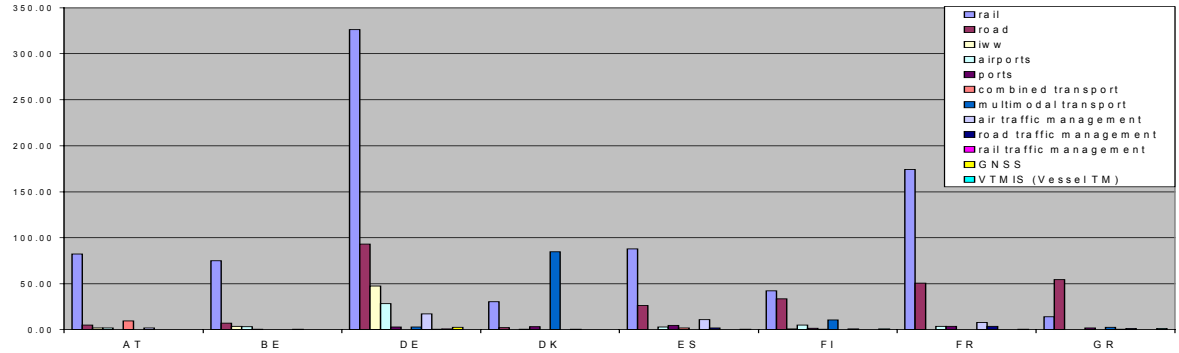
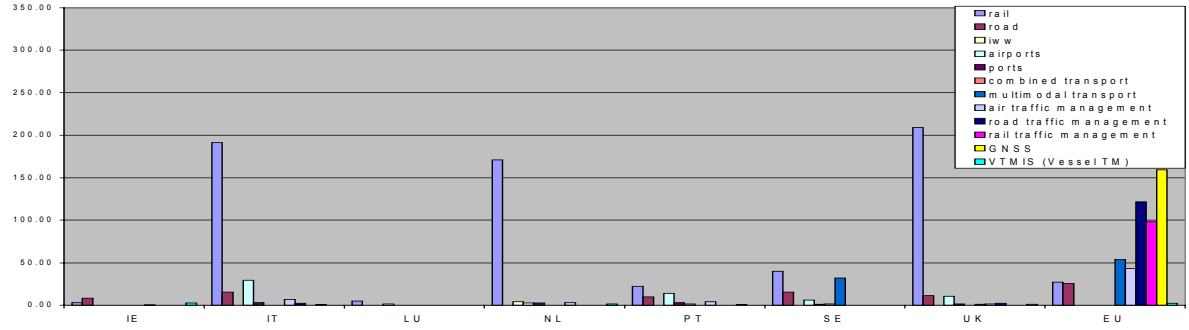


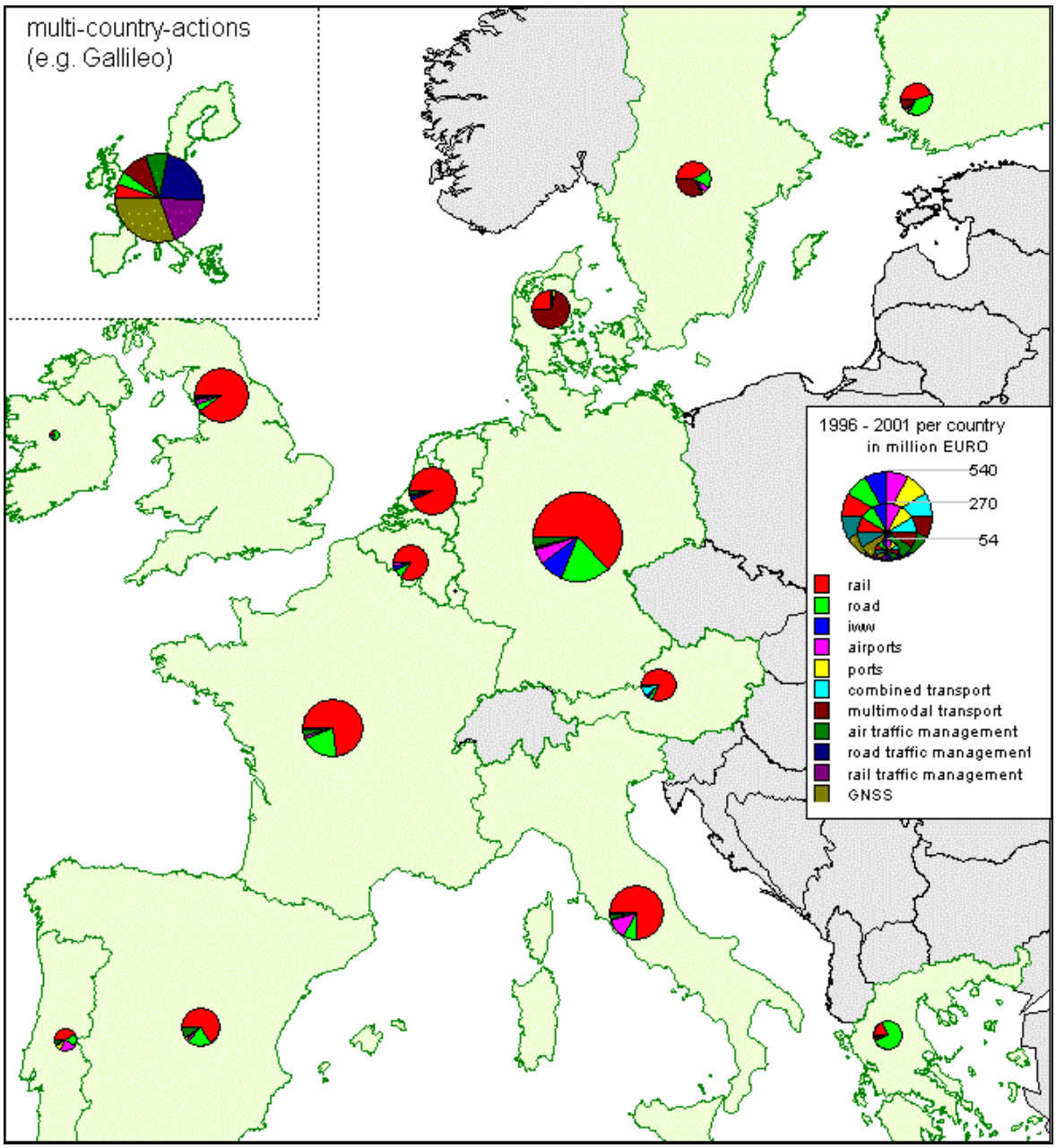
Table 7-5: TEN-T support 1996 - 2001 in million Euro, by country



The figures with regard to trans-national activities (EU) reveal that GNSS received the highest support, followed by road traffic management.

The following map illustrates the share of TEN-T support by mode and country. The largest proportion (19.4%) was spent on multi-national projects. The largest TEN-T support for an individual Member State was granted to Germany, which received 19% of the total expenditure between 1996 and 2001. It was followed by France and the UK, which both received approximately 9%, while Italy benefited with 8%. The Netherlands, Spain and Denmark received 7% each, while less than 4% was granted to the remaining countries. Ireland and Luxembourg received less than 1% of the total.

Map 7-1: Share of TEN-T support per mode and country



7.2 Financial Support from ISPA

Besides Phare and Sapard the "Instrument for Structural Policies for Pre-Accession" (ISPA) is one of the financial instruments to assist the Candidate Countries in their preparation for accession. Between 2000 and 2006, a total amount of 1,040 million Euro a year[10] (7,280 million Euro in total) will be provided for infrastructure projects in the field of transport and envi-

[10] 1999 price level

ronment. The total costs are estimated at 2.3 billion Euro and will be co-financed by the beneficiary states and international funding institutions.

Resources have been allocated to the Candidate Countries by the Commission according to a set of criteria, taking into account the specific socio-economic and environmental situation. Table 7-6 shows the ISPA resources by country. Poland was allocated the highest share (30%-37%) followed by Romania (20%-26%).

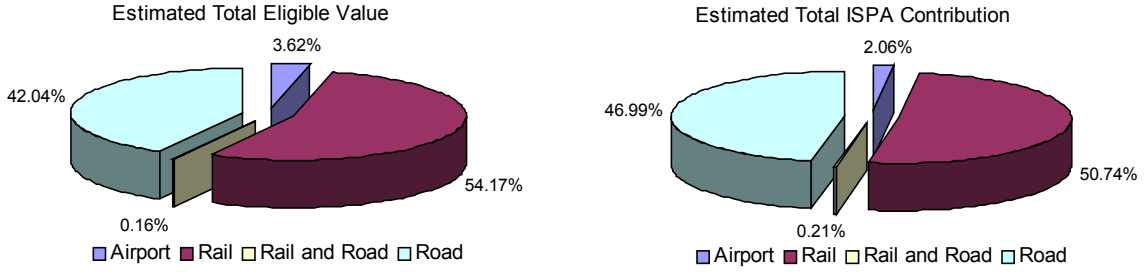
Table 7-6: ISPA resources by country as decided by the EC (2000 – 2006)

Country	allocated ISPA resources in % of the total expenditure
Bulgaria	8.0% - 12.0%
Czech Republic	5.5% - 8.0%
Estonia	2.0% - 3.5%
Hungary	7.0% - 10.0%
Lithuania	4.0% - 6.0%
Latvia	3.5% - 5.5%
Poland	30.0% - 37.0%
Romania	20.0% - 26.0%
Slovenia	1.0% - 2.0%
Slovakia	3.5% - 5.5%

64 transport projects were launched in 2000 and 2001. They focused mainly on the rehabilitation and construction of roads, motorways and railways, with regard to strategic priorities of the TEN-T. Only one project dealt with airports, which was the reconstruction, development and extension of the airport of Sofia in Bulgaria.

Half of the estimated total eligible support for transport projects signed in 2000 and 2001 concerned rail; 47% was related to roads and 2% to airports. Two projects labelled 'road and rail' made up 0.2% of the total value. These were projects where both modes were involved, namely technical assistance for transport project management in the Czech Republic and similar technical assistance support for the Danube bridge in Bulgaria.

Figure 7-2: ISPA signed projects (2000 and 2001), estimated total eligible value per mode and total ISPA contribution (changes possible)



The estimated total ISPA contribution per mode reflects more or less the eligible value. Slightly more than 50% was granted for rail and 47% contributed to road projects.

Concerning the overall distribution of the eligible value and the ISPA contribution as presented in Table 7-7, it is clear that Poland and Romania received the highest support, the former 855 million Euro and the latter 642 million Euro.

In general, 65% of the estimated total eligible value for transport projects was covered by the estimated ISPA contribution. However, it should be noticed that changes of the figures are possible due to results of calls for tender.

Table 7-7: Projects signed - per country per (sub) sector (committed between 1/ 1/ 2000 and 31/ 12/ 2001) in million Euro (changes possible)

Country	estimated total eligible value					estimated total ISPA contribution				
	airport	rail	rail and road	road	total	airport	rail	rail and road	road	total
Bulgaria	135.1	340.0	5.9	40.0	**521.0**	50.0	153.0	5.0	30.0	**238.0**
Czech Republic	0.0	98.1	0.2	96.3	**194.6**	0.0	45.2	0.2	57.9	**103.3**
Estonia	0.0	29.9	0.0	17.5	**47.4**	0.0	22.4	0.0	13.1	**35.5**
Hungary	0.0	381.7	0.0	40.2	**421.9**	0.0	191.4	0.0	20.1	**211.6**
Lithuania	0.0	60.1	0.0	67.9	**128.1**	0.0	24.3	0.0	51.0	**75.3**
Latvia	0.0	135.8	0.0	26.6	**162.4**	0.0	101.8	0.0	20.0	**121.8**
Poland	0.0	466.3	0.0	681.0	**1147.3**	0.0	344.5	0.0	510.7	**855.2**
Romania	0.0	309.8	0.0	546.6	**856.3**	0.0	232.3	0.0	409.9	**642.3**
Slovenia	0.0	30.6	0.0	0.0	**30.6**	0.0	18.8	0.0	0.0	**18.8**
Slovakia	0.0	168.3	0.0	52.2	**220.5**	0.0	97.0	0.0	27.1	**124.1**
Total	**135.1**	**2020.6**	**6.1**	**1568.3**	**3730.2**	**50.0**	**1230.8**	**5.2**	**1139.9**	**2425.9**

7.3 Financial Support from Phare

Phare was the EU's financial assistance programme for the countries of Central and Eastern Europe. This included grant financing for investments and restructuring of the transport sector in the ten Candidate Countries in that region (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia).

The Phare financed transport sector programmes in the ten Candidate Countries were executed from 1991 until the end of 1998. The total budget allocated to these programmes totalled 905 million Euro, or some 10% of the cumulative Phare budget for the ten countries over that period.

The modes of transport were classified as follows:

- Road,
- Rail,
- Air,
- Maritime,
- Inland Waterways.
- Combined Transport, where one mode was necessarily rail, as indicated in the EU Directives.

- Multiple, which referred to contracts that included more than one mode (usually road and rail).
- All Modes, which referred to contracts (mainly institutional types of output) covering more than three modes.

The following figures show the contracted amount in 1,000 Euro over the period from 1991 to 1998. Concerning the different modes of transport, more than half of the contracted amount fell into the road category (52%). The second largest share (32%) was assigned to rail. The remaining 16% was allocated to other modes or projects covering more than one mode. The smallest share of 0.5% was spent on inland waterways.

Figure 7-3: Total contracted amount 1991-1998 by mode and country

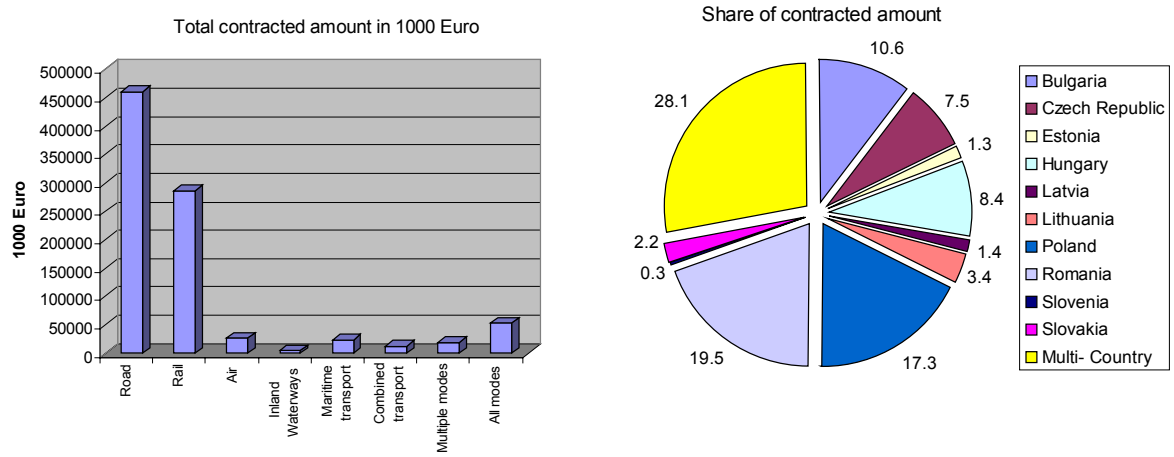
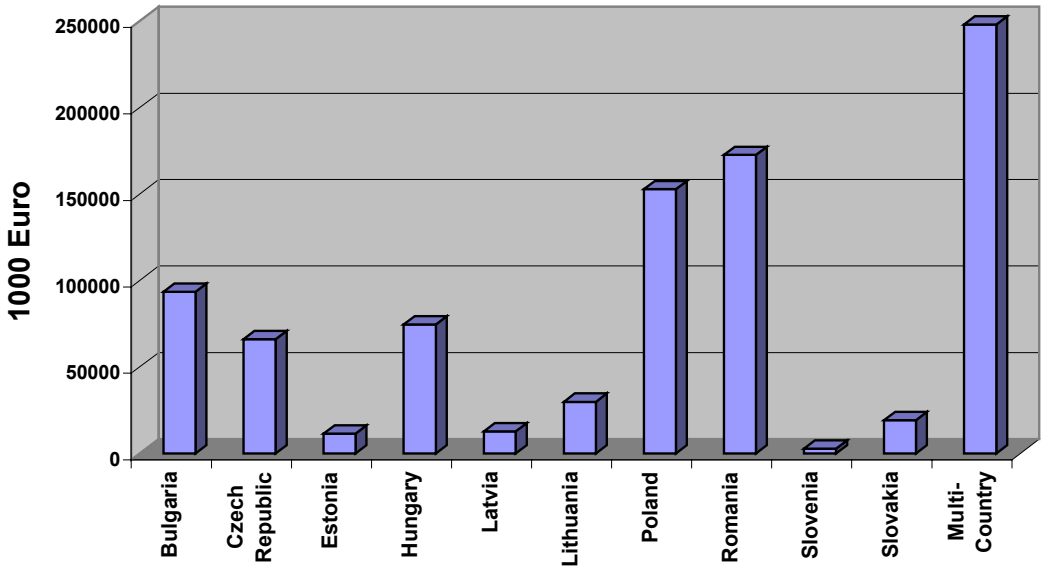


Figure 7-4: Total contracted amount 1991-1998 per country



The distribution of contracted amounts related to the ten Candidate Countries shows that Romania was granted 19% of the total while Poland received 17%, the highest amounts for individual countries. However, the highest share (28%) was allocated to multi-country projects. The following figures show the distribution of contracted amounts with regard to the mode of transport for the ten Candidate Countries and for multi-country projects.

The tables in Annex 7-1 present the annual distribution of the transport funds allocated by country from 1990 until 1998, by budget year and not by actual year of commitment or expenditure. The peak of allocated funds was in 1996 when 202.8 million Euro was paid. The amount then decreased towards the end of the programme. A substantial reduction can be observed with regard to the budget committed to institution building. Whereas in 1991 60% was reserved for this activity, the share went down to less than 5% in 1998. In total 905 million Euro were allocated for Phare transport funds, of which 83% was assigned to transport investments and the remainder designated for transport institution building.

Table 7-8: Allocation of transport Phare funds by country between 1991 and 1998 (million Euro)

Country		90 - 92	93	94	95	96	97	98	TOTAL
Bulgaria	Transport Investment	0	0	10.4	13.9	30	0	24	**78.3**
	Transport Institution Bldg	1	3.5	1.9	6.1	0	0	3.6	**16.1**
	Total	1	3.5	12.3	20	30	0	27.6	**94.4**
Czech Republic	Transport Investment	0	0	0	60	0	0	0	**60**
	Transport Institution Bldg	2.8	3.1	0	0	0	0	0	**5.9**
	Total	2.8	3.1	0	60	0	0	0	**65.9**
Estonia	Transport Investment	0	0	0	0	6	0	2.5	**8.5**
	Transport Institution Bldg	0.3	0.3	0	1.5	1	0	0	**3.1**
	Total	0.3	0.3	0	1.5	7	0	2.5	**11.6**
Hungary	Transport Investment	0	0	24.2	24.1	5	15	0	**68.3**
	Transport Institution Bldg	2	0	3	0	2	0	0	**7**
	Total	2	0	27.2	24.1	7	15	0	**75.3**
Latvia	Transport Investment	0	0	0	0	0	4.1	2.5	**6.6**
	Transport Institution Bldg	1	2	0	1.8	1.2	1	0	**7**
	Total	1	2	0	1.8	1.2	5.1	2.5	**13.6**
Lithuania	Transport Investment	0	0	0	0	3.3	4.5	3.5	**11.3**
	Transport Institution Bldg	2.4	4.2	4.6	3	1	3.2	0.5	**18.9**
	Total	2.4	4.2	4.6	3	4.3	7.7	4	**30.2**
Poland	Transport Investment	0	45.7	28.8	19.5	42.2	14	0	**150.2**
	Transport Institution Bldg	2	3.2	5.2	2.5	3.5	3	0	**19.4**
	Total	2	48.9	34	22	45.7	17	0	**169.6**
Romania	Transport Investment	7.9	0	21	0	71.2	0	58	**158.1**
	Transport Institution Bldg	3	0	4	3.3	4.5	0	0	**14.8**
	Total	10.9	0	25	3.3	75.7	0	58	**172.9**
Slovenia	Transport Investment	0	0	0	0	0	0	0	**0**
	Transport Institution Bldg	0	0.9	0.9	0	0.9	0.5	0	**3.2**
	Total	0	0.9	0.9	0	0.9	0.5	0	**3.2**
Slovakia	Transport Investment	0	0	0	0	0	0	15	**15**
	Transport Institution Bldg	0.7	2	1.5	0.5	0	0	0	**4.7**
	Total	0.7	2	1.5	0.5	0	0	15	**19.7**
Multi Country and horizontal	Transport Investment	14.3	13	24.5	24.7	17	99.5	0	**193**
	Transport Institution Bldg	6.8	9.3	4.4	12	14	9.5	0	**56**
	Total	21.1	22.3	28.9	36.7	31	109	0	**249**
TOTAL	**Transport Investment**	**22.2**	**58.7**	**108.9**	**142.2**	**174.7**	**137.1**	**105.5**	**749.3**
	Transport Institution Bldg	**22**	**28.5**	**25.5**	**30.7**	**28.1**	**17.2**	**4.1**	**156.1**
	Total	**44.2**	**87.2**	**134.4**	**172.9**	**202.8**	**154.3**	**109.6**	**905.4**

7.4 Structural and Cohesion Funds for Transport

In the last programming period (1994-1999) the Structural Funds provided 13.7 billion Euro for investment into transport infrastructure in Objective 1 regions. About 70% of the money was invested in roads, while a 16% was allocated to rail infrastructure. Ports and airports were supported by 5% respectively 3% of the total sum. 4.5 % are invested into other transport related actions such as the development of intermodal transport, public transport as well as transport studies. With regard to the TEN-T approximately 3.5 billion Euro have been assigned to the realisation of TEN projects.

The Cohesion Fund supported transport infrastructure projects, which carried out the further development of the TEN-T or enhanced access to it. The Cohesion Funds made available 5 billion Euro for the TEN-T network in Ireland, Portugal, Greece and Spain. Almost 70% of the total was allocated to road infrastructure, 23% went into railways and ports, while airports received 3% - 5%.[11] With regard to rail infrastructure, 4.9 billion Euro were granted. The largest loan was given to Italy (2.3 billion Euro). Financial support for airport infrastructure totalled 3.2 billion Euro. Spain and Greece received the largest loans, which amounted to 888 million Euro and 867 million Euro respectively.

Table 7-9: Funding per country in million Euro by the Cohesion Fund (1994 – 1999)

COHESION FUND						
	Spain	Portugal	Greece	Ireland	Total	%
Rail	797	175	486	146	1,604	*23*
Road	1,821	629	161	637	3,248	*18*
Air	0	0	0	3	3	*0*
Ports	13	90	0	50	153	*5*
Other Mode	74	83	0	0	157	*23*
Total	**2,705**	**977**	**647**	**836**	**5,166**	
%	***23.5***	***12.1***	***10.4***	***24.5***	***16.9***	

7.5 Financing from the European Investment Bank (EIB)

The European Investment Bank has also supported the financing of transport investments. The tables in Annex 7-1 present the amounts granted by country and by mode in million Euro, both for the Member States and the Candidate Countries. The figures are based on information made available by the EIB.

With regard to the Member States the largest amount was granted to road infrastructure (11.5 billion Euro), followed by loans for railway projects (8 billion Euro). Financial support for airports also played an important role and loans amounted to 3.6 billion Euro. The smallest

[11] EC, DG Region: Thematic evaluation of the Impact of Structural Funds on Transport Infrastructures, Final Report, November 2002

amounts were assigned to air traffic management (22.5 million Euro) and combined transport (13 million Euro). Loans for port infrastructure totalled 822 million Euro between 1997 and 2001. Concerning road investments in the Member States, Portugal received the highest amount followed by Greece and France. The largest loan for railways was given to Italy (2.3 billion Euro). Support for air traffic management was granted to Belgium and the Netherlands, while Italy received support for combined transport.

Table 7-10: EIB loans, Member States, in million Euro

	1993-1996	1997	1998	1999	2000	2001	Total 1997 - 2001
Road	6,229.0	2,117.4	1,634.2	3,052.5	2,102.0	2,631.0	11,537.1
Rail	3,444.0	2,003.1	1,967.6	2,078.6	770.0	1,234.0	8,053.2
Ports	421.0	34.8	90.6	10.0	124.1	563.0	822.5
Airports	810.0	775.2	618.4	692.5	1,014.0	513.0	3,613.1
ATM	121.0	0.0	22.5	0.0	0.0	0.0	22.5
Combined T.	15.0	13.0	0.0	0.0	0.0	0.0	13.0
TOTAL	**11,040.0**	**4,943.5**	**4,333.2**	**5,833.7**	**4,010.1**	**4,941.0**	**24,061.4**

The Candidate Countries received 4.8 billion Euro from the EIB in the period from 1997 to 2001. Loans were granted mainly for road infrastructure (3.4 billion Euro) and railway projects (1.3 billion Euro). Loans for investments in airports (70 million Euro) and ports (38 million Euro) were also granted.

Table 7-11: EIB loans, Candidate Countries, in million Euro

	1993-1996	1997	1998	1999	2000	2001	Total 1997 - 2001
Road	788.0	262.0	1,005.0	755.0	749.0	620.0	3,391.0
Rail	663.0	75.0	260.0	498.0	160.0	340.0	1,333.0
Ports	64.0	20.0	0.0	8.0	10.0	0.0	38.0
Airports	10.0	70.0	0.0	0.0	0.0	0.0	70.0
ATM	135.0	0.0	0.0	0.0	0.0	0.0	0.0
Combined T.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	**1,660.0**	**427.0**	**1,265.0**	**1,261.0**	**919.0**	**960.0**	**4,832.0**

For road infrastructure, the largest loan was given to Poland, amounting up to 1 billion Euro between 1997 and 2001. The second highest amount was granted to the Czech Republic. For rail infrastructure, loans added up to 1.3 billion Euro in the period from 1997 to 2001. Port infrastructure was supported to the value of 38 million Euro in the same period. Between 1993 and 1996, Latvia received 28 million Euro in total while 35 million were granted to Romania. Bulgaria, Estonia and Lithuania received financial support from the EIB for airport infrastructure, totalling 70 million Euro between 1997 and 2001. Between 1993 and 1996 loans of 135 million Euro were granted for traffic management projects to Bulgaria, Estonia, Romania and Slovakia.

7.6 Sources of Finance according to the Survey

During the data collection procedure the sources of finance have been asked for any project mentioned. The answers to this request have been not very comprehensive, thus the interpretation of the data needs to be treated with cautions. However, the following tables present the result of the survey for selected time periods for the Member States and the Candidate Countries.

Table 7-12: Investment according to sources of finance mentioned by the Member States (million Euro)

period	National budgets	TEN-T	Cohesion Fund	ERDF	EIB loans	Others
1996-97	4,890.1	27.6	133.5	43.5	134.1	1,346.2
1998-99	11,845.0	130.8	398.9	287.5	384.8	2,127.7
2000-01	18,763.4	138.1	830.2	290.1	301.5	2,004.9
2002-03	25,009.6	57.7	182.7	264.3	370.7	4,375.0
2004-05	20,404.8	13.4	93.6	144.6	100.4	5,189.7
2006-10	18,965.0	22.5	4.3	52.1	80.3	9,903.6
2011-15	2,326.4	0.0	0.0	0.0	0.0	5,067.4
total	**102,204.3**	**390.2**	**1,643.1**	**1,082.2**	**1,371.8**	**30,014.5**

Obviously the major contribution to the projects are financed by national funds, which also encompass the loans from the European Investment Bank. Contributions by the Cohesion Fund as well as by the ERDF have been reported frequently. Other sources of financing play an important role which is getting even more important until the end of the decade.

Table 7-13: Investment according to sources of finance mentioned by the Candidate Countries (million Euro)[12]

period	National budgets	ERDF	EIB loans	Others
1996-97	231.2	4.7	41.7	89.0
1998-99	499.2	0.0	157.0	52,181.8
2000-01	686.8	26.7	235.5	103,052.3
2002-03	603.2	26.7	200.2	51,001.1
2004-05	460.9	0.0	215.2	129.0
2006-10	408.3	0.0	76.3	157.5
2011-15	0.0	0.0	0.0	0.0
total	**2,889.6**	**58.1**	**925.8**	**206,610.7**

In Candidate Countries other sources of financing have been mentioned very often and reach their peak in the period of 2000/01. EIB loans which are part of the national budgets contribute to the implementation of the TEN-T in the enlarged European Union. Furthermore, the Cohesion fund is a vital instrument to finance infrastructure investments.

[12] Only member States are eligible for ERDF funds in case Candidate Countries mention ERDF funding they might refer to PHARE and ISPA

8 Additional investments to achieve the Guidelines 1996

8.1 Targets stipulated in the Guidelines 1996

The targets, which were stipulated for the networks in the Guidelines 1996, were provided by the Commission and apply to the TEN-T network in the Member States. The Guidelines assign a certain railway or road type to each link of the network. Roads are divided into three categories: ordinary roads, high quality roads or motorways. For railways the types are conventional line, up-graded high-speed line or high-speed line. Concerning inland waterways the Guidelines stipulate that all links belonging to the Trans-European Transport network should fulfil the requirements of ECMT class IV. Unfortunately these targets were not formulated for each individual link. For some Member States, this information is still lacking, while for airports and ports target status criteria have not yet been developed. Hence, the additional investments to complete the TEN-T network in the enlarged European Union are estimated for road, rail and inland waterways only.

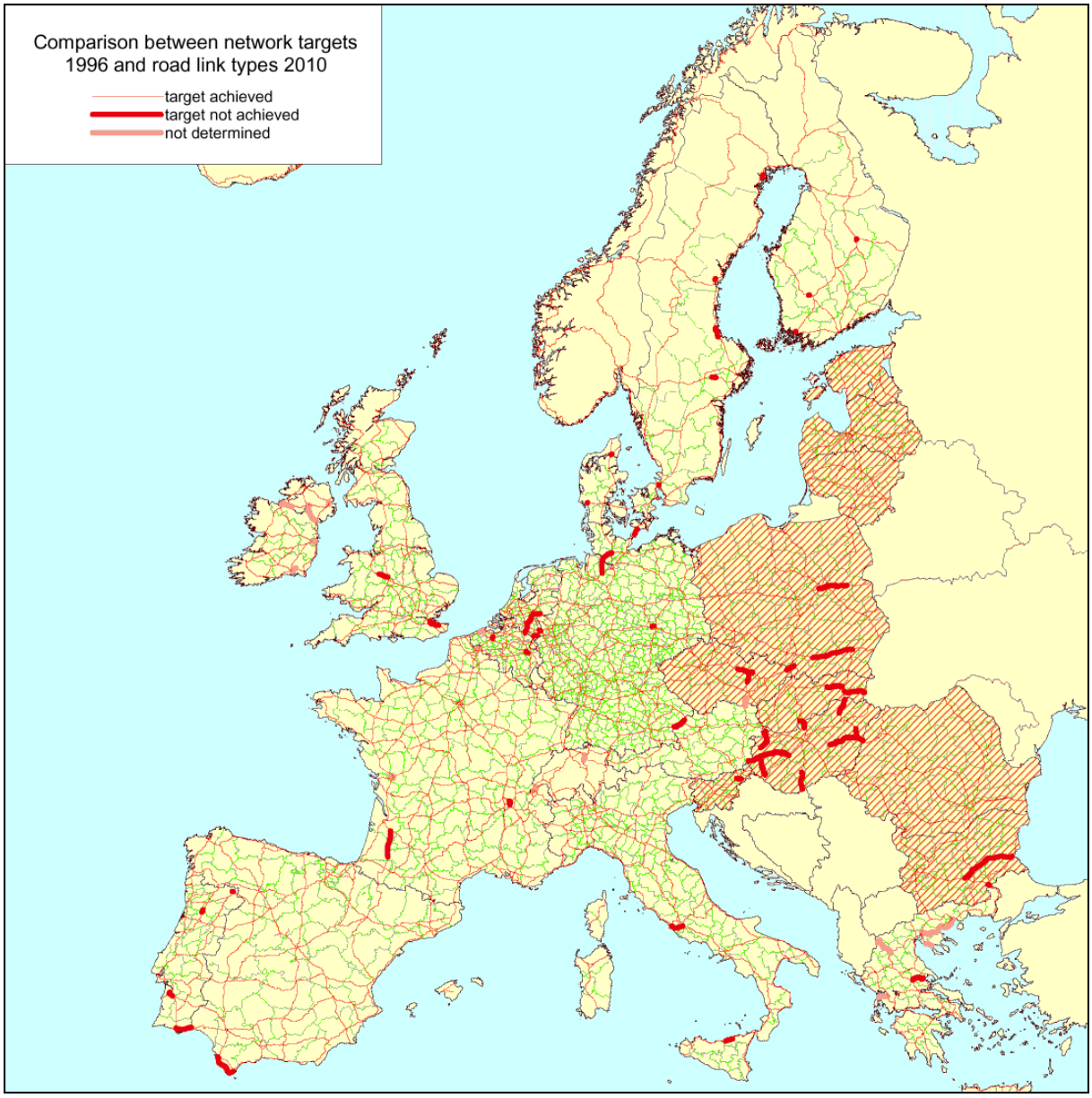
The targets concerning the network in the Candidate Countries have been justified by the experts from national ministries. In general it is assumed that a TEN-T network in the Member States and the Candidate Countries should be completed in 2010. The experts also reported projects and indicated the type of the link and the year of completion.

8.2 Fulfilment of the Guidelines in 2010

Based on the results of the data collection, the following maps indicate where the networks, which are supposed to exist in 2010, will probably not fulfil the requirements of the TEN-T Guidelines. E.g. no measures have been reported for a conventional rail link which is according to the Guidelines meant to be an upgraded high speed line operating in 2010. In order to achieve the target of the Guidelines measures have to be undertaken. The cost for the respective measures have been approximated on a link by link basis based on the cost estimations described in chapter 5 in 1999 prices. Investments expected to be carried out after 2010 are not taken into account since the targeted deadline for completion is 2010.

The purpose of the following paragraphs is not to prepare an estimation of the cost necessary to qualitatively develop the TEN-T network. The purpose is to indicate where the network in spite of the investments mentioned by the ministries in the Member States and the Candidate Countries will not even fulfil the requirements of the TEN-T Guidelines stipulated in 1996 respectively indicated by the experts of national ministries in the Candidate Countries. Therefore the results can not be compared with cost estimations presented by the TINA report in 1999 as those calculations comprise rehabilitation measures for the networks and include investments in airports, river ports, sea ports and terminals. Furthermore cost estimations in the TINA report consider the period between 1999 and 2015.

Map 8-1: Achievement of the Guidelines 1996 until 2010 concerning the TEN-T road network



The above map shows that, concerning roads, the Guidelines will be more or less fulfilled in the Member States by 2010. Only a few missing links are anticipated, with the most obvious gaps being in Germany, France, United Kingdom, Netherlands and Spain.

In the Candidate Countries, the links that will not be in accordance with the Guidelines will be mainly located in Hungary, the Czech Republic, the Slovak Republic and in Romania. The picture will change by 2015, however, as almost all links will fulfil the requirements.

Concerning the TEN-T railway network, the situation looks more serious as the map below illustrates.

Map 8-2: Achievement of the Guidelines 1996 until 2010 concerning the TEN-T railway network

In 2010 a significant proportion of the network will not be in accordance with the requirements of the Guidelines, comprising mainly the high-speed network in the Member States. In addition, in the Candidate Countries, considerable sections will also not comply. However, as some of the projects are likely to be implemented, the situation might be different in 2015, particularly in the Candidate Countries.

This analysis does not consider the quality of existing links. Up-grading requirements, which do not influence the status of the link, are not taken into account. Also, some projects are indicated on the map which were included in 1996 but which are no longer valid (e.g. the high speed line between Hamburg and Berlin).

The aggregated length of links which do not comply with the requirements of the TEN-T Guidelines 1996 or as reported by the Candidate Countries is presented in the following table.

Table 8-1: Aggregated length of links which in 2010 do not comply with requirements of the TEN-T Guidelines 1996 in km

	roads			
	Ordinary road km	high quality road km	Motorway km	Total km
Member States	0	76	966	1042
Candidate Countries	95	804	516	1415
	railways			
	conventional lines	upgraded high speed lines	high speed lines	Total
Member States	700	7317	4555	12572
Candidate Countries	136	1162	259	1557
	Inland waterways			
	Upgrading to ECMT class IV	new link in ECMT class V	New link in ECMT class higher than V	Total
Member States	1271	26	0	1297
Candidate Countries	2301	0	0	2301

For these links which have to be either constructed or upgraded no investments have been provided by our counterparts in the Member States and the Candidate Countries. This length cannot be compared with the length mentioned in the TINA report, as rehabilitation measures are not considered.

Concerning the TEN-T inland waterway network, it is anticipated that most of the links will be in accordance with the requirements of an ECMT class IV.

The cost estimations presented in the previous chapters are used to approximate the expenditure to fulfil the Guidelines 1996 and the plans of the Candidate Countries. The term reported investments refers to the investments provided by the experts of the national ministries. The remaining investments refer to those investments which are needed to complete the TEN-T network but have not been mentioned by the experts. They were calculated taking into account different types of measures based on the cost estimations set out in chapter 5.

Table 8-2: Cost estimation to quantitatively fulfil the requirements of the TEN-T Guidelines of 1996

	Roads mio Euro	Railways mio Euro	Inland Waterways mio Euro	Total mio Euro
Member States	**118,818.3**	**324,151.4**	**14,579.1**	**457,548.8**
decided investments (1996-2001)	48,849.1	82,315.5	3,151.9	134,316.4
decided investments (2002-2010)	64,347.4	137,433.9	5,085.5	206,866.8
outstanding investments	5,621.9	104,402.1	6,341.7	116,365.6
Candidate Countries	**40,069.0**	**24,934.1**	**11,729.1**	**76,732.1**
decided investments (1996-2001)	3,771.1	2,946.9	63.0	6,781.0
decided investments (2002-2010)	31,199.1	7,396.1	465.5	39,060.7
outstanding investments	5,098.8	14,591.0	11,200.6	30,890.4

The table shows that in the Member States the total investments needed to implement the TEN-T road, rail and inland waterway network adds up to 458 billion Euro. One quarter of this sum has not been reported and has to be made available on top of the already decided investments. Regarding the road network 5% of the investments needed have not been reported, furthermore, 31% of rail investments and 43% of the inland waterway investments need to be made available additionally.

The investments in the Candidate Countries are estimated using average costs of a group of Member States (Spain, Portugal, Italy and Greece) as it can be expected that within the period under consideration the prices in the Candidate Countries will at least become similar to those in this group of countries. The average unit costs derived from the investments provided by the experts from the ministries in the Candidate Countries are very low and result from relatively few projects.

40% of the investments, which are necessary to implement the TEN-T network in the Candidate Countries have not been reported. The total sum to construct the network sums up to 77 billion Euro. Concerning the different modes of transport 13% of the road investments, 59% of the railway investments and 95% of the inland waterway investments need to be made available in addition to the reported investments.

9 Conclusions

The aim of this study is to bring into knowledge of the Commission detailed technical information of the status of the TEN-T network, investments that have been made and are foreseen until 2010 including an outlook ahead to the year 2015. The study includes the Member States and the Candidate Countries. The information shall help the Commission to prepare the proposal for revision of the Guidelines in 2004 by estimating the infrastructure cost and the necessary funds to be made available. The Guidelines 1996 comprises stipulations for the railway, road and inland waterway networks. To achieve the target to rework the Guidelines in 2004 this study can be considered as a first step.

In the framework of the study new networks have been constructed based on the information available in the European Commission. The network are constructed on a link by link basis indicating in form of a geographical information system for each link selected information on the technical status in 1996, 2001, 2010 and as an outlook for 2015.

The information has been collected from the responsible ministries in the Member States and the Candidate Countries by direct and pro-active contacts with the relevant administrations. A specific data collection approach has been developed and presented already in the inception report. The data collection approach is divided in several steps and based on face to face interviews carried out similar to the Delphi method in at least two waves. The first wave collects data in each country and is followed by plausibility test and identification of missing data. Inconsistencies and missing data are the main issue of the second wave of face to face interviews as well as the collection of general information contained in studies or other information material.

An important prerequisite for the success of this data collection approach is the distribution of recommendation letters, direct contact to the members of the TEN-T committee and the TINA Senior Official group as well as the preparation by a general questionnaire asking for national contact persons and other information. Furthermore face to face interviews can successfully carried out only with the help an interactive data collection tool, which presents the participants the network of the country on the screen and permits data input by marking a link via predefined input tables. Such a tool “PLANTis” has been developed. “PLANTis” inserts the data direct to the connected data base. Extra input activities usual in a common data collection procedure with the help of questionnaires can be avoided. To handle the bulk of information the data have been organised in an Access data base linked to the geographical information presented by “PLANTis”. As the tool is submitted to the European Commission accompanied by a detailed and user friendly manual the recommendation is to organise future data collection as described before and to use the data collection tool. The data collection tool should be established in the Member States and the Candidate Countries to facilitate periodical updating of the information as requested in Article 18 of the Guidelines.

The data base handed over to the European Commission contains the selected information for each link and each port and airport as far as reported. The updating of the data base can be concentrated on those links where changes (investments) happened during the period under consideration. However, the network constructed so far as well as the information provided for each link should be carefully checked and if necessary corrected. As far as technical information or the start and end names of a link have to be changed no difficulty will occur. The insertion of additional links in the contrary requires substantial knowledge and efforts.

The “PLANTis” tool does not only perform as a data collection tool. With the help of “PLANTis” also the available data can be extracted from the data base and presented for a specific link , a selection of links or for a selected region(country). Investments can be presented year by year according to modes and regions. This capability of “PLANTis” facilitates the discussion with the professionals of the ministries in the Member States and the Candidate Countries as well as the identification of projects of common interest.

The guidelines have to express objectives, priorities and broad lines of measures envisaged in the area of the Trans-European Transport network in a consistent manner. Future guidelines should distinguish between the existing type and the targeted type of any selected line and include necessities for rehabilitation of an existing type which will not change the type. Furthermore information and objectives should be related to links or other components of the network. It is recommended that links reflect the geographical and economical situation and are not determined by projects, which happened to be performed at the time the guidelines are formulated as projects will change in terms of the kind of measure as well as in terms of the location.

Concerning ports, airports and terminals objectives should be oriented to interoperability contributions. The capability to act as interconnection point or an intermodal platform should form the base to determine whether a port, airport or terminal is considered to be included in the Trans European Transport network.

To distinguish between different components of the project cost is almost impossible for future projects as most of the involved experts in the national administrations do not possess these information. It is recommended to include a certain investment structure to divide the costs to different planning stages. The same applies for the timeframe of investment during the construction period.

The discussion with the experts at the responsible ministries in most of the contacted countries shows that investments can be reported with a certain degree of accuracy only for the following 3 to 4 years. Usually any further commitments depend on the approval of the responsible institutions and can not be published ahead of their decision. Therefore the periodically upgrading of the data base is recommended also for the investments.

The preliminary cost estimation identifies that approximately 445 billion Euro have to be funded in order to fulfil the requirements of Decision No 1692/96/EC of the European Parliament and of the Council of 23 July 1996 on Community guidelines for the development of the Trans-European transport network concerning roads, railways and inland waterways in the Member States between 1996 and 2010. 70% of the investments to complete the network are related to rail infrastructure. Almost 75% of the necessary investments have been reported by the Member States and are considered as decided upon. The remaining 25% need to be made available on top of the reported investments.

In the Candidate Countries 76 billion are estimated to realise the TEN-T network between 1996 and 2010. Approximately half of the funds are assigned to road infrastructure. 50% of the investments have been reported already the other half has to be made available additionally.

Without preconditioning any decisions the following example is supposed to provide an impression concerning a future involvement by the European Commission. If it is assumed that the EU is financing 10% to 15% of the entire investments remaining from 2004 onwards to fulfil the guideline requirements the European Commission has to provide funds between 24 and 36 billion Euro for the current Members States and between 6 and 9 billion Euro for the Candidate Countries. If only the outstanding investments are going to be co-financed 11 billion to 17 billion Euro are needed to support the Member States and 3 billion to 5 billion Euro as assistance to the Candidate Countries.