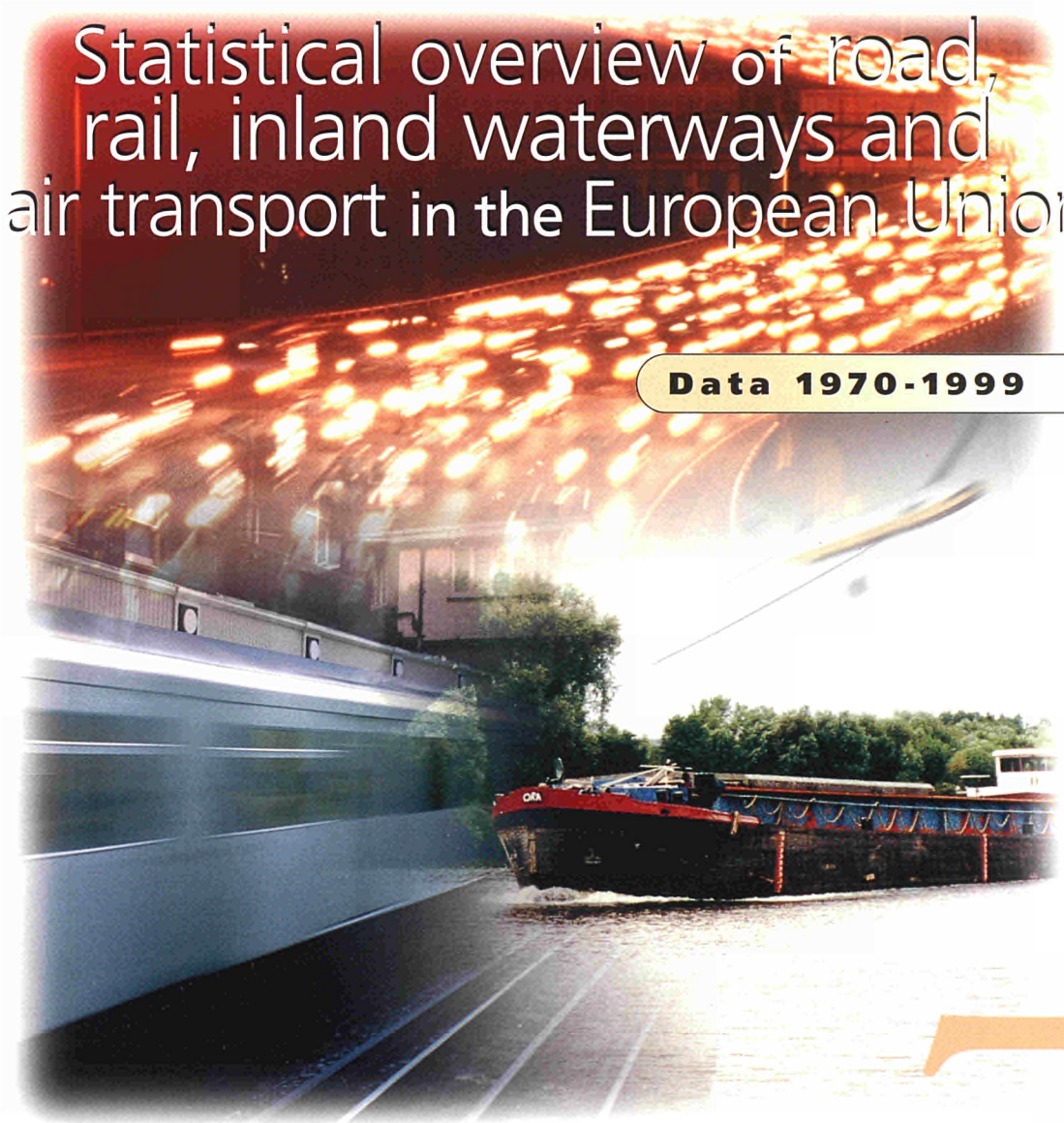
PANORAMA OF THE EUROPEAN UNION

2001 EDITION

Panorama of transport

Statistical overview of road, rail, inland waterways and air transport in the European Union

Data 1970-1999



7

EUROPEAN COMMISSION

eurostat

THEME 7
Transport

..... Our mission is to provide the **European Union** with a **high-quality statistical information service**

Eurostat's collections are adapted to the needs of all users.
You will find them in each of the nine themes proposed by Eurostat.


1 General statistics


2 Economy and finance


3 Population and social conditions


4 Industry, trade and services


5 Agriculture and fisheries


6 External trade


7 Transport


8 Environment and energy


9 Science and technology

Graphs · Tables · Comments · Maps	Content	Format
Press releases: Eurostat publishes around 100 press releases every year in connection with the release of new data. The press releases include the key figures on the EU, the Member States and their partners. They are provided free of charge. They are also available on the Internet as soon as they are published: www.europa.eu.int/comm/eurostat/		Paper Html PDF
Statistics in focus: This collection is published regularly by Eurostat and provides up-to-date summaries of the main results of statistical surveys, studies and analyses. It covers all themes and consists of about four to eight pages per issue. Eurostat issues around 150 *Statistics in Focus* per year. Available as single copies or on subscription.		Paper PDF
Key indicators: This collection provides the main indicators on a theme or sub-theme in an easy-to-carry booklet of up to 100 pages. Available as single copies or on subscription.		Paper Html
Panorama of the European Union: This collection highlights the features and trends of a multi-sectoral theme or a sectoral sub-theme. The publications consist of around 200 pages and include analysis as well as tables and graphs. Available as single copies or on subscription.		Paper CD-ROM
Methods and nomenclatures are intended for specialists who want to consult the methodologies and nomenclatures used for a theme, a sub-theme or a sector. Available as single copies.		Paper CD-ROM
Detailed tables are intended for specialists. They present part, or all, of the statistical data compiled on a theme, sub-theme or sector. Available as single copies or on subscription.		Paper CD-ROM
Studies and research summarise the results of European statistical studies and research and are intended for specialists. Available as single copies or on subscription.		Paper CD-ROM
Catalogues provide rapid access to concise information on Eurostat's products and services. They are free of charge and include the *Mini guide*, a selection of Eurostat products and services, and *Statistical references*, the quarterly newsletter on Eurostat's latest products and services.		Paper

2001 EDITION

Panorama of transport

Statistical overview of road, rail, inland waterways and air transport in the European Union

Data 1970-1999

7

EUROPEAN COMMISSION

eurostat

THEME 7
Transport

..... Immediate access to harmonised statistical data

Eurostat Data Shops

A personalised data retrieval service

In order to provide the greatest possible number of people with access to high-quality statistical information, Eurostat has developed an extensive network of Data Shops (1).

Data Shops provide a wide range of **tailor-made services**:

- ★ immediate information searches undertaken by a team of experts in European statistics;
- ★ rapid and personalised response that takes account of the specified search requirements and intended use;
- ★ a choice of data carrier depending on the type of information required.

Information can be requested by phone, mail, fax or e-mail.

(1) See list of Eurostat Data Shops at the end of the publication.

Internet

Essentials on Community statistical news

- ★ Euro indicators: more than 100 indicators on the euro zone; harmonised, comparable, and free of charge.
- ★ About Eurostat: what it does and how it works.
- ★ Products and databases: a detailed description of what Eurostat has to offer.
- ★ Indicators on the European Union: convergence criteria; euro yield curve and further main indicators on the European Union at your disposal.
- ★ Press releases: direct access to all Eurostat press releases.

For further information, visit us on the Internet at: www.europa.eu.int/comm/eurostat/

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (http://europa.eu.int).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 2001

ISBN 92-828-9974-8

Printed in France

PRINTED ON WHITE CHLORINE-FREE PAPER

FOREWORD

The *Panorama of Transport* sets out to describe, via annual statistics, the most important features of transport in the European Union. In so doing it provides European citizens and decision makers with information on medium and long term trends in the transport economy. This publication describes transport not only in terms of the quantities of freight and passengers moved and the vehicles and infrastructure used, but also as part of the economy, the environment and health, as a factor in our quality of life. Transport statistics are often an indicator of economic activity and European integration, as is shown by the notable increase in the proportion of international intra-EU transport, but they also reflect short-term problems, for example the serious and immediate impact on aviation of security problems or fuel price increases.

The first edition of the *Panorama* published in 1999 dealt mainly with road, rail and inland waterway transport, with particular emphasis on freight transport for which Community statistics have been collected for many years. This second edition is not just a simple updating of the previous edition; it widens its coverage to include air transport, where international passenger transport has been increasing, since 1993 - the first year in which data were collected by Eurostat - at a rate equivalent to a doubling every ten years. Road freight cabotage, while remaining a small part of total national transport is also growing fast, and is therefore covered in detail.

The *Panorama of Transport* gives the essential background information not only for the well-known accidents or attacks which have affected, in Europe and in the USA, various aspects of transport (notably trans-Alpine road transport, the transport of dangerous goods by sea, and civil aviation), but also for the less newsworthy road accidents which kill every year more than 40 000 people and leave more than 1,5 million people injured, often for the rest of their lives.

The *Panorama* is designed to provide statistics to support the development of Community transport policy. In particular, in order to meet the challenge of a transport policy which contributes to economic development while improving our quality of life, the European Commission proposed some sixty measures in its White Paper adopted, in September 2001, *European transport policy for 2010:* time to decide (www.europa.eu.int/comm/energy_transport/en/lb_en.html).

The *Panorama* exploits the wide range of data available at Eurostat not only on transport but also on the economy, on the environment and on energy, bringing these data together and explaining them. The user who wishes to go further can contact Eurostat and the network of Datashops. More specialised or more detailed dissemination products can be obtained, such as the CD-ROM *Everything on transport statistics*, which includes all data, publications and documents on transport available at Eurostat. The next edition of the *Panorama* will also include maritime transport; it will therefore cover all the main modes of transport.

Yves Franchet
Director-General
Eurostat

Project management:	Vincent Tronet, Eurostat
Publication management:	Jelle Bosch, Artemis Information Management
Chapter authors:	Jelle Bosch, Artemis Information Management Keith Crawford, DG Energy and Transport
Internal reviewers:	Joachim Hubertus, Eurostat Frank Laurent, DG Energy and Transport Graham Lock, Eurostat Josefine Oberhausen, Eurostat Maria Smihily, Eurostat Hans Strelow, Eurostat Vincent Tronet, Eurostat
Original language:	English
Translations:	European Commission Translation Service
For further information:	Data requests : see list of datashops at end of publication. Other comments and questions : John Allen, Head of Unit Transport Statistics Unit Tel. (352) 4301 37291 Fax (352) 4301 32289 Email: estat-transport@cec.eu.int

PANORAMA OF TRANSPORT

Statistical overview of road, rail, inland waterway and air transport in the European Union

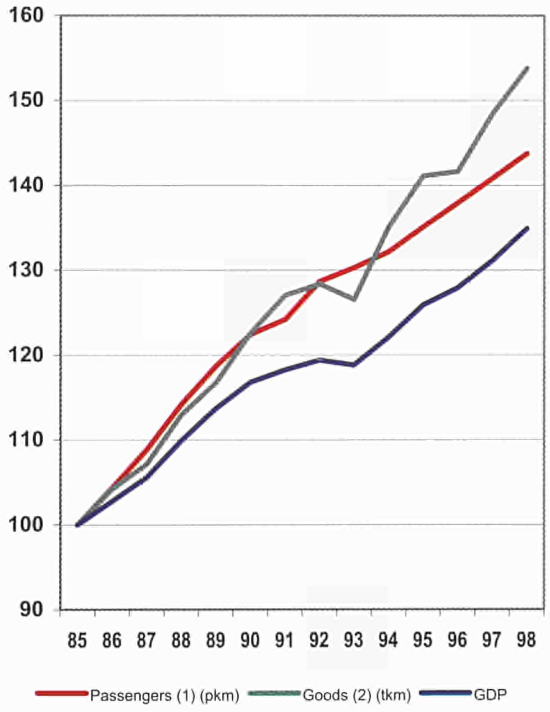
CONTENTS

1. The transport sector in the European Union

Transport is an integral part of the Treaty establishing the European Community (see box), and Community statistics on transport have played an essential role in implementing EU policies related to transport.

Trends in transport mirror economic trends. Transport has shown a steady growth since the 1970s, although the trend has been less regular in goods traffic than in passenger traffic (see Graph 1.1). Factors that determine this global development are the changes in the structure and location of the manufacturing industries, changes in production methods due to demands for 'just-in-time' shipments, the growing requirements for staff mobility in the services sector and the general increase of car ownership, leisure time and disposable income.

Graph 1.1: EU-15 transport growth (1985 = 100)



(1): Pass. cars, buses & coaches, tram & metro, rail, air.
(2): Road, rail, inland waterways, pipelines, sea (intra-EU).
Sources: Eurostat, Energy and Transport DG.

A sector in its own right

The transport economy in the European Union delivers benefits in its own right: the sector accounts for an estimated 4 % of the Union's gross national product and employs more than 6 million people. The latter figure represents more than 4 % of all persons employed in the EU (if 'own account' transport is to be included, transport's share in GDP would be about 5 % and an additional 1 million persons should be added to the employment number).

Each day, the transport industries and services of the European Union have to get 150 million people to and from work, enable 100 million trips made in the course of the work, carry 50 million tonnes of goods, deal with 15 million courier, express and parcel shipments apart from serving the needs of travel and trade outside the boundaries of the European Union.

Apart from the economic importance of the transport sector, the ever increasing mobility of citizens is today part of everyday life and its significance for every individual should not be underestimated.

In 1998, average intra-EU passenger transport demand was 35 km per person/day (taking into account transport by passenger car, buses and coaches, trams and metros, railways and aircraft).

Continuous growth expected

Table 1.2 and Graph 1.3 shows that road haulage has been constantly growing and takes a largely dominant position in freight transport. Meanwhile rail's share of the freight market has decreased in the past 30 years.

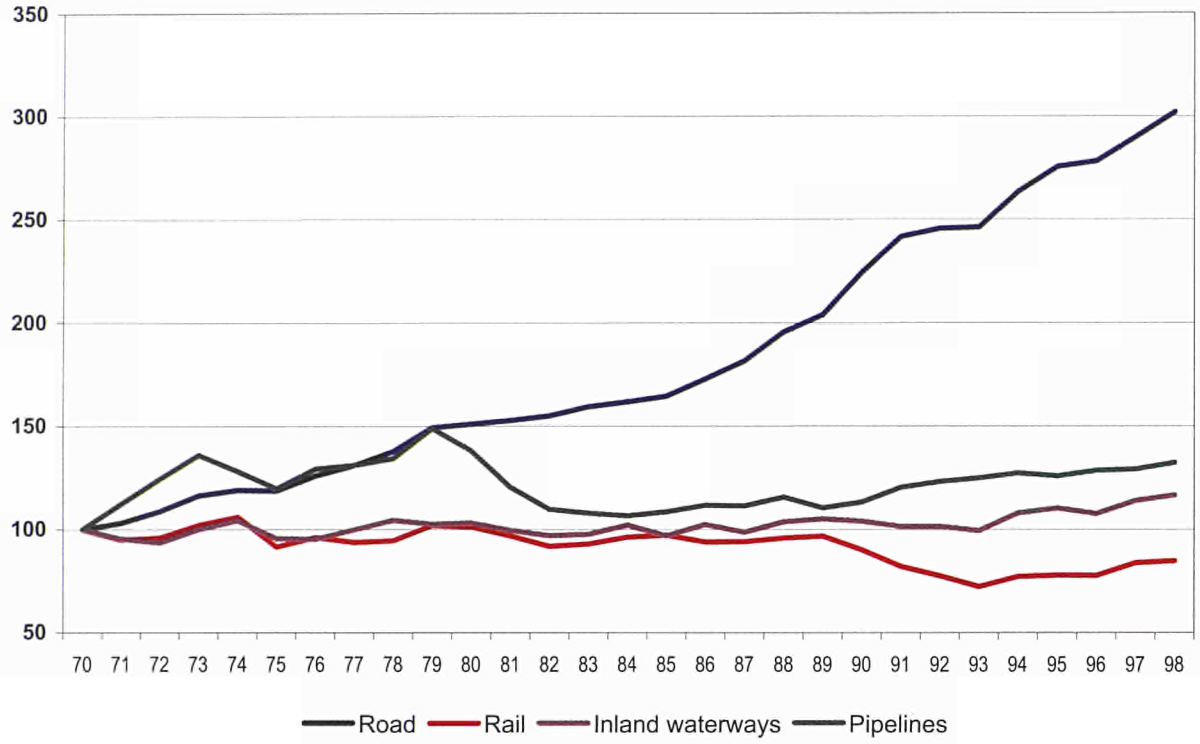
Table 1.2: EU-15 average annual growth by transport mode (%)

	1970-98	1990-98	1997-98
Total goods transport[1]	+ 2.44	+ 2.75	+ 3.47
Road goods transport	+ 4.03	+ 3.78	+ 4.13
Rail goods transport	- 0.58	- 0.75	+ 1.14
Inland ww. goods transp.	+ 0.55	+ 1.43	+ 1.22
	1993-99	**1997-98**	**1998-99**
Air transport - passengers[2]	+ 8.01	+ 6.99	+ 7.40

[1] road, rail, inland waterways, pipelines.
[2] international traffic only.
Sources: Eurostat, Energy and Transport DG.

It is however air transport that has experienced the most important growth in recent years. Passenger data available at Eurostat show that the number of passengers in intra- and extra- EU traffic passed from 232 million in 1993 to 368 million in 1999. This corresponds to a average annual increase of 8 %.

Graph 1.3: EU-15 goods transport: growth by mode based on tkm (1970 = 100)



Sources: Eurostat, Energy and Transport DG.

Physical links vital

The establishment and development of trans-European networks (TEN) in the area of transport, telecommunication and energy infrastructures has been a community policy since the Maastricht Treaty (see box). The transport TEN covers all modes of transport; the first projects have now been completed (see Chapter 2.4).

(extracts from the Treaty establishing the European Community, incorporating changes made by the Treaty of Amsterdam)

TITLE V

TRANSPORT

Article 70

The objectives of this Treaty shall, in matters governed by this Title, be pursued by Member States within the framework of a common transport policy.

Article 71

1. For the purpose of implementing Article 70, and taking into account the distinctive features of transport, the Council shall, acting in accordance with the procedure referred to in Article 251 and after consulting the Economic and Social Committee and the Committee of the Regions, lay down:

(a) common rules applicable to international transport to or from the territory of a Member State or passing across the territory of one or more Member States;

(b) the conditions under which non-resident carriers may operate transport services within a Member State;

(c) measures to improve transport safety;

(d) any other appropriate provisions.

(...)

Article 80

1. The provisions of this Title shall apply to transport by rail, road and inland waterway.
2. The Council may, acting by a qualified majority, decide whether, to what extent and by what procedure appropriate provisions may be laid down for sea and air transport.

(...)

TITLE XV

TRANS-EUROPEAN NETWORKS

Article 154

1. To help achieve the objectives referred to in Articles 14 and 158 and to enable citizens of the Union, economic operators and regional and local communities to derive full benefit from the setting-up of an area without internal frontiers, the Community shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructures.
2. Within the framework of a system of open and competitive markets, action by the Community shall aim at promoting the interconnection and interoperability of national networks as well as access to such networks. It shall take account in particular of the need to link island, landlocked and peripheral regions with the central regions of the Community. (...)

2. Transport infrastructure

2.1. General development

On a global scale, the EU offers a dense transport network. Increasing demand for transport services, both for passengers and goods, have had an impact on the development of the infrastructures. This development has however its particularities, both with regard to the individual Member States (see Chapter 2.2) and the mode of transport in question.

Motorway network more than tripled since 1970

In 1998, the total length of railways in EU-15 amounted to 153 640 km (see Table 2.1). Although almost half of this network (48 %) is now electrified, the overall length in use steadily decreased (see Graph 2.2) and stands 10 % lower than in 1970. As far as network density is concerned, EU-15 offers 47.5 km of railways per 1 000 square kilometres. This is nearly twice as much as in the United States (25.6 km/1 000 km^2 in 1996, including Alaska and Hawaii) but substantially less than Japan (71.2 km/1 000 km^2 in 1996).

Table 2.1: Network lengths in EU-15 (km)

	1970	1998	Change 1970 - 98
Rail	170 662	153 640	- 10%
Roads	2 737 049	3 379 350	+ 23%
of which motorways	16 051	49 271	+ 207%
Pipelines	12 539	21 799	+ 74%
Inland water-ways	32 468	28 310	- 13%
TOTAL NETWORK	2 952 718	3 583 099	+ 21%

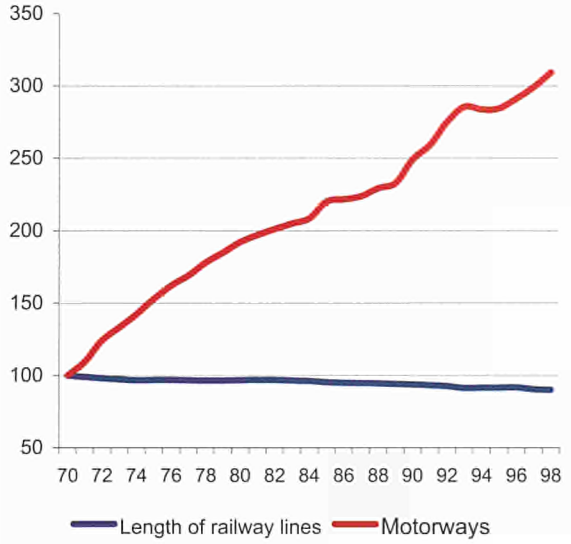
Sources: Eurostat/ECMT/UN-ECE, national statistics.

As would be expected, the road network, comprising motorways, regional highways and roads as well as local roads is the densest transport network. Given that the existing definition of the term 'local roads' allows various interpretations by Member States (leading to results altering comparability) data officially reported by Member States have been used. Local roads make up almost two thirds of the entire road network.

The total length of the road network in EU-15 amounted to nearly 3.4 million km of which 49 271 km (1.5 %) consisted of motorways. The length of the motorway network in the EU more than tripled in less than three decades (see Graph 2.2). Equivalent figures for the United States show a total network of about 6.5 million km with a share of 88 000 km (1.4 %) of motorways (1996). Japan featured 1.16 million km of roads with a 0.5 % share of motorways (6 000 km).

When relating the length of the entire road network to the total area, EU-15 offers 1 043 km per km^2 while the equivalent value is 690 (1996) for the United States (motorways: 15.2 km and 9.4 km respectively). With 3 115 km/1 000 km^2, Japan's total road network is extremely dense, whereas the density of the motorway network is close to the EU average (16.1 km/1 000 km^2).

Graph 2.2: Development of rail and motorways network in EU-15 (1970 = 100)



Sources: Eurostat/ECMT/UN-ECE

Inland waterways decreased most since 1970

Only 9 of the 15 Member States are able to offer significant transport using inland waterways. In 1998, the total length of inland waterways (comprising rivers, canals and navigable lakes) amounted to 28 310 km of length which represents a density of 8.7 km per 1 000 km^2. This density is twice as much compared to the United States (4.4 km per 1 000 km^2 approximately 41 000 km of length, excluding the Great Lakes).

This network of lakes, rivers and artificially built canals offers a unique transport system in the nine Member States, still offering considerable potential, especially since the opening of the

Rhine-Main-Danube canal. Nearly the entire network of navigable waterways is used for the transport of goods. Examples are few for the transport of passengers other than for leisure purposes (like scheduled passenger lines on the North Italian lakes and transport in Venice).

Pipelines not to be forgotten

In addition to the three main inland transport modes, pipelines should be mentioned, a network the length of which in 1998 constituted 14.2 % of the rail, 0.65 % of the road and 77 % of the inland waterway network. For statistical purposes, only oil pipelines are considered here. With a total length of 21 799 km, oil pipelines contribute only 0.61 % of the total network length (rail, road, inland waterways and oil pipelines).

In the present publication, the pipeline network will not be considered as a main inland transport mode since oil pipelines are only dedicated to the transport of a very restricted group of goods (liquid oil products). However, when considering the volumes forwarded, it becomes obvious that this mode is far from being negligible.

A 21 % increase over 28 years

The total length of the three 'classic' networks experienced a considerable growth: from 2.95 million km in 1970 to 3.58 million km in 1998. This represents an increase of 21 %. The most important share of this growth can be attributed to the road network with a growth of 23 %, while the rail and inland waterways network decreased by 10 % and 13 % respectively.

In terms of modal share, the railway network makes up only 4.3 % (1970: 6.0 %) of the total length of the transport network in 1998 while the road network amounts to 94.9 % (1970: 93.0 %) and inland waterways to 0.8 % (1970: 1.1 %).

2.2. Length of transport networks by country

The situation in most of the Member States is similar to the general trends and developments at EU level, outlined in the previous chapter. However, an analysis by mode shows to what extent the individual Member States follow the general EU trend.

Four largest EU countries represent more than two thirds of EU-15 network

At EU-15 level, the total length of the railway network decreased by 10 % between 1970 and 1998 (see Table 2.5). The railway network decreased most in Portugal and Belgium (22 and 19 % respectively), while only in Italy, Luxembourg and Finland did it remain stable.

Table 2.3 outlines that in 1998, the railway network of Germany was the longest in EU-15: with 38 126 km this network constitutes 25 % of the total EU-15 network. The French railway network comes second with 31 727 km or 20.6 %. The UK and Italian network follow with 11 % and 10.4 % respectively. These four Member States alone stand for two thirds (66.9 %) of the entire EU network.

Rail density more than five times higher in Germany than in Greece

In terms of network density things look different: despite a 20 % decrease since 1970, Belgium still has the highest rail network density with 111.7 km/1 000 km^2, followed by Germany (107.7km/1 000 km^2) and Luxembourg (106.7 km/1 000 km^2). Lowest density in EU-15 can be found in Finland (17.4 km/1 000 km^2) and Greece (19.0 km/1 000 km^2).

The case of Finland illustrates the typical situation of a country offering a large territory/low population ratio. One would expect to find a similar situation in neighbouring Sweden. However, figures show that network density in Sweden is roughly the same as in Spain (24 km/ 1 000 km^2). Sweden and Finland have one thing in common though: per 100 000 inhabitants these countries have far more than 100 km of tracks. Austria, in third position, follows far behind with 70 km/100 000 inhabitants. It should be noted that the two Nordic countries feature a very uneven population distribution, an element that is not considered in these ratios.

Table 2.3: Length of transport networks 1998 - key indicators

	Railways[1]				Motorways		
	km	% electrified	km/100 000 inhab.	km/1 000 km^2	km	km/100 000 inhab.	km/1 000 km^2
Belgium	3 410	74	33.4	111.7	1 682	16.5	55.1
Denmark	2 232	28	42.1	51.8	861	16.2	20.0
Germany	38 126	48	46.9	107.7	11 427	13.9	32.0
Greece	2 503	0	23.8	19.0	*500*	*4.8*	*3.8*
Spain	12 303	56	31.2	24.4	8 269	21.0	16.4
France	31 727	45	53.9	57.8	9 303	15.8	16.9
Ireland	1 909	2	52.5	27.7	103	2.8	1.5
Italy	16 041	65	27.9	53.2	6 453	11.2	21.4
Luxembourg	274	95	64.6	106.7	115	27.1	44.8
Netherlands	2 808	73	17.9	67.5	*2 360*	*15.0*	*56.8*
Austria	5 643	60	69.9	67.3	1 613	20.0	19.2
Portugal	2 794	30	28.7	31.1	1 252	12.6	13.6
Finland	5 867	35	113.9	17.4	473	9.2	1.4
Sweden	11 156	68	126.0	24.8	1 439	16.3	3.2
United Kingdom[2]	16 847	30	28.5	69.0	3 421	5.8	14.0
EU-15	153 640	48	41.1	47.5	49 271	13.1	15.2

[1] Railways: Data for UIC member railways. [2] United Kingdom data refer to Great Britain
Estimates in italic.
Sources: Eurostat/ECMT/UN-ECE, UIC, IRF, national statistics.

45 % of high speed lines in France

In six Member States, high-speed railway lines have been increasingly built over the last decade. The largest part of these lines in terms of length was installed in France. With their TGV lines France offers 1 246 km or 46 % of this track type, followed by Germany with 577 km (21 %) and Spain with 471 km (17 %). The figures mentioned in Table 2.4 concern only new lines especially built for high-speed purposes and do not consider existing tracks that might have been adapted for high-speed operation.

Within the next couple of years a considerable amount of high-speed sections will be added to the European rail network. The adding of new high-speed lines to the global rail network so far has however not been able to compensate the putting out of service of other parts of the network.

Table 2.4: EU-15 high-speed rail lines[1] - in km

	B	DK	D	E	F	I	S	UK[2]	EU-15
1981	-	-	-	-	301	150	-	-	451
1983	-	-	-	-	417	150	-	-	567
1988	-	-	90	-	417	224	-	-	731
1990	-	-	90	-	699	224	-	-	1 013
1991	-	-	428	-	699	224	-	-	1 350
1992	-	-	428	471	737	246	-	-	1 883
1993	-	-	428	471	1 057	246	-	-	2 203
1994	-	-	428	471	1 159	246	-	52	2 356
1995	-	-	428	471	1 159	246	-	52	2 356
1996	14	-	428	471	1 246	246	-	52	2 457
1997	88	15	428	471	1 246	246	-	52	2 546
1998	88	15	577	471	1 246	246	39	52	2 734
1999	88	15	577	471	1 246	246	39	52	2 734

[1] Especially built for high-speed train traffic. [2] Channel Tunnel (with F)

Source: UIC.

Most spectacular increase of motorway construction in Greece and Spain

Completely different tendencies as described above can be observed for the development of road networks. Between 1970 and 1998 the total road network increased by almost 23 %. Although motorways constitute only a small part of the entire road network, their length has more than tripled (at EU-level) during the observation period (from 16 051 km in 1970 to 49 271 km in 1998). Extraordinary growth can be noticed for Greece and Spain: the Greek motorway network increased from 11 km in 1970 to about 500 km in 1998. A similar development is recorded in Spain where the network increased from 387 km to 8 269 km over the same period, although definitional problems might overstate this increase.

Spain's motorway network density now at EU-15 average

As far as the length of the total road network is concerned (including motorways), the highest growth during the period 1970-98 has been achieved in Portugal (+ 70 %), Belgium (+ 55 %), France (+ 38 %) and the Netherlands (+ 37 %).

In 1998, the most extensive motorway network within EU-15 can be found in Germany with 11 427 km, followed by France (9 303 km) and Spain (8 269 km). The Benelux countries offer the densest motorway network with values between 44.8 km/1 000 km^2 and 56.8 km/1 000km^2. The EU-15 average is 15.2 km per 1 000 km^2, a value close to those registered in Spain, France and the United Kingdom.

Inland waterways: Germany one quarter of EU-15 length

In the present context, navigable inland waterways are defined as 'rivers, lakes and canals, over which vessels of a carrying capacity of not less than 50 tonnes can navigate when normally loaded'. Inland waterways in the EU are nearly exclusively used for the transport of goods. It can be stated that little passenger transport takes place using the inland waterway network (and this mainly for leisure purposes).

Between 1970 and 1998, the total length of navigable inland waterways in the nine EU Member States able to perform transport activities using this mode decreased by 4 158 km which represents nearly 13 % (see Table 2.5). Germany, with 6 740 km is the main contributor to today's network (24 %). Part of the network has increased in importance with the opening of the Rhine-Main-Danube canal in the early 1990s, facilitating traffic to Austria. With + 4 %, Finland is the only country showing an increase in network length in nearly three decades.

Italy abandons 37 % between 1980 and 1990

France's waterways offer a slightly scattered network structure and experienced a 23 % decrease over the last three decades. Italy ceased to use 860 km of navigable waterways, representing a loss of 37 %. It should be noted that transport lines on the lakes in Northern Italy and in Venice represent about 40 %, and the river Po approximately 25 % of the total Italian network.

The Netherlands owns an extraordinary long navigable waterway system compared to the size of the country. Despite a loss of nearly 10 % in usable length since 1970, the transport of goods over inland waterways continues to be an important mode, both in national and international transport (see Chapter 5.1 - Transport of goods).

Table 2.5: Length of transport networks by country (km)

Railways[1] (length in use)
Motorways
Other roads
Pipelines[2](oil)
Inland waterways (navigable canals, rivers and lakes)

	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK[4]	EU-15	EU-15 index 1970=100
1970	4 232	2 352	43 777	2 571	13 668	36 117	2 189	16 089	271	3 148	5 907	3 591	5 870	11 550	19 330	170 662	100
	488	184	6061	11	387	1 553	0	3 913	7	1 209	478	66	108	403	1 183	16 051	100
	93 539	62 592	541 370	34 692	139 221	710 384	86 695	281 405	4 949	81 890	102 053	41 763	73 444	110846[3]	356 155	2 610 152	100
	52	-	3 358	-	1 099	3 609	-	1 860	-	323	604	-	-	-	1 634	12 539,00	100
	1 553	-	6 808	-	-	7 433	-	2 337	37	5 599	350	-	6 000	-	1 631	31 748	100
1980	3 971	2 015	42 765	2 461	13 542	34 382	1 987	16 133	270	2 760	5 847	3 588	6 096	11 382	18 030	165 229	97
	1 203	516	9 225	91	2 008	5 264	0	5 900	44	1 780	938	132	204	850	2 683	30 838	192
	124 710	68 405	591 929	37 367	147 644	796 514	89 796	290 370	5 050	91 628	103 553	50 410	74 490	96504[3]	337 077	2 808 943	108
	458	77	3 387	-	1 753	5 254	-	3 069	-	391	777	-	-	-	3 166	18 332	146
	1 510	-	6 697	-	-	6 568	-	2 337	37	4 843	350	-	6 057	-	1 631	30 030	95
1990	3 479	2 344	40 981	2 484	12 560	34 260	1 944	16 086	271	2 798	5 624	3 592	5 867	10 801	16 914	160 005	94
	1 631	601	10 809	190	4 693	6 824	26	6 193	78	2 092	1 445	316	225	939	3 180	39 242	244
	138 575	70 173	617 390	38 312	156 243	801 274	92 303	297 419	5 013	102 498	104 807	61 222	76 855	132619[3]	378 934	2 941 018	113
	301	444	3 547	-	2 678	4 948	-	4 086	-	391	777	-	-	-	2 422	19 594	156
	1 513	-	6 669	-	-	6 197	-	1 366	37	5 046	351	-	6 237	-	1 631	29 047	91
1995	3 368	2 349	41 719	2 474	12 280	31 939	1 947	15 998	275	2 739	5 672	2 850	5 880	9 782	16 999	156 271	92
	1 666	796	11 190	420	6 962	8 275	72	6 401	123	2 208	1 596	687	394	1 231	3 308	45 329	282
	142 126	70 525	643 970	38 265	155 655	951 097	92 360	305 500	5 046	111 144	104 715	68 045	77 328	136233[3]	387 799	3 153 575	121
	294	409	3 318	-	3 691	4 830	-	4 235	-	391	777	-	-	-	2 602	20 547	164
	1 531	-	6 663	-	-	5 962	-	1 466	37	5 046	351	-	6 245	-	1 153	28 454	90
1996	3 380	2 349	40 826	2 474	12 284	31 852	1 945	16 014	274	2 739	5 672	2 850	5 881	10 923	17 001	156 464	92
	1 674	832	11 246	470	7 293	8 596	80	6 439	115	2 223	1 607	710	431	1 330	3 344	46 390	289
	142 126	70 504	648 730	38 300	154 805	960 561	92 570	306 900	5 053	111 212	104 445	69 340	77 351	136915[3]	389 585	3 171 482	122
	300	336	2 460	-	3 691	4 983	-	4 235	-	391	777	-	-	-	3 459	20 632	165
	1 531	-	6 760	-	-	5 678	-	1 466	37	5 046	351	-	6 245	-	1 153	28 267	89
1997	3 422	2 232	38 450	2 503	12 294	31 754	1 945	16 030	274	2 805	5 672	2 856	5 865	11 168	16 991	154 261	90
	1 679	855	11 309	500	7 750	8 864	94	6 445	118	2 360	1 613	797	444	1 423	3 412	47 663	297
	143 235	70 582	648 730	38 300	155 045	964 646	95 744	306 900	5 053	111 212	104 739	69 340	77 351	136884[3]	390 918	3 181 795	122
	300	336	2 460	-	3 691	5 746	-	4 235	-	391	777	-	-	-	3 936	21 872	174
	1 540	-	6 673	-	-	6 051	-	1 466	37	5 046	351	-	6 245	-	1 153	28 562	90
1998	3 410	2 232	38 126	2 503	12 303	31 727	1 909	16 041	274	2 808	5 643	2 794	5 867	11 156	16 847	153 640	90
	1 682	861	11 427	500	8 269	9 303	103	6 453	115	2 360	1 613	1 252	473	1 439	3 421	49 271	307
	144 168	70 601	650 000	39 000	155 004	971 064	95 732	307 000	5 060	111 212	104 748	70 000	77 352	136593[3]	392 545	3 193 486	122
	300	336	2 370	-	3 691	5 746	-	4 235	-	391	777	-	-	-	3 953	21 799	174
	1 529	-	6 740	-	-	5 732	-	1 477	37	5 046	351	-	6 245	-	1 153	28 310	89

Sources: Eurostat, UIC, UN-ECE, national statistics. Estimates in italic.
[1] Railways: Length in use. Data refer to main railway companies (UIC-members). [2] Pipelines: only oil-pipelines longer than 40 km are considered. [3] Does not include private roads open to the public (approx. 74000 km). [4] United Kingdom figures refer to Great Britain.

2.3. Expenditure

In 1995 the EU-15 Member States spent almost ECU 67 000 million on transport infrastructures in road, rail, navigable inland waterway and airports. Expenditure in this domain represents the total public investment of Member States in road, rail, inland waterway and airport infrastructures, like roads, rail tracks, canals, airports, transport terminals and the like. Figures do not include investments in rolling stock or other vehicles.

Public expenditure in transport is higher than the amount of ECU 67 000 million mentioned earlier, since the amount does not take into account investments in pipelines and maritime ports for instance.

Wide range of funding sources

Furthermore, since expenditure in the transport sector is performed by a wide range of public authorities and often spread over several years, reliable data become available only after a certain lapse of time. In the frame of this chapter, data from 1987 to 1995 will be focused upon.

The figure of ECU 66 648 million spent at EU-15 level in 1995 constitutes an increase of 28 % compared to 1987 (in constant 1995 prices). Over the period observed, investments in the four transport modes reached a peak in 1992 (with ECU 73 879 million) and decreased slightly during the following years.

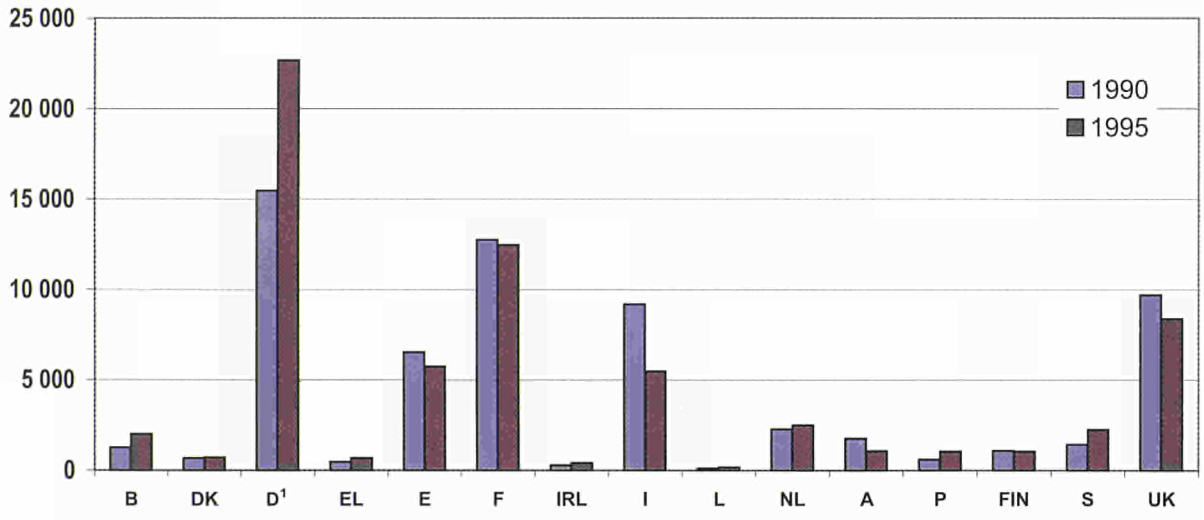
1 % of EU-15 GDP for transport infrastructure

Table 2.6 offers an insight into how much the public bodies in the various Member States have been spending over the years and for what mode of transport. It is obvious that large countries invest more money on transport networks than small countries. Graph 2.7 outlines the absolute sums invested in the transport infrastructures and compares the 1995 situation to the one in 1990.

A better view of the efforts made by the individual Member States can however be obtained by looking at the percentage this investment represents compared to the total gross domestic product (GDP) of a country.

In 1995, the average spending in EU-15 counted for 1.0 % of the total GDP generated at EU-15 level. The two Member States of the Iberian peninsula performed particularly well with a share of nearly 1.3 %. Sweden also scores higher than average with a share of 1.2 %. Increased investments in rail infrastructure from 1993 onwards have influenced this figure.

Graph 2.7: Total gross investment in transport infrastructure - in million ECU (1995 prices)



[1] 1990: without former GDR

Source: ECMT

Table 2.6 : Total gross investment in transport infrastructure - in million ECU (1995 prices)

		1987	1990	1991	1992	1993	1994	1995	1995 modal share	1995 as % of GDP
Belgium	Total	1 366	1 270	1 473	1 774	2 088	2 166	2 020	100	0.96
	Road	664	789	866	963	997	1 122	965	47.8	0.46
	Rail	488	244	299	444	729	663	805	39.9	0.38
	Inl. waterways	157	195	188	173	167	208	158	7.8	0.07
	Airports	57	42	120	194	195	173	92	4.6	0.04
Denmark	Total	689	671	620	689	728	753	714	100	0.52
	Road	345	232	214	238	272	310	335	46.9	0.24
	Rail	287	385	337	407	417	324	277	38.8	0.20
	Inl. Waterways	-	-	-	-	-	-	-	-	-
	Airports	57	54	69	44	39	119	102	14.3	0.07
Germany[1]	Total	16 025	15 461	22 234	23 391	22 311	22 775	22 666	100	1.21
	Road	9 911	9 708	13 558	14 478	13 989	14 135	13 924	61.4	0.74
	Rail	4 781	3 619	6 021	6 611	6 296	6 987	7 034	31.0	0.37
	Inl. waterways	653	570	628	571	650	619	646	2.9	0.03
	Airports	680	1 564	2 027	1 731	1 376	1 034	1 062	4.7	0.06
Greece	Total	425	464	489	580	714	525	673	100	0.75
	Road	254	276	293	401	489	378	516	76.7	0.57
	Rail	154	167	178	153	189	120	*130*	19.3	0.14
	Inl. waterways	-	-	-	-	-	-	-	-	-
	Airports	17	21	18	26	36	27	27	4.0	0.03
Spain	Total	3 134	6 523	7 125	6 551	6 477	6 428	5 737	100	1.28
	Road	2 080	4 808	5 149	4 930	5 166	4 956	4 254	74.2	0.95
	Rail	883	1 394	1 744	1 441	1 152	1 146	987	17.2	0.22
	Inl. waterways	-	-	-	-	-	-	-	-	-
	Airports	171	321	232	180	159	326	496	8.6	0.11
France	Total	9 527	12 737	13 988	14 160	13 602	12 915	12 466	100	1.05
	Road	6 316	7 809	8 049	8 342	8 555	8 840	8 628	69.2	0.73
	Rail	2 867	4 317	5 193	4 964	4 222	3 385	3 148	25.3	0.26
	Inl. waterways	74	98	98	98	123	123	123	1.0	0.01
	Airports	270	513	648	756	702	567	567	4.5	0.05
Ireland	Total	193	291	319	340	462	372	413	100	0.82
	Road	161	244	262	295	394	306	347	84.0	0.69
	Rail	16	17	14	20	33	36	36	8.7	0.07
	Inl. waterways	-	-	-	-	-	-	-	-	-
	Airports	16	30	43	25	35	*30*	*30*	7.3	0.06
Italy	Total	8 254	9 184	8 981	9 376	8 141	6 991	5 475	100	0.65
	Road	4 951	6 752	6 946	6 984	6 006	5 181	3 713	67.8	0.44
	Rail	3 000	2 040	1 598	1 900	1 824	1 461	1 497	27.3	0.18
	Inl. waterways	43	23	16	24	16	10	6	0.1	0.00
	Airports	260	369	421	468	295	339	259	4.7	0.03
Luxembourg	Total	113	118	168	190	185	166	171	100	1.22
	Road	87	87	141	166	164	146	150	87.7	1.07
	Rail	23	30	26	23	20	19	*20*	11.7	0.14
	Inl. waterways	-	-	-	-	-	-	-	-	-
	Airports	3	1	1	1	1	1	*1*	0.6	0.01
Netherlands	Total	2 091	2 271	2 371	2 413	2 484	2 605	2 495	100	0.79
	Road	1 588	1 587	1 509	1 517	1 524	1 586	1 565	62.7	0.49
	Rail	263	390	499	537	639	723	627	25.1	0.20
	Inl. waterways	109	131	149	141	147	141	144	5.8	0.05
	Airports	131	163	214	218	174	155	159	6.4	0.05
Austria	Total	1 392	1 775	1 587	1 471	1 560	1 366	1 080	100	0.60
	Road	875	766	649	636	513	516	477	44.2	0.26
	Rail	437	894	804	690	897	727	490	45.4	0.27
	Inl. waterways	12	9	10	12	20	23	3	0.3	0.00
	Airports	68	106	124	133	130	100	*110*	10.2	0.06
Portugal	Total	384	602	597	746	730	888	1 051	100	1.28
	Road	257	382	372	501	502	601	654	62.2	0.80
	Rail	90	173	183	223	212	262	362	34.4	0.44
	Inl. waterways	2	-	-	-	-	-	-	-	-
	Airports	35	47	42	22	16	25	35	3.3	0.04
Finland	Total	980	1 099	1 147	1 195	1 090	1 101	1 045	100	1.06
	Road	836	912	945	898	835	815	722	69.1	0.73
	Rail	125	141	140	219	202	247	270	25.8	0.27
	Inl. waterways	2	10	15	14	2	2	1	0.1	0.00
	Airports	17	36	47	64	51	37	52	5.0	0.05
Sweden	Total	849	1 440	1 296	1 439	1 779	2 134	2 263	100	1.23
	Road	450	687	617	703	1 023	1 014	1 071	47.3	0.58
	Rail	283	541	619	694	726	1 088	1 146	50.6	0.62
	Inl. waterways	-	-	-	-	-	-	-	-	-
	Airports	116	212	60	42	30	32	46	2.0	0.03
United Kingdom	Total	6 806	9 697	9 281	9 564	9 010	9 169	8 379	100	0.97
	Road	4 838	6 195	5 969	6 125	6 056	5 915	5 279	63.0	0.61
	Rail	1 536	2 677	2 694	2 883	2 323	2 468	2 401	28.7	0.28
	Inl. waterways	-	-	-	-	-	-	-	-	-
	Airports	432	825	618	556	631	786	699	8.3	0.08
EU-15	Total	52 228	63 603	71 676	73 879	71 361	70 354	66 648	100	1.01
	Road	33 613	41 234	45 539	47 177	46 485	45 821	42 600	63.9	0.65
	Rail	15 233	17 029	20 349	21 209	19 881	19 656	19 230	28.9	0.29
	Inl. waterways	1 052	1 036	1 104	1 033	1 125	1 126	1 081	1.6	0.02
	Airports	2 330	4 304	4 684	4 460	3 870	3 751	3 737	5.6	0.06

[1] : 1987 and 1990 figures exclude former GDR.

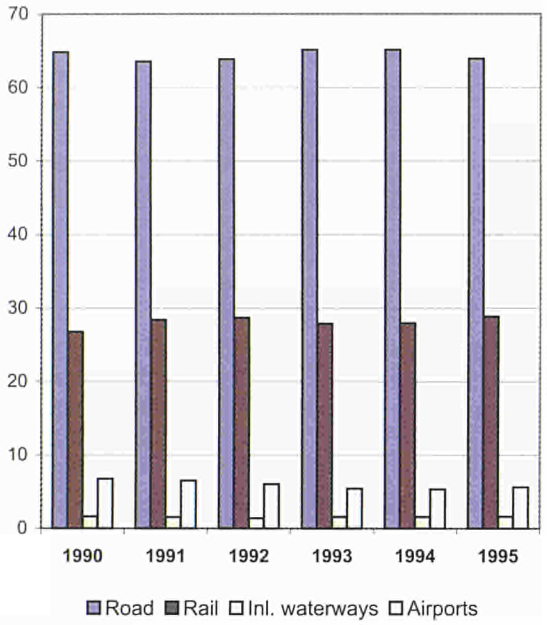
Estimates in italic

Source: ECMT.

Expected high share for the road network

Graph 2.8 outlines that throughout the period 1990-95, close to 65 % of the total investments were dedicated to road infrastructure. However, considerable investments continue to be made in the railway infrastructure (1995: 29 % of the total). The slight upward trend of the roads' share in the late 1980s seems to have stopped.

Graph 2.8: Total gross investment in transport infrastructure in EU-15: modeal split (%)



Source: ECMT

The inland waterways' share in investments is at a low level throughout the period observed and stands at 1.6 % at EU-15 level in 1995. However, this image is heavily influenced by the fact that not all countries feature this transport mode. If only countries with significant inland waterways are taken into account, the equivalent figure rises to 2.3 %. Countries with intensive inland shipping invest relatively more in this mode: for instance, in 1995, nearly 8 % of infrastructure expenditure in Belgium was on inland waterways, nearly 6 % in the Netherlands. The modal split by country is displayed in the second-last column of Table 2.6.

Combination with private capital

The concept of the trans-European transport networks (TENs) outlines the supra-national dimension of transport networks.

Public sector funds for the financing of transport infrastructure projects remain however of prime importance. Furthermore, funding of certain projects is increasingly combined with private capital.

National and EU funds often combined

EU funding can be substantial for countries and regions eligible in the frame of the allocation of Structural Funds (European Regional Development Fund and Cohesion Fund). Parts of the EU funding is dedicated to the trans-European transport network. The next chapter gives ample details on the various instruments for the financing of theTENs.

2.4. Trans-European transport networks (TENs)

The Maastricht Treaty provided the background for the development of trans-European networks (TENs) for telecommunications, energy and transport. TENs are a key element for the creation of the internal market and the reinforcement of economic and social cohesion. This development includes the interconnection and interoperability of national networks as well as the access to such networks.

This chapter outlines the main ideas and projects linked to the development of the transport TEN.

Further coordination and integration of national networks

A comprehensive, environmentally responsible European transport network is of prime importance for employment, competitiveness and growth. The trans-European transport network should lead to a gradual integration of national networks. A single network of a European dimension should ensure mobility of persons and goods, offer high quality infrastructures combining all modes of transport and allow optimal use of existing capacities.

Guidelines adapted every five years

The community guidelines for the development of the transport TEN (Council Decision No 1692/96/EC) mention the characteristics of the different networks. Every five years, the Commission evaluates progress made in setting up the network and state whether the guidelines need to be adapted.

Community measures for the rail network include:

- the gradual establishment of the network consisting in the infrastructure and fixed installations. This includes the creation of a high-speed network and the maintenance or upgrading of conventional lines;
- the achievement of technical interoperability of the European high-speed train network;
- the taking into account of requirements concerning safety, reliability, human health, environmental protection, technical compatibility and operation.

A complete map of the TEN rail network is displayed in this chapter.

For the road network, measures focus:

- on the forging of missing links and in particular those on cross-frontier intra-Community axes and those that are attractive to peripheral or enclosed areas;
- on improvements on existing links, especially on cross-border axes and peripheral areas;
- on connections between certain non-member countries;
- on inter-modal connections aimed at combined-transport axes;
- on bypasses for the principal urban nodes located on the road TEN;
- on the development and implementation of computerised traffic-management systems.

A complete map of the TEN road network is displayed in this chapter.

Measures for the inland waterway network comprise:

- the building of missing links in the existing network or the removing of bottlenecks through efficient traffic management systems;
- the notion of a multi-modal approach: complementarity with other modes through improved port infrastructures.

A complete TEN by 2010

The European Commission has prepared a complete TENs design which it estimates will be a reality by 2010. All of the projects have been approved by the Member States concerned and some of them are now completed.

Fourteen priority projects

Fourteen transport projects of common interest were endorsed as priorities during the European Council meeting in Essen in December 1994 (see window). These projects also reflect the priority attached to the strengthening of alternatives to road transport. About 80 % of the estimated investments are on rail links; a further 9 % on road/rail links. Only 10 % of the investment is dedicated to new road building. However, It should be mentioned that the TEN road network already largely exists. Most of the planned work relates to the upgrading of low quality existing roads. Three of the 14 priority projects are now completed (Projects 9, 10 and 11, see window); for most other projects, financing is largely in place, work has begun and should be completed before 2007. Certain projects however, like Project 6 (Lyon-Turin rail link) run significantly behind schedule.

Multiple-source funding

The priority projects and in particular those located in areas eligible for Structural Funds and Cohesion Fund financing have benefited from substantial amounts of EU financing.

Despite the impressive numbers displayed in Table 2.9, EU financing of TEN represents in most cases a small proportion of the total cost, except for some projects in the 'cohesion' countries. The greater part comes from public authorities in the Member States and sometimes the private sector.

The dedicated TEN transport budget (a total of more than ECU 1.7 billion for the period 1995-98) has considerably helped to launch major projects. As can be seen in Table 2.9, this budget had a volume of EUR 497 million for 1999 alone. With regards to the projects categories, the Commission has continued to concentrate the greater part of the available resources (58 %) on the 14 priority projects (including rail traffic management projects). Some 33 % was dedicated to other important projects of common interest and 9 % to traffic management projects (all modes except rail).

Some 58 % of TEN budget for direct grants

When looking at the 1999 budget by form of intervention, it appears that 28 % of the volume has been attributed for feasibility studies, 58 % for direct grants and 14 % for interest rate rebates. The third way of looking to the 1999 budget is by modal split: 64 % went to rail projects (including traffic management), 17 % to road projects, 4 % to projects linked to inland waterways. Traffic management (all modes except rail) was granted 9 %, airports 5 % and seaports 1 % of the budget.

Structural Funds by far the main EU source

However, the Structural Funds, European Regional Development Fund (ERDF) and Cohesion Funds are by far the main source of Union grants for TEN projects. Due to the multiannual approach and the fact that funding is spent via regional and national authorities, it is not easy to determine exactly the amount of money invested through the ERDF. The most important financing decisions were however made in the Greek programmes, in particular regarding priority Project 7.

The strategy pursued by the Cohesion Fund has been guided by the main concern of ensuring an appropriate linkage to trans-European transport networks and improving the overall efficiency of transport systems in those countries that benefit from the Fund. Beneficiaries of the Cohesion Fund are Greece, Spain, Ireland and Portugal.

Between 1991 and 1998 (included), commitments from this source added up to EUR 8.3 billion, of which 56 % have been dedicated to road and 34 % to rail projects. The Cohesion Fund TEN financing for 1999 was established at EUR 444 million.

EIB as long time financier

One of the European Investment Bank's (EIB) priority objectives is to grant loans that help develop large infrastructure projects of common interest. Loans approved by the EIB in 1999 for TENs in the transport sector reached EUR 4 807 million in the European Union, resulting in a total of EUR 36.7 billion approved for that sector to date.

Table 2.9: Community financing of the transport-TEN 1993 - 1999 (million EUR)

Type of assistance	Instrument	1993 - 95	1996	1997	1998	1999
Loans	European Investment Bank	7 666	3 504	4 943	4 415	5 977
Loan guarantees	European Investment Fund	161	303	55	71	266
Grants	European Regional Development Fund	999	2 639	527	:	:
Grants	Cohesion Fund	2 995	1 221	1 251	1 337	444
Grants, interest rate subsidies, loan guarantees and co-financing of studies	European Commission's specific TEN Budget line	625	280	352	474	497
	of which the 14 priority projects	362	211	211	305	266

Source: Energy and Transport DG.

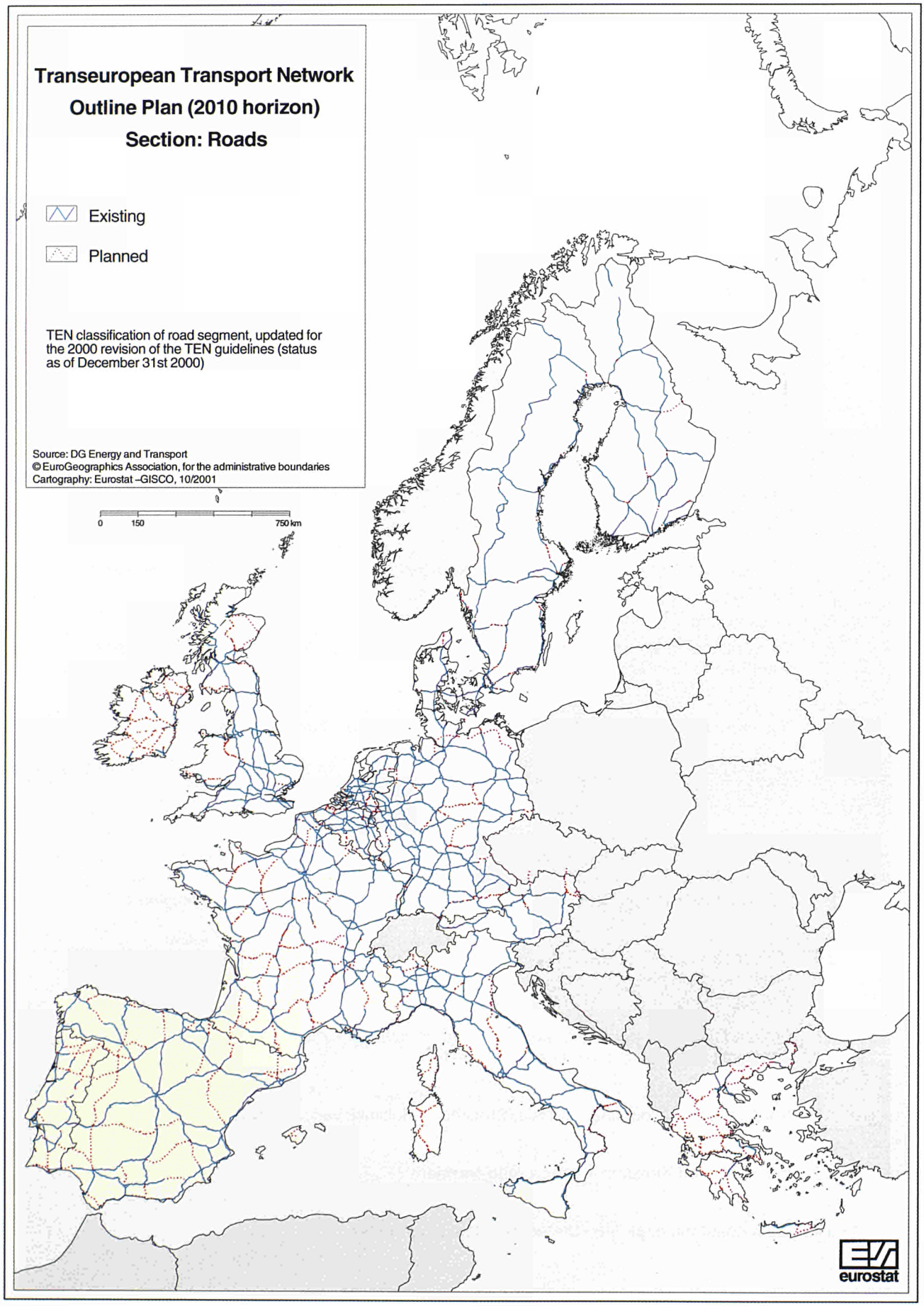
TINA for the candidates

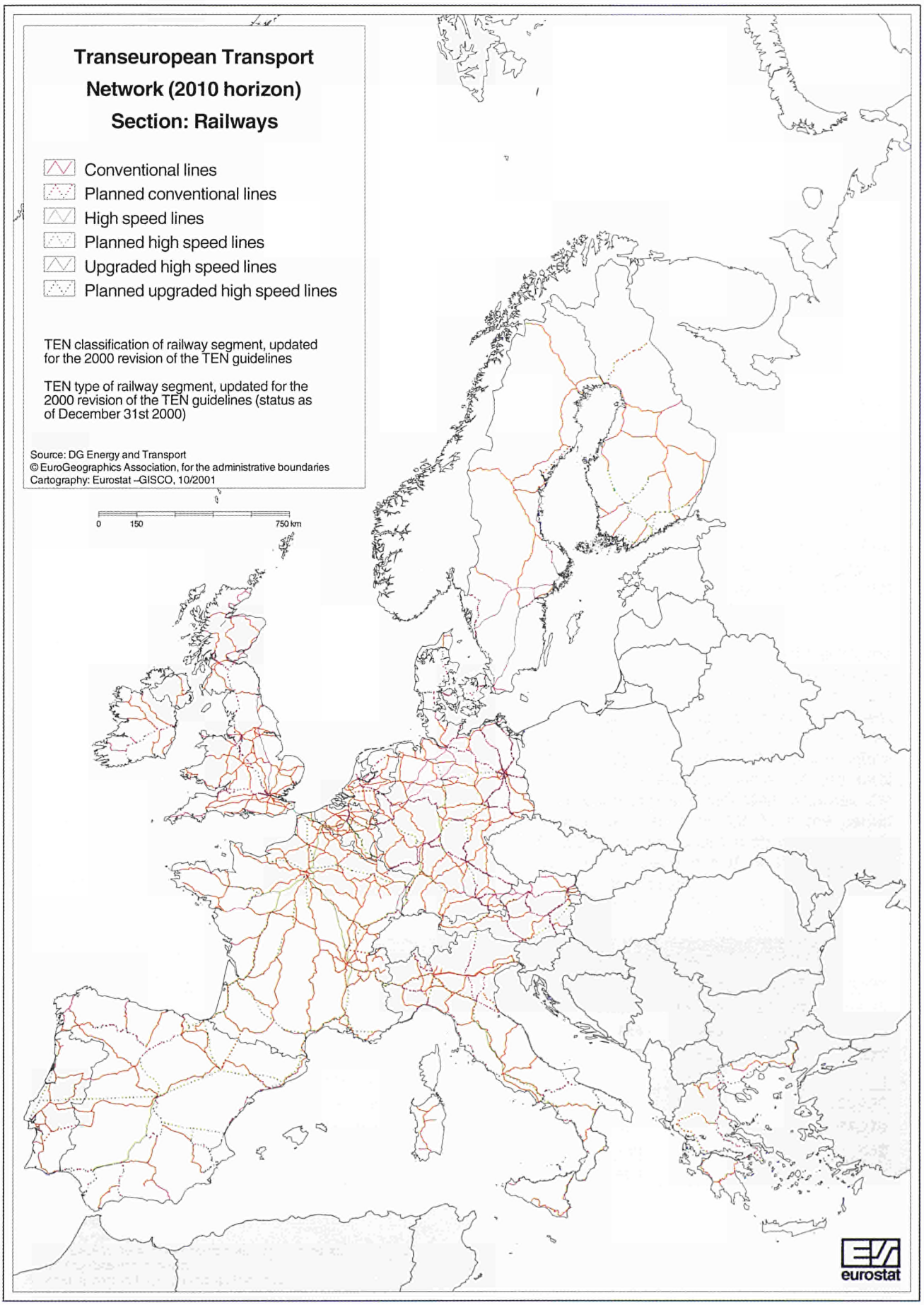
The 'Transport infrastructure needs assessment' (TINA) report (published in October 1999) completed the Commission's mission to identify the necessary components of a transport TEN in the 11 candidate countries. The report takes into account traffic forecasts, the development of the network over time and its changing technical features as well as existing and future capacity imbalances.

The estimated cost for the network in the candidate countries is established at EUR 92 billion, of which 40 % is attributed to measures in rail, 48 % in road and 2 % in inland waterway infrastructures. The remaining 10 % have been calculated for network nodes such as airports, river and seaports and other terminals.

TENs for transport: 14 priority projects

1. High-speed train: Paris-Brussels-Cologne-Amsterdam-London (PBCAL)
2. High-speed train/combined transport: north-south (Berlin-Brenner-Verona)
3. High-speed train: south from Madrid, two links northwards to join French high-speed network
4. High-speed train: Paris-eastern France-southern Germany (including Metz-Luxembourg branch)
5. Conventional rail/combined transport: 'Betuwe line' (linking Rotterdam with Rhein/Main-Rhein/Neckar centres)
6. High-speed train/combined transport: France-Italy (Lyon-Turin-Milan-Venice-Trieste)
7. Greek motorways: PATHE (north-south axis) and Via Egnatia (east-west axis)
8. Lisbon-Valladolid motorway
9. Conventional rail link: Cork-Dublin-Belfast-Larne-Stranraer (upgrading) - Completed
10. Malpensa airport, northern Italy (doubling of runway capacity, new terminal and cargo facilities) - Completed
11. Öresund fixed link (four-lane motorway and double-track rail line between Denmark and Sweden) including access routes - Completed
12. Nordic triangle (Copenhagen-Oslo/Stockholm-Helsinki: various road and rail projects)
13. Ireland-United Kingdom-Benelux road corridor
14. West coast main rail line - United Kingdom (upgrading)


Transeuropean Transport Network
Outline Plan (2010 horizon)
Section: Roads
Existing
Planned
TEN classification of road segment, updated for the 2000 revision of the TEN guidelines (status as of December 31st 2000)
Source: DG Energy and Transport
© EuroGeographics Association, for the administrative boundaries
Cartography: Eurostat –GISCO, 10/2001
0
150
750 km
eurostat


Transeuropean Transport Network (2010 horizon)
Section: Railways
Conventional lines
Planned conventional lines
High speed lines
Planned high speed lines
Upgraded high speed lines
Planned upgraded high speed lines
TEN classification of railway segment, updated for the 2000 revision of the TEN guidelines
TEN type of railway segment, updated for the 2000 revision of the TEN guidelines (status as of December 31st 2000)
Source: DG Energy and Transport
© EuroGeographics Association, for the administrative boundaries
Cartography: Eurostat –GISCO, 10/2001
0
150
750 km
eurostat

3. Means of transport

Transport equipment can roughly be defined as all means that enable the transport of goods and/or persons; thus not only passenger cars, buses, lorries, trains (composed of locomotive and wagons), inland waterway vessels and aircraft are meant here, but also road trailers and semi-trailers, rail goods vehicles, bicycles and powered two-wheelers.

In the frame of this chapter however, only the main transport equipment related to road, rail, inland waterways and air transport will be highlighted.

One in 10 jobs related to car industry

The European transport equipment industry is of considerable importance, both for intra- and extra-European trade: the automotive industry alone accounts for about 10 % of the total industrial value added. It is estimated that one out of every 10 EU-15 jobs is directly or indirectly linked to the automotive industries, and although the market for passenger cars and goods vehicles is sensitive to economic fluctuations, this industrial branch has kept its importance within the EU-15 economy.

Rail equipment successful outside the EU

By its excellent reputation with regard to know-how and applied technologies, the rail equipment industry scores very well in extra-EU export too.

With the privatisation process of formerly State-owned railway enterprises and the gradual introduction of European-wide high-speed train connections (see also Chapter 2.4 - Trans-European transport networks), the rail equipment industry faces new challenges.

Decrease in rail material less high than it appears

When considering the EU data relating to rail transport in Table 3.1, the considerable change in rail transport becomes obvious: at EU-15 level, all three categories considered here (locomotives, rail passenger vehicles and rail goods wagons) show a drop in number. Goods wagons are particularly affected.

Table 3.2 shows that all Member States, except Greece with a very modest relative increase, experienced very serious cuts in their stock of rail goods vehicles culminating in - 96 % for the UK. In the entire EU, 957 000 goods wagons were taken out of service between 1970 and 1998. A cautious interpretation of these figures is however requested: the decline of stock is overstated in an increasing number of Member States. In the frame of the railway privatisation process, a growing part of equipment is outsourced or leased. Since figures mostly refer to material owned by railway companies, leased or otherwise outsourced rolling stock does not appear in the statistics anymore.

Along with a higher share of electrified tracks, the stock of locomotives (defined as railway vehicles equipped with a prime mover and motor or with a motor only used for hauling railway vehicles) changed: in 1970, one third of EU-15 locomotives were powered by electricity; in 1996 this figure stood at 50 %. A general decline of the total number of locomotives is recorded: whereas the total number decreased by 12 % in the period 1970 to 1994, a very sharp drop in numbers is registered in the second half of the 1990s in nearly all Member States.

Table 3.1: Means of transport - key indicators EU-15

		1970	1980	1990	1995	1997	1998
Road	Cars (million)	60,78	102,61	142,77	159,06	165,26	168,98
	Buses and coaches (1 000)	332	444	484	486	506	510
	Goods vehicles [1] (1 000)	7 408	10 628	15 747	17 851	18 915	19 377
	Trailers and semi-trailers (1 000)	1 693	3 250	6 409	6 977	:	:
Rail	Locomotives (units)	46 958	48 038	43 989	41 383	*26 760*	*25 720*
	Passenger vehicles [2] (units)	96 797	95 858	86 326	80 183	*74 679*	*74 279*
	Goods transport wagons [3] (1 000)	1 508	1 221	839	661	*563*	*552*
IWW	Self-propelled goods vessels [4] (units)	30 483	21 714	16 999	15 721	*14 593*	*14 321*

[1] Lorries and tractors.
[2] Coaches, railcars and trailers.
[3] Data relate to main railway companies (UIC members).
[4] Including tugs and pushers.
Sources: Eurostat, IRF, UIC, national statistics.

Estimates in italic.

Table 3.2: Rail transport equipment

Stock of locomotives (units)	1970	1980	1990	1994	1997	1998
Belgium	1 536	1 794	1 727	1 607	950	942
Denmark	753	802	874	953	143	208
Germany	15 275	15 405	14 308	12 733	8 567	7 877
Greece	247	313	401	422	330	356
Spain	*1 700*	1 860	1 985	2 143	1 064	1 024
France	7 303	7 611	7 422	7 183	5 157	5 125
Ireland	307	192	166	253	113	110
Italy	4 179	5 506	*5 000*	*5 000*	3 109	3 041
Luxembourg	109	96	99	*116*	74	74
Netherlands	1 262	1 298	1 244	1 200	495	330
Austria	1 400	1 450	1 553	1 605	1 203	1 197
Portugal	450	523	548	577	296	288
Finland	1 100	1 020	800	765	645	641
Sweden	1 800	1 758	1 304	1 056	614	607
United Kingdom	9 537	8 410	6 558	5 770	*4 000*	*3 900*
EU-15	*46 958*	48 038	*43 989*	*41 383*	*26 760*	*25 720*
Index 1970 = 100	100	102	94	88	57	55

Goods transport rail wagons (1 000)	1970	1980	1990	1994	1997	1998
Belgium	48.9	43.4	30.3	20.0	18.9	19.1
Denmark	10.3	8.3	4.6	4.2	3.2	3.2
Germany	459.0	476.4	366.7	271.5	224.1	224.0
Greece	9.0	10.9	11.0	11.1	8.6	*8.5*
Spain	41.0	41.0	37.2	33.0	28.5	26.5
France	302.4	253.1	162.0	135.1	123.7	117.2
Ireland	9.5	4.7	1.8	1.8	1.8	1.8
Italy	125.9	113.4	99.7	90.0	76.7	76.0
Luxembourg	4.2	3.7	2.7	2.6	2.3	2.3
Netherlands	19.2	12.3	6.7	6.0	4.7	*4.6*
Austria	34.9	38.7	34.3	31.9	20.2	19.3
Portugal	9.0	6.7	4.6	4.4	4.5	4.6
Finland	21.9	21.5	15.2	14.0	13.7	13.1
Sweden	48.2	45.9	27.5	20.7	17.9	17.2
United Kingdom	364.9	141.2	34.4	14.2	*14.0*	*14.0*
EU-15	1 508	1 221	839	661	*563*	*552*
Index 1970 = 100	100	81	56	44	37	37

Passenger rail transport wagons (units)	1970	1980	1990	1994	1997	1998
Belgium	3 415	3 641	3 286	3 109	3 430	3 389
Denmark	1 481	1 613	1 594	1 623	1 375	*1 375*
Germany	31 506	29 118	24 139	19 616	18 548	18 128
Greece	574	660	810	861	787	*787*
Spain	3 353	3 506	3 839	4 193	4 079	3 813
France	15 053	15 922	15 748	15 589	15 746	15 830
Ireland	481	343	314	318	347	*347*
Italy	11 357	13 611	14 025	13 744	12 273	12 213
Luxembourg	114	102	114	146	146	*146*
Netherlands	1 932	1 986	2 268	2 631	2 688	2 723
Austria	4 125	4 055	3 689	3 779	3 315	3 583
Portugal	980	1 143	1 232	1 346	1 367	1 406
Finland	1 043	1 095	957	968	959	968
Sweden	2 705	2 021	1 747	1 623	1 619	1 571
United Kingdom	18 678	17 042	12 564	10 637	*8 000*	*8 000*
EU-15	96 797	95 858	86 326	80 183	*74 679*	*74 279*
Index 1970 = 100	100	99	89	83	77	77

NB: Figures relate to UIC member companies only.
Sources: Eurostat, UIC, UN-ECE, national statistics.

Estimates in italic.

The number of locomotives at EU level in 1998 was less than half of that in 1970. The largest reduction in stock compared to 1970 was registered in the Netherlands (- 74 %) and Denmark (- 72 %), followed by Sweden (- 41 %).

However, a large part of the decrease in the last few years can be attributed to the aforementioned outsourcing of equipment.

In 1998, 74 279 rail passenger vehicles were available in the EU-15: a 23 % drop compared to 1970, but a steady decline compared to the other rail material categories. The total number of rail passenger transport vehicles taken off the tracks between 1970 and 1998 corresponds to the 1998 stock of these vehicles in the Benelux countries and France together.

A clear increase in the number of rail passenger transport vehicles can be registered in six Member States: highest growth in relative terms can be found for Portugal (+ 43 %) and the Netherlands (+ 41 %), followed by Greece (+ 37 %).

Nearly 170 million passenger cars on EU-15 roads

The constantly growing demand for personal mobility has mostly been met by an important increase in the number of passenger cars; increased demand for goods transport mainly by an important growth in the number of lorries, road tractors, trailers and semi-trailers.

In 1998, 169 million passenger cars were on the EU-15 roads, an impressive 178 % growth in less than three decades (annual growth rate: 3.7 %).

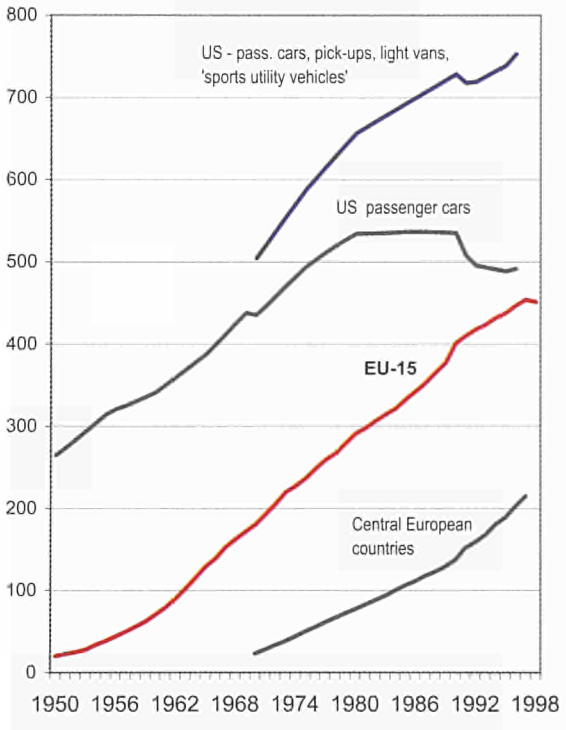
Graph 3.3 gives an overview of the development of the level of motorisation in the EU, the United States and the central European countries. Car density in the EU doubled in the last 25 years and reached 451 units per 1 000 inhabitants in 1998.

Unsurprisingly, average annual growth rates of the number of cars registered between 1970 and 1998 were highest in Greece (+ 9.2 %), Portugal (+ 7.5 %) and Spain (+ 7.1 %). The lowest rates were registered for Sweden (+ 1.8 %) and Denmark (+ 1.9 %). In 1996, three Member States had a car-density higher than the US average: Germany, Italy and Luxembourg (with 500, 531 and 558 cars per 1 000 inhabitants respectively). However, the US figure (491) only take into account the category 'passenger cars'; the impressive number of pick-up trucks, light vans and 'sports utility vehicles' used for private transportation (like passenger cars) are not included since they often constitute a statistical subcategory of 'commercial vehicles'. The level of motorisation in the United States is thus far higher. This is expressed in the upper curve of Graph 3.3, where all two-axle, four-tyre vehicles are taken into account, except those specifically declared as lorries.

The stock of buses and coaches expectedly progressed less than private cars, however, a 54 % increase at EU-15 level is registered for the period 1970-98.

Mainly the first decade of the observation period saw impressive developments. Between 1970 and 1998, only Belgium (- 9.7 %) registered a negative development. Quite to the contrary, spectacular increases can be noticed in Ireland (+ 199 %), Portugal (+ 189 %) and Denmark (+ 176 %). It should be noted that these figures include buses used in urban common transport.

Graph 3.3: Motorisation - cars per 1 000 inhabitantts



NB: United States - some of the pick-ups and light vans, etc. are used for commercial purpose.

Source: Energy and Transport DG.

Lorries 'compensate' rail goods wagons

Goods road vehicles have obviously been compensating the considerable reduction of rail goods wagons: their number rose by 162 % between 1970 and 1998. Goods road vehicles as mentioned in Table 3.4 include lorries, road tractors (only capable of goods haulage when a semi-trailer is attached) and sometimes vans and pick-ups. The fact that certain countries include vans makes comparison between Member States somewhat problematic.

Table 3.4: Road transport equipment

Passenger cars (million)	1970	1980	1990	1995	1997	1998	Cars per 1 000 inhab. 1998
Belgium	2.06	3.16	3.86	4.27	4.42	4.49	440
Denmark	1.08	1.39	1.59	1.67	1.78	1.82	343
Germany	15.11	25.87	35.50	40.40	41.37	41.67	508
Greece	0.23	0.86	1.74	2.20	2.50	2.68	254
Spain	2.38	7.56	12.00	14.21	15.30	16.05	408
France	11.90	18.40	23.60	25.10	26.09	26.81	456
Ireland	0.39	0.74	0.80	0.96	1.13	1.15	309
Italy	10.18	17.69	27.42	31.70	30.74	31.37	545
Luxembourg	0.07	0.13	0.18	0.23	0.24	0.24	572
Netherlands	2.56	4.55	5.51	5.63	5.81	5.90	376
Austria	1.20	2.25	2.99	3.59	3.78	3.89	481
Portugal	0.42	0.92	1.85	2.56	2.95	3.20	321
Finland	0.71	1.23	1.94	1.90	1.95	2.02	392
Sweden	2.29	2.88	3.60	3.63	3.70	3.79	428
United Kingdom [1]	11.90	15.60	20.70	21.90	23.50	23.90	404
EU-15	62.48	103.22	143.27	159.96	165.26	168.98	451
Index 1970 = 100	100	165	229	256	265	270	245

Buses and coaches (1 000)	1970	1980	1990	1995	1997	1998
Belgium	16.2	19.6	15.6	14.6	14.7	14.6
Denmark	5.0	7.4	8.1	13.5	13.8	13.9
Germany	63.9	95.8	100.4	86.3	84.0	83.3
Greece	10.5	18.0	21.4	24.6	25.6	26.3
Spain	30.7	42.6	45.8	47.4	50.0	51.8
France	41.0	65.0	75.0	80.0	82.0	82.0
Ireland	2.0	2.7	4.0	5.3	5.8	6.0
Italy	32.9	58.1	77.7	75.0	84.2	84.8
Luxembourg	0.6	0.6	0.8	0.8	0.9	0.9
Netherlands	9.5	11.2	12.1	11.5	11.2	10.8
Austria	6.8	9.0	9.4	9.8	9.7	9.7
Portugal	5.9	8.5	12.1	15.0	16.4	*17.0*
Finland	8.1	9.0	9.3	8.1	8.5	9.0
Sweden	14.3	12.8	14.6	14.6	14.8	14.8
United Kingdom [1]	84.2	83.3	78.0	80.0	84.0	85.1
EU-15	332	444	484	486	506	510
Index 1970 = 100	100	134	146	147	152	154

Goods vehicles (lorries and road tractors) [2] (1 000)	1970	1980	1990	1995	1997	1998
Belgium	212	268	343	402	435	453
Denmark	245	249	287	333	336	347
Germany	1 188	1 511	1 653	2 215	2 315	2 371
Greece	105	401	743	884	952	987
Spain	710	1 388	2 333	2 937	3 206	3 393
France	1 504	2 515	3 568	3 597	3 453	3 400
Ireland	49	65	143	142	158	170
Italy	877	1 338	2 349	2 430	*2 763*	2 816
Luxembourg	9	9	11	15	16	17
Netherlands	286	314	507	578	635	650
Austria	121	184	253	290	301	310
Portugal	100	230	555	866	*1 050*	*1 080*
Finland	108	146	264	272	267	281
Sweden	145	182	310	308	321	338
United Kingdom [1]	1 749	1 828	2 428	2 582	2 707	2 764
EU-15	7 408	10 628	15 747	17 851	18 915	19 377
Index 1970 = 100	100	143	213	241	255	262

This aspect plays when looking at Graph 3.5: it appears to be remarkable that the number of road tractors is that low. Only 4.1 % of all goods road vehicles in EU-15 (excluding Ireland and Italy) consist of road tractors: a figure that does not match the picture one has in mind while on the road. The reason can be found in the fact that approximately 70 % of the goods vehicles have a carrying capacity of 'less than 1.5 tonnes': this class corresponds to relatively small 'light duty' vehicles (often vans), leaving a much less 'obstructive' impression on the road.

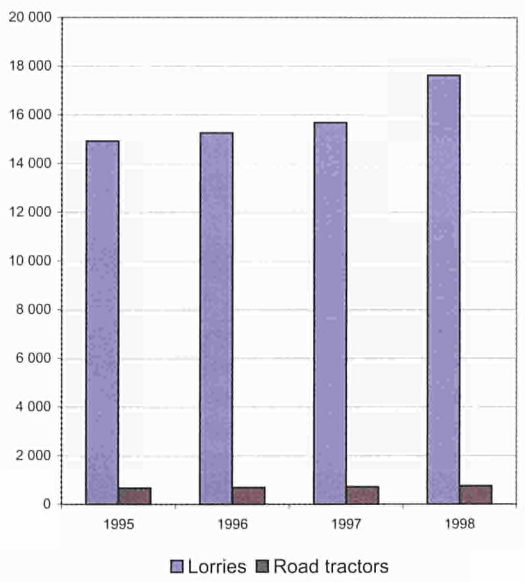
Table 3.4: (continued) Road transport equipment

Number of trailers and semi-trailers [3] (1 000)	1970	1980	1990	1995	1997	1998
Belgium	25	51	95	126	:	:
Denmark	35	128	318	436	465	:
Germany	1070	1905	3565	3139	3252	3371
Greece	2	5	9	12	13	13
Spain	18	48	106	168	182	201
France	81	156	165	182	181	:
Ireland	9	12	19	17	:	:
Italy	104	264	600	840	:	:
Luxembourg	6	12	9	6	:	:
Netherlands	33	68	140	190	:	:
Austria	24	50	296	423	444	466
Portugal	31	72	160	290	303	317
Finland	10	23	345	434	453	477
Sweden	85	252	348	481	490	502
United Kingdom [1]	160	204	234	233	235	:
EU-15	1 693	3 250	6 409	6 977	:	:
Index 1970=100	100	192	379	412	:	:

[1] Data refer to Great Britain only.
[2] Difference in definition between countries: some countries include vans - therefore limited comparability.
[3] Difference in definition between countries: data for some countries include small trailers - therefore limited comparability.
Sources: Energy and Transport DG, Eurostat/ECMT/UN-ECE, IRF, national statistics.

Estimates in italic.

Graph 3.5: Lorries and road tractors in selected Member States [1] (1 000)



[1] Denmark, Germany, Greece, France, Austria, Finland, Sweden, UK.
Source: Eurostat.

The interest of semi-trailers

Road tractors alone will not carry goods: semi-trailers will be attached to them. The number and size of semi-trailers gets more attention when considering their potential in combined (road-rail) transport.

Not all Member States are able to give a complete breakdown of the various trailer categories; however the number of semi-trailers registered in 9 Member States (Denmark, Germany, Greece, Spain, France, Austria, Finland Sweden and the UK) increased by more than 26 % between 1995 and 1998 (1998: 902 667 units).

Table 3.4 also offers an overview of the number of trailers (coupled to lorries) and semi-trailers together. In 1998, their number exceeded 7 million at EU-level. Depending on the vehicle registers in the various countries, light trailers with a load capacity of 'up to 4 999 kg' often have a substantial share. They may include very light trailers, often registered for private use.

50 % of the inland vessels disappeared

In 1998, EU-15 only offered less than half the amount of vessels than it did in 1970 (see Table 3.6). Various scrappage schemes in individual Member States have contributed to this important decrease. Nevertheless, the 1998 fleet offered roughly the same transport performance than in 1970. The improvement of transport efficiency in this domain is thus quite remarkable.

While the number of vessels increased in Luxembourg and Finland, the fleet decreased sharply in the other Member States offering substantial goods transport on navigable inland waterways. More than 16 000 vessels have been taken off the transport market. Vessels concerned were often of the smaller category, unable to operate economically.

Highest reductions in the number of vessels can be observed for Belgium and France (- 75 %), as well as for Germany (- 45 %).

The number of dumb and pushed barges has experienced a similar drop between 1970 and 1998: their number was cut by 50 %; only Italy managed to keep its fleet.

Highest share of 51-150 seat passenger aircraft

Table 3.7 offers an overview of the civil aircraft fleet in the various Member States. The information presented shows the fleet 'by operating country'. Nearly all aircraft operated in the country are also registered in that country, some of them could however carry a foreign registration. This is, for instance, the case if aircraft are temporary leased out to a different company. Some 73 % of the entire fleet consist of passenger aircraft. Aircraft with a seating capacity of 51 to 150 clearly dominate the EU-15 fleet (37 % of all passenger aircraft, 27.6 % of the entire fleet).

More than 15 % of all civil aircraft are so-called business aircraft (767 units at EU-15 level). This category includes privately or company-owned planes but also airtaxis. The majority of these planes have a capacity of less then 20 seats. The 'special purpose/ambulance' category (123 units) includes aircraft used for training, geo-survey and mapping, weather and atmospheric survey as well as surveillance and patrol.

It should be noted that 'combi-aircraft' (defined as 'passenger aircraft with enhanced capabilities for the carriage of freight on the passenger deck') have been included in the passenger aircraft categories according to their seat capacity.

'Quick-change convertible (passenger/ cargo)' aircraft are designed to allow a quick change of configuration from passenger to cargo and vice versa. Although their number is limited, one should be aware that this category includes both small (with a seat capacity of 10 to 20 passengers) and large aircraft (like a Boeing 747 with more than 500 seats). Such aircraft types are often used for night-time postal flights and day-time passengers flights.

Some 7 % of aircraft fleet for cargo transport

Some 7 % of the entire fleet consists of dedicated cargo aircraft. Table 3.7 details two categories: up to 100 000 lbs (= 45 359 kg) of maximum take-off weight (MTOW) and over 100 000 lbs MTOW. The cargo version of a propeller driven Fokker F27 for instance has a MTOW of 45 000 lbs, an Airbus A300 (version B4-100F) 348 000 lbs and a Boeing 747 (version 400F) 875 000 lbs.

Table 3.6: Inland waterway transport equipment

	Self-propelled goods vessels, tugs and pushers (units)						Dumb and pushed barges (units)					
	1970	1980	1990	1994	1997	1998	1970	1980	1990	1994	1997	1998
Belgium	5 092	3 107	1 871	1 650	1 264	1 250	455	190	164	170	157	150
Denmark	-	-	-	-	-	-	-	-	-	-	-	-
Germany[1]	6 038	4 464	3 230	3 018	3 425	3 294	2 200	1 732	1 566	1 313	1 273	1230
Greece	-	-	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	-	-	-	-	-	-
France	5 790	4 254	2 514	1 803	1 479	1 443	1 591	1 211	768	775	694	695
Ireland	-	-	-	-	-	-	-	-	-	-	-	-
Italy	3 124	2 347	2 755	2 853	2 830	2 800	393	217	372	390	390	390
Luxembourg	17	18	25	44	45	45	0	0	0	0	0	0
Netherlands	9 885	6 966	6 011	5 750	5 067	5 000	1 523	925	937	900	920	920
Austria	57	64	61	40	42	44	225	150	171	130	141	141
Portugal	-	-	-	-	-	-	-	-	-	-	-	-
Finland[2]	90	113	136	160	164	168	70	57	23	23	23	28
Sweden	-	-	-	-	-	-	-	-	-	-	-	-
United Kingdom	390	381	396	403	277	277	1 610	1 228	411	427	361	361
EU-15	30 483	21 714	16 999	15 721	14 593	14 321	8 067	5 710	4 412	4 128	3 959	3915
Index 1970=100	100	71	56	52	48	47	100	71	55	51	49	49

[1] Including former GDR for 1970-90 data. [2] Including passenger vessels.

Source: Eurostat/ECMT/UN-ECE.

Table 3.7: EU-15 Airfleet[1] by operator country - Number of aircraft types in service in mid-2000

Aircraft type/usage	B	DK[2]	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S[2]	UK	EU-15	% of EU-15 fleet
Business/corporate/executive	14	33	180	9	42	94	6	81	12	20	43	29	11	34	159	767	15.5
Freight/cargo - under 100 000 lbs Maximum take-off weight	10	2	31	3	42	7	0	14	0	4	1	2	0	13	30	159	3.2
Freight/cargo - over 100 000 lbs Maximum take-off weight	40	14	23	0	10	18	10	4	17	10	3	0	0	0	37	186	3.8
Quick-change convertible (pass./ cargo)/multi-role	1	7	12	0	13	22	0	0	2	6	2	1	1	12	26	105	2.1
Special purpose/ambulance	1	2	17	0	5	35	2	4	0	3	5	1	2	6	40	123	2.5
Passenger 50 seats or less	12	44	127	18	40	169	8	70	16	41	38	12	7	69	145	816	16.5
Passenger 51 to 150 seats	76	56	212	50	148	133	53	122	2	59	34	31	45	64	278	1 363	27.6
Passenger 151 to 250 seats	25	17	176	9	138	128	24	111	3	40	15	16	15	14	190	921	18.6
Passenger 251 seats and more	14	7	83	7	24	77	7	27	0	48	10	7	4	4	186	505	10.2
Total aircraft	193	182	861	96	462	683	110	433	52	231	151	99	85	216	1 091	4 945	100

[1] All military aircrafts excluded. [2] Includes those SAS passenger aircraft registered in Denmark and Sweden respectively, for which the operator country is 'multinational'. *Source:* Airclaims CASE2 database.

4. Enterprises, economic performance and employment

4.1. Enterprises and employment

The evolution of the transport sector is highly influenced by general economic activity. There is indeed a close inter-relation between the transport sector and the other sectors of the economy: the other sectors need an efficient transport sector to develop and the transport sector is dependent on the other sectors' activity.

Land transport: 7 % of the EU labour force

The importance of the transport branch in the EU economy is best illustrated by the number of jobs it is generating: according to the latest available labour force survey results, about 6.3 million persons are employed in the transport sector at Community level. This includes the following four categories: land transport (freight and passenger transport via railways, by road and via pipelines), water transport (both maritime and inland waterway transport), air transport and supporting and auxiliary transport activities.

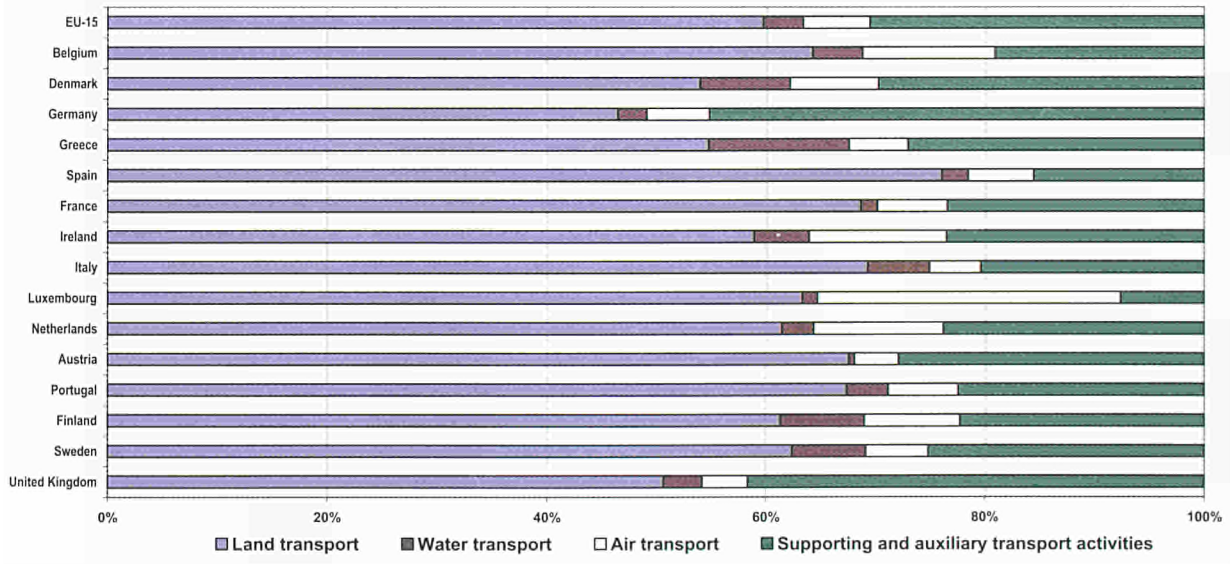
Graph 4.1 shows the relative share in employment of the individual four transport categories. In all Member States but Germany, the share of land transport is higher than 50 %. The EU average can be established at just under 60 %. Germany and the UK have a noticeable high share in 'supporting and auxiliary transport activities', consisting of cargo handling, storage and warehousing, other supporting transport activities and activities of travel and transport agencies as well as tour operators.

In most countries, land transport takes a dominant position, as it employs over 7 % of the EU labour force. Within the land transport category, nearly all enterprises belong to road transport. In terms of activity (turnover), road transport takes a share of 84 % in land transport at Community level and employs 73 % of its workers.

High rate of self-employment in inland waterway transport

The employment share in water transport is particularly low in Luxembourg and Austria, countries that do not dispose of access to open seas. The employment in these Member States can largely be attributed to inland waterway transport activities only. On the contrary, water transport marks high shares in figures for Greece and Denmark, and to a lesser extent Finland and Sweden. The geographical features of these countries, some with a considerable amount of islands, explain this relatively high employment.

Graph 4.1: Share of persons employed in various transport activities (NACE 60-63) - 2nd quarter 1999



Source: Eurostat (LFS).

From the data available (Table 4.2), it appears that a high proportion of the enterprises are of the smallest category (1-49 persons), an indication for an important rate of self-employment, typical for inland waterway transport.

Steady growth in air transport employment

Employment in the air transport sector has been increasing considerably over the last decade. Among the four categories displayed in Graph 4.1, it appears that at Community level, the average employment share of air transport can be established at 6 % (1999). One Member State clearly stands out: Luxembourg shows a share of over 27 %, largely explained by the presence of two airlines (of which one is a major all-cargo airline). In a geographically small country, this has an important impact on the distribution of shares.

Low infrastructure costs for road transport enterprises

As can be seen in Table 4.2, the number of land transport enterprises is by far the highest in all countries for which data are available. Road transport enterprises account for a very large part in this category. The companies are fairly small and the costs for the infrastructure are relatively low. Railway and pipeline enterprises are far lower in number as a result of the high infrastructure costs and the limited liberalisation of the railway transport sector.

Over-average share in auxiliary activities for Germany

'Supporting and auxiliary transport activities' display the second highest employment figures within the four categories considered. As mentioned earlier, Germany excels here with a share of 45 %. Only the United Kingdom comes close (41 %); all other Member States display far lower shares, most of them within the 20 to 30 % range. Spain and Luxembourg are lowest with a share of 15 % and 8 % respectively.

Table 4.2: Number of enterprises by employment sizeclass in 1997

	Total land transport (incl. pipelines)				Railways				Road transport			
	1 - 49	50 - 249	250>	Total	1 - 49	50 - 249	250>	Total	1 - 49	50 - 249	250>	Total
Belgium	:	:	:	:	:	:	:	:	:	:	:	:
Denmark	:	:	:	:	:	:	:	21	567	37	1	605
Germany	:	:	:	:	:	:	:	:	:	:	:	:
Greece	:	:	:	:	:	:	:	:	:	:	:	:
Spain	:	:	:	203 351	:	:	:	6	:	:	:	203 340
France	78 436	1 118	132	79 686	26	4	2	32	78 361	1 113	129	79 603
Ireland	2 562	:	:	2 577	240	:	:	:	:	:	:	:
Italy	138 480	410	120	139 010	:	:	26	152[3]	138 395	386	94	138 875
Luxembourg	:	:	:	578	:	:	:	:	:	:	:	577
Netherlands	10 915	:	:	11 350	:	:	:	5	10 910	:	:	11 345
Austria	8 875	170	14	9 059	3	6	2	11	8 871	163	12	9 046
Portugal	:	121	:	16 907	:	0	:	:	:	121	:	:
Finland	20 242	60	13	20 315	2	0	1	3	20 239	60	12	20 311
Sweden	26 466	114	11	26 591	19	1	0	20	26 444	113	11	26 568
United Kingdom	:	:	:	47 031	:	:	:	107	:	:	:	46 913

	Water transport (maritime and inland waterway)				Air transport				Supporting and auxiliary transport activities			
	1 - 49	50 - 249	250>	Total	1 - 49	50 - 249	250>	Total	1 - 49	50 - 249	250>	Total
Belgium	:	:	:	:	:	:	:	:	:	:	:	:
Denmark	:	:	:	:	:	:	:	178	:	:	:	:
Germany	:	:	:	:	:	:	:	303	:	:	:	:
Greece	:	:	:	:	:	:	:	:	:	:	:	:
Spain	:	:	:	41	:	:	:	24	:	:	:	16 887
France	1 879	26	9	1 914	481	42	15	538	9 301	504	131	9 936
Ireland	:	:	:	45	:	:	:	34	785	:	:	813
Italy	831	62	15	908	73	:	:	89	19 319	487	79	19 885
Luxembourg	:	:	:	23	:	:	:	2	:	:	:	174
Netherlands	4 530	:	:	4 580	130[1]	:	:	140[1]	4 970	:	:	5 175
Austria	74	1	0	75	76	2	3	81	1 904	85	19	2 008
Portugal	:	:	:	97	:	0	:	25	:	50	:	2 387
Finland	269	13	6	288	61	1	1	63	1 400	57	11	1 468
Sweden	636	25	10	671	164	4	3	171	3 361	76	22	3 459
United Kingdom	:	:	:	1 193	:	:	:	871	:	:	:	16 817

[1] 1998; [2] 1996; [3] 1995
Source: Eurostat (SBS).

Table 4.3 displays the number of persons employed by sizeclass in 1997. Eurostat's Structural Business Statistics Unit established the average number of persons employed in road transport enterprises at 3.3 (calculated from available data), an indicator for a high proportion of small and medium sized enterprises (SMEs). If the land transport sector is taken as a whole, this figure sums up to 6.1 because of the concentration of the railways sector, where an average railway enterprise in the EU employed 2 200 persons (1995).

Low female employment in seafaring nations

Graph 4.4 gives an insight of the distribution of employment by sex in the four categories considered. It appears that land transport, largely consisting of road transport, is dominated by male employment. At EU level, 12 % of the employment is taken up by women, the two extremes consisting of Greece and Denmark with 3 % and 19 % female employment respectively.

Female employment in water transport amounts to 18 % in Community average. The two countries with the highest female employment are Luxembourg and particularly Austria, countries that only dispose of inland waterways and are without doubt influenced by a relatively high degree of family businesses. It should however be remembered that in Austria and Luxembourg, the total water transport employment is limited to 258 and 66 jobs respectively.

Another notable high share of female employment in water transport is registered in Finland. In countries with important maritime shipping activities like Greece, Spain, Italy and the United Kingdom, the share in male employment is far higher.

Table 4.3: Number of persons employed by sizeclass in 1997

	Total land transport (incl. pipelines)				Railway				Road transport			
	1 - 49	50 - 249	250 >	Total	1 - 49	50 - 249	250 >	Total	1 - 49	50 - 249	250 >	Total
Belgium	51 446	10 864[3]	:	122 163	:	0[3]	:	40 650[1]	51 418	10 864	:	81 632
Denmark	:	:	:	:	:	:	:	12 411	13 248[3]	:	:	:
Germany	:	:	:	:	:	:	:	:	:	:	:	:
Greece	:	:	:	:	:	:	:	:	:	:	:	:
Spain	:	:	:	40 507[1]	:	:	:	41 314	:	:	:	:
France	254 975	102 333	280 389	637 697	:	:	:	186 793[4]	:	101 476	:	452 033
Ireland	10 229	:	:	21 520	:	:	:	:	:	:	:	:
Italy	285 264[2]	40 887[2]	233 614[2]	559 765[2]	1 064[3]	2 514[3]	144 027[2]	162 800[3]	284 407[2]	37 877[2]	89 587[2]	411 871[2]
Luxembourg	:	:	:	8 952[2]	:	:	:	3 229	:	:	:	5 723
Netherlands	:	:	:	184 036[1]	:	:	:	27 050[4]	:	:	:	151 840[5, 6]
Austria	50 989	15 743	72 378	139 110	:	:	:	62 840[3]	:	:	:	81 227
Portugal	:	11 460	:	94 184	:	0	:	:	:	11 460	:	:
Finland	41 475[1]	6 010	17 752[1]	62 961	:	0	:	:	:	6 010	:	52 555
Sweden	52 287[2]	10 020[2]	20 731[2]	83 038[2]	:	:	:	136[2]	:	:	20 731[2]	82 901[2]
United Kingdom	:	:	:	455 872[6]	:	:	:	34 334[6]	:	:	:	421 258

	Water transport (maritime and inland waterway)				Air transport				Supporting and auxiliary transport activities			
	1 - 49	50 - 249	250 >	Total	1 - 49	50 - 249	250 >	Total	1 - 49	50 - 249	250 >	Total
Belgium	1 126	:	:	2 248	264	188[2]	:	12 041	15 851	12 003	11 601	39 455
Denmark	:	:	:		:	:	:	9 853	:	:	:	:
Germany	:	:	:		:	:	:	46 600	:	:	:	:
Greece	:	:	:		:	:	:	:	:	:	:	:
Spain	:	:	:	2 723	:	:	:	31 682	:	:	:	34 216[1]
France	3 970	2 918	8 520	15 408	1 305	2 238	56 140	59 683	57 055	56 555	112 622	226 232
Ireland	:	:	:	1 666	:	:	:	6 215	6 607	1 927	3 479	12 013
Italy	3 030[2]	7 375[2]	11 873[2]	22 278[2]	774[2]	:	:	19 693[2]	89 139[2]	47 591[2]	55 725[2]	192 455[2]
Luxembourg	:	:	:	66[3]	:	:	:	1 833[3]	:	:	:	1 594[3]
Netherlands	:	:	:	15 198	:	:	:	29 000[4]	:	:	:	74 273
Austria	:	:	0	258	182[1]	:	:	6 807	10 898	:	:	32 077
Portugal	:	:	:	2 138	:	:	0	9 723	:	5 084	:	26 888
Finland	966	1 516	:	8 162[1]	:	:	:	9 291[1]	6 304	6 110	7 687	20 101
Sweden	:	2 723[2]	:	12 982[2]	:	:	:	12 793	11 323[2]	8 036[2]	15 101[2]	34 460[2]
United Kingdom	:	:	:	20 077	:	:	:	73 473	:	:	:	338 128

[1] 1998. [2] 1996. [3] 1995. [4] 1994. [5] 1993. [6] Employees.
Source: Eurostat (SBS).

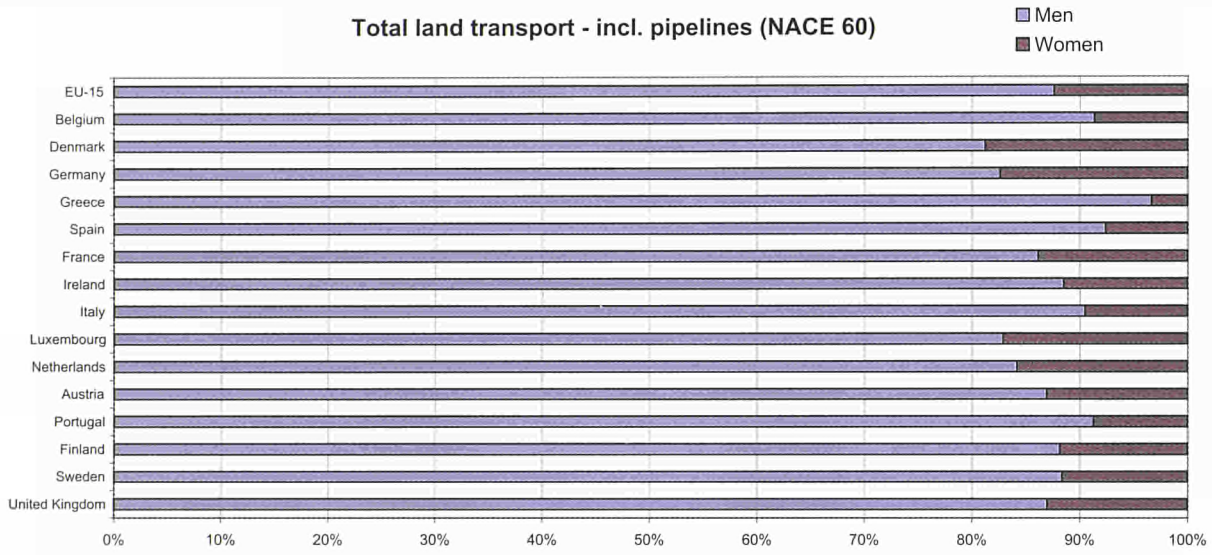
Air transport: minority of men in only one country

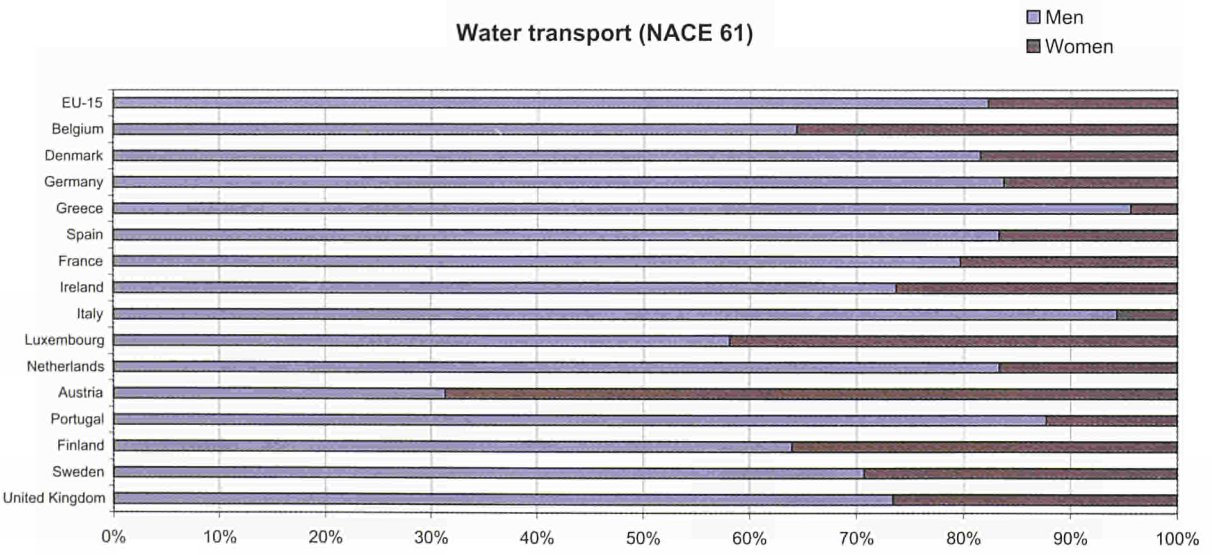
In air transport employment, Ireland is the only Member State where men constitute a minority. Female employment is approaching 40 % at EU-15 level, the branch with the highest share.

Auxiliary activities heterogeneous

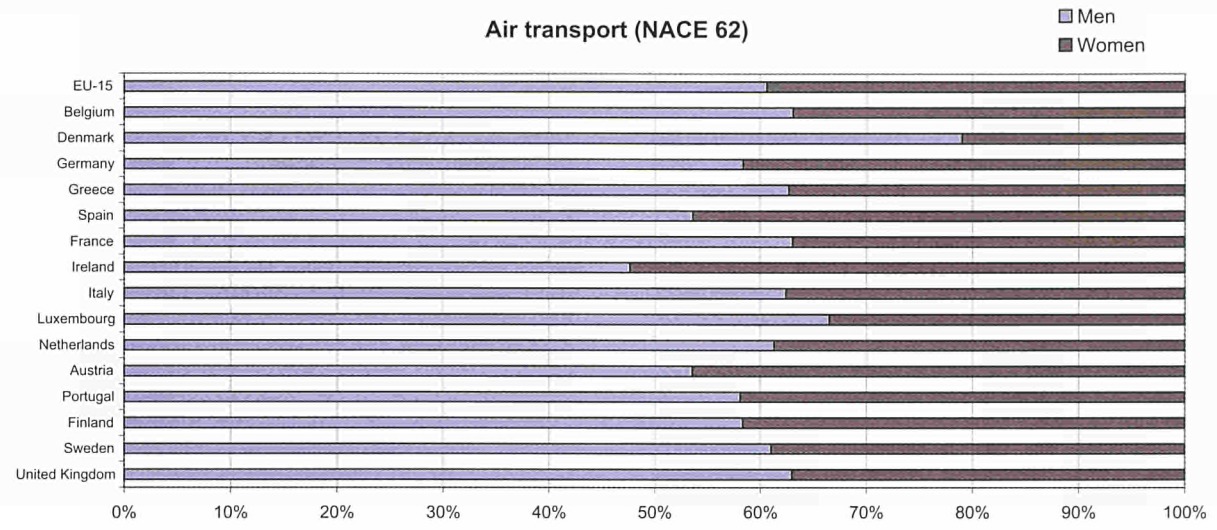
Supporting and auxiliary transport activities incorporate quite heterogeneous activities like cargo handling, storage and warehousing but also supporting activities relating to land, water and air transport as well as employment in travel agencies and the like. The EU-15 average of female employment could be established at 32 %. The majority of the Member States oscillate around this average, with the exception of Luxembourg, Ireland and Portugal, with a share of slightly over 40 %.

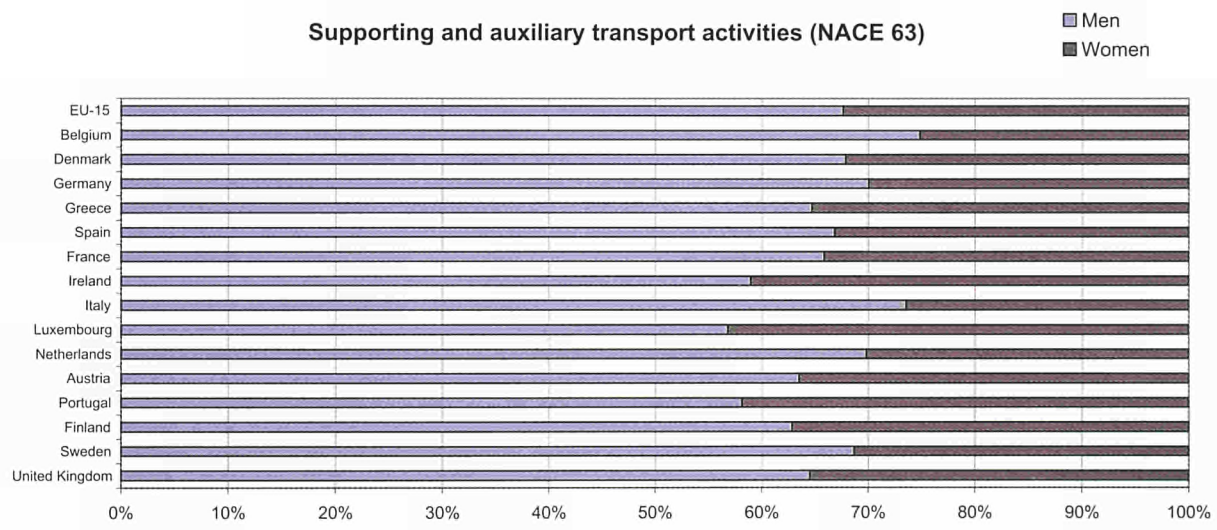
Graph 4.4 : Share of sexes in persons employed, by NACE classification 2nd quarter 1999





Graph 4.4: (continued) Share of sexes in persons employed, by NACE classification 2nd quarter 1999





Source: Eurostat (LFS)

4.2 Economic performance

Transport activities are important contributors to wealth creation. National accounts indicate that in 1997, they generated between 3 % (in Greece and France) and over 6 % (in Denmark and Belgium) of the gross domestic product (GDP).

There are various ways to express the economic performance of an economic sector. In the case of the transport sector, composed of various subsectors, the choice is limited to those indicators for which disaggregated data are available. Thus, in the frame of this chapter, data on turnover, value added and investment will be highlighted.

Table 4.5 offers details on turnover per activity for the individual Member States - as far as those are available. Expressed in million ECU, total land transport (transport via rail, road and pipelines) and auxiliary transport activities roughly offer similar turnover figures.

ECU 15 140 million and ECU 12 160 million respectively. Turnover figures of auxiliary transport activities often come close to those of total land transport. They exceed them by a large margin in Belgium, Spain, and Ireland.

Table 4.6 gives an overview of the value added by activity. Here it appears that land transport generally offers the highest figures among the various categories.

Both tables should thus be seen in the light of the number of jobs the various categories create. As mentioned in the previous chapter, the employment in the auxiliary transport activities branch is much lower than in the land transport category, although turnover figures are often similar.

Table 4.5: Turnover by activity in 1997 - in million ECU

	Total land transport (incl. pipel.)	Rail transport	Road transport	Water transp. (marit. + iww.)	Air transport	Auxiliary transport activities
EU-15	:	:	:	:	:	
Belgium	8 582	1 494[1]	7 165	1 900	2 747	11 797
Denmark	:	1 848	:	:	2 073	:
Germany	:	:	:	:	15 140	:
Greece	:	:	:	:	:	:
Spain	:	1 561	:	317[1]	4 782	8 557[1]
France	44 460	8 250[4]	32 063[2]	4 611	12 160	39 992
Ireland	1 253	:	:	305	1 372	2 332
Italy	34 257[2]	4 618[3]	28 979[2]	3 949[2]	5 157[2]	26 984[2]
Luxembourg	736[2]	218[2]	517[2]	6[3]	473[3]	479[3]
Netherlands	10 583[3]	1 103[4]	9 726	4 075	4 726[4]	8 273
Austria	7 022	2 085[3]	5 306	74	1 704	8 847
Portugal	4 187	:	:	418	1 106	3 979
Finland	4 999[1]	:	4 403[1]	1 949[1]	1 339[1]	4 475[1]
Sweden	10 728	52[2]	9 413[2]	3 274	2 495	13 144
United Kingdom	40 786	6 614	34 114	5 607	20 999	47 664

[1] 1998. [2] 1996. [3] 1995. [4] 1994.
Source: Eurostat (SBS).

High land transport turnover in 'strategic' countries

As far as data are available, it appears that turnover in land transport exceeded ECU 40 000 million in the United Kingdom and France. Italy exceeded ECU 34 000 million. Small but geographically 'strategic' countries like the Netherlands and Belgium offer high turnover figures as well. The figures for the water transport category reflect the relative importance of maritime transport in countries like France, the Netherlands and the United Kingdom. With far less persons employed, the air transport category generates impressive turnover figures: the United Kingdom displays nearly ECU 21 000 million followed by Germany and France with

Comparisons between countries, not sectors

Table 4.7 outlines the ratios 'turnover per persons employed' and provides an idea of the performance of the various categories of the transport sector. It should be noted that turnover per person comparisons should rather be made between countries and not between subsectors since they do not take into account infrastructure costs. And even so, infrastructure costs can vary substantially from country to country.

It appears that the average turnover per person in total land transport exceeds ECU 80 000 only in Luxembourg, Sweden and the United Kingdom. Spain, Ireland, Italy, the Netherlands, Austria and Portugal are below the average (65 400 ECU - calculated on the basis of available data).

Table 4.6 : Value added by activity in 1997 - in million ECU

	Total land transport (incl. pipelines)	Rail transport	Road transport	Water transp. (marit. + iww.)	Air transport	Auxiliary transport activities
EU-15	:	:	:	:	:	:
Belgium	5 800	2 640[1]	3 296	106	612	2 663
Denmark	:	1 169	:	:	647	:
Germany	:	:	:	:	:	:
Greece	:	:	:	:	:	:
Spain	2 369[1]	2 274	:	181[1]	1 934	921[1]
France	18 890	:	12 889[2]	629	3 352	9 865
Ireland	517	:	:	82	440	465
Italy	18 779[2]	803[3]	13 322[2]	1 248[2]	1 461[2]	9 043[2]
Luxembourg	425[2]	191[2]	235[2]	4[3]	172[3]	79[3]
Netherlands	6 658[3]	:	6 057	1 393	:	3 992
Austria	5 383	1 431[3]	2 905	20	449	1 662
Portugal	1 447	:	:	76	458	985
Finland	2 826[1]	:	2 375[1]	626[1]	531[1]	1 067[1]
Sweden	3 906	14[1]	3 145[2]	800	787	2 340
United Kingdom	:	:	:	:	:	:

[1] 1998. [2] 1996. [3] 1995. [4] 1994.
Source: Eurostat (SBS).

Table 4.7 : Turnover per person employed/employee in 1997 - in thousands of ECU

	Total land transport (incl. pipelines)	Rail transport	Road transport	Water transp. (marit. + inl.ww.)	Air transport	Auxiliary transport activities
EU-15	:	:	:	:	:	:
Belgium	70.3	36.8[1]	87.8	845.1	228.1	299.0
Denmark	:	148.9	:	:	210.4	:
Germany	:	:	:	:	324.9	:
Greece	:	:	:	:	:	:
Spain	40.0[1]	40.0	:	120.0[1]	150.0	250.0[1]
France	69.7	44.2[4]	70.9[2]	299.3	203.7	176.8
Ireland	58.2	:	:	183.3	220.7	194.2
Italy	60.0[2]	30.0[3]	70.0[2]	180.0[2]	260.0[2]	140.0[2]
Luxembourg	82.2[2]	67.6[2]	90.4[2]	92.7[3]	257.9[3]	300.7[3]
Netherlands	58.5[3]	40.8[4]	58.5[5, 6]	268.1	163.0[4]	111.4
Austria	50.5	33.2[3]	65.3	288.1	250.4	275.8
Portugal	44.5	:	:	195.7	113.7	148.0
Finland	71.3[1]	:	73.6[1]	238.8[1]	144.1[1]	200.8[1]
Sweden	90.0	256.9[2, 6]	113.5[2, 6]	226.5	195.0	270.1
United Kingdom	89.5[6]	192.6[6]	81.0[6]	279.3[6]	285.8[6]	141.0[6]

[1] 1998. [2] 1996. [3] 1995. [4] 1994. [5] 1993. [6] No. of employees.
Source: Eurostat (SBS).

Conversely, and obviously due to higher infrastructure costs, the water and air transport subcategories, as well as the auxiliary transport activities all offer three digit figures (except for water transport in Luxembourg), although substantial differences between countries can be noticed. It should be reminded that the water transport domain regroups both maritime transport and transport via inland waterways. Due to the diverse national characteristics of water transport in the various Member States, a comparison between countries is somewhat problematic.

In the air transport sector, Germany leads with ECU 325 000 per person, well ahead of the United Kingdom with ECU 286 000. Portugal displays the lowest ratio and generates only 40 % of the turnover per person of that of the United Kingdom.

Luxembourg and Belgium turn around ECU 300 000 per person with respect to turnover per person in auxiliary transport activities followed by Sweden and Austria. Amongst the available figures, the United Kingdom and the Netherlands display the lowest figures for this sector, with ECU 141 000 and ECU 111 000 respectively.

Apparent labour productivity highest in air transport

A cross subsector comparison becomes possible when looking at the apparent labour productivity (value added per person employed - see Table 4.8), a ratio that expresses the amount of value added in the production value in relation to employment.

The available data allow an insight on how the various subsectors perform. Compared to total land transport, water transport and auxiliary transport activities, it appears then that air transport has the highest apparent labour productivity, except for Belgium, where auxiliary transport activities show the highest figures.

Sector influences main type of investment

Finally, Table 4.9 shows the investment per person employed. They include investments made by private companies only. Only in certain cases (notably in rail and air transport), a small part of the investments might originate from public bodies, depending on a company's structure and ownership. Investments in the transport sector are quite heterogeneous: in road and water transport, this will mainly consist in the acquisition of transport equipment. In rail transport, this will also include investments made in infrastructure (tracks, railway stations). Supporting and auxiliary transport services include, among others, cargo handling, storage and warehousing; infrastructural investments thus take an important share in this subsector.

Table 4.8 : Apparent labour productivity (value added/employment) in 1997 - in thousands of ECU

	Total land transport (incl. pipelines)	Rail transport	Road transport	Water transport (marit. + inl.ww.)	Air transport	Auxiliary transport activities
EU-15	:	:	:	:	:	:
Belgium	47.5	65.0[1]	40.4	47.0	50.8	67.5
Denmark	:	94.2	:	:	65.7	:
Germany	:	:	:	:	:	:
Greece	:	:	:	:	:	:
Spain	60.0[1]	60.0	:	70.0[1]	60.0	30.0[1]
France	29.6	:	28.5[2]	40.8	56.2	43.6
Ireland	24.0	:	:	49.4	70.7	38.7
Italy	30.0[2]	0.5[3]	30.0[2]	60.0[2]	70.0[2]	50.0[2]
Luxembourg	47.5[2]	59.0[2]	41.0[2]	62.9[3]	93.8[3]	49.6[3]
Netherlands	36.8[3]	:	:	91.7	:	53.8
Austria	38.7	22.8[3]	35.8	78.0	65.9	51.8
Portugal	15.4	:	:	35.5	47.1	36.6
Finland	40.3[1]	:	39.7[1]	76.7[1]	57.1[1]	47.9[1]
Sweden	32.8	67.6[2, 4]	37.9[2, 4]	55.3	61.6	48.1
United Kingdom	:	:	:	:	:	:

[1] 1998. [2] 1996. [3] 1995. [4] No. of employees.
Source: Eurostat (SBS).

Table 4.9 : Investment per person employed in 1997 - 1000 ECU

	Total land transport (incl. pipelines)	Rail transport	Road transport	Water transport (marit. + inl.ww.)	Air transport	Auxiliary transport activities
EU-15	:	:	:	:	:	:
Belgium	16.8[1]	27.6[1]	11.5[1]	37.9[1]	8.4[1]	22.6[1]
Denmark	:	26.1	:	:	30.7	:
Germany	:	:	:	:	:	:
Greece	:	:	:	:	:	:
Spain	10.0[1]	10.0[1]	:	50.0[1]	:	:
France	6.7	:	6.7[2]	24.1	15.0	38.5
Ireland	6.9	:	:	54.7	28.3	12.8
Italy	10.0[2]	10.0[3]	10.0[2]	60.0[2]	10.0[2]	10.0[2]
Luxembourg	6.9[3]	5.2[3]	7.9[3]	5.1[3]	48.9[3]	5.9[3]
Netherlands	10.0[3]	:	:	39.1	:	21.6
Austria	13.5	10.5[3]	12.5	30.8	70.5	8.6
Portugal	14.2	:	:	38.7	20.5	26.0
Finland	11.9[1]	:	12.3[1]	23.1[1]	22.7[1]	9.0[1]
Sweden	13.7	:	:	26.4	15.3	22.3
United Kingdom	:	:	:	:	:	:

[1] 1998. [2] 1996. [3] 1995.
Source: Eurostat (SBS).

5. Traffic and transport quantities and performances

5.1. Transport of goods

5.1.1. General development

The performance of the European transport sector has been in line with the expanding economy. As can be seen in Table 5.1, from 1970 to 1998 total European goods transport in the present 15 Member States grew from 890 000 to 1 704 000 million tkm (almost 92 %).

Table 5.1: Goods transport in EU-15 (1 000 million tkm)

	Road	Rail	Inland water ways	Pipelines	Total
1970	434	283	106	66	889
1980	665	287	108	93	1 154
1990	944	256	109	77	1 386
1995	1 141	221	114	86	1 562
1996	1 159	219	111	86	1 575
1997	1 205	238	118	85	1 646
1998	1 255	241	121	87	1 704
1970 - 80	+ 53.2 %	+ 1.4 %	+ 1.8 %	+ 40.9 %	+ 29.8 %
1980 - 90	+ 41.9 %	- 10.8 %	+ 0.9 %	- 17.2 %	+ 20.1 %
1990 - 98	+ 32.9 %	- 5.7 %	+ 10.9 %	+ 13.4 %	+ 23.0 %
1970 - 98	+ 189.0 %	- 14.8 %	+ 14.7 %	+ 31.4 %	+ 91.7 %

Sources: Energy and Transport DG, Eurostat, ECMT, UIC, national statistics.

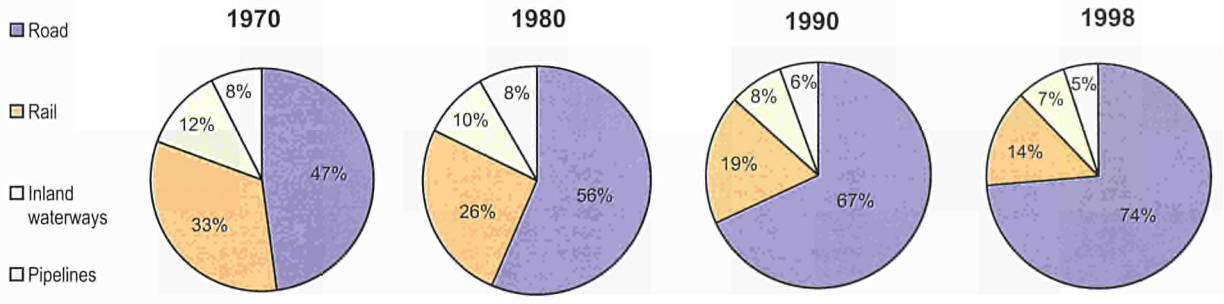
Constant increase of road haulage, stagnation of rail transport

The considerable growth of inland transport has been almost entirely realised by road transport. As far as the other modes of transport are concerned, only pipeline transport has substantially grown since 1970, but this mode is accredited with a rather modest share of only 5 % of total inland transport (in tkm - see Graph 5.2).

Remarkably enough, Graph 5.3 shows that the development of the two remaining modes of inland transport, namely railway and inland waterways, is less spectacular. Railway transport even decreased (- 15 % since 1970). Inland waterway transport progressed by only 15 % in nearly three decades. It should however be noted that the efficiency of the latter transport mode made a big step forward since the transport performance was done with a considerably reduced vessel fleet (see Chapter 3 - Means of transport).

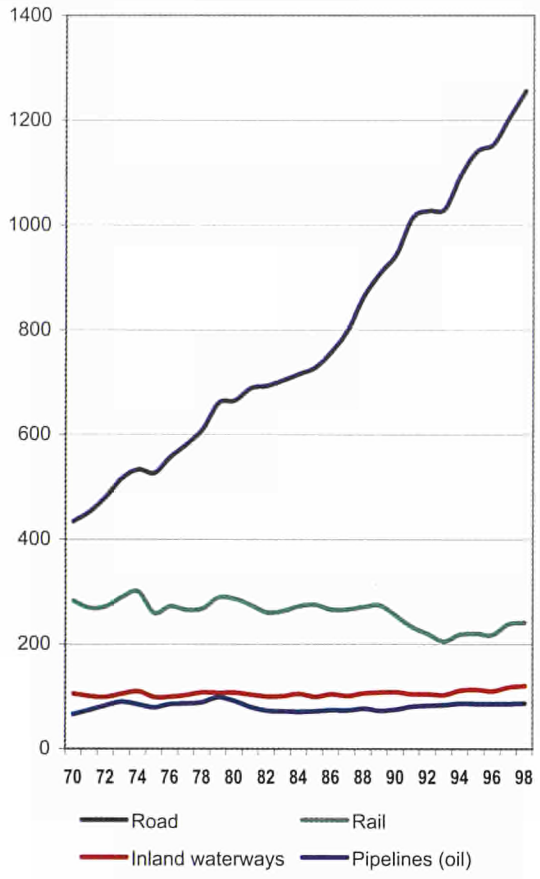
In 1998, for the European Union as a whole, 74 % of all inland transport was performed by road, 14 % by rail, 7 % by inland shipping and 5 % by pipelines. This modal split is based on the quantity of tonne-kilometres hauled. Goods transport by air has not been considered here since statistics on airfreight are only available in the number of tonnes handled at the reporting airports. Various figures relating to individual airports do however suggest a rapid growth.

Graph 5.2 : Goods transport: modal split - EU-15 - Basis : tkm



Source: Energy and Transport DG.

Graph 5.3: Goods transport evolution in EU-15 1970 - 1998 in 1 000 million tkm



Sources: Energy and Transport DG, Eurostat.

Road haulage dominant, except in two countries

Table 5.4 outlines that for all 15 Member States - in the Netherlands and Austria by a small margin - road transport is the main carrier of goods. In Greece, Spain, Ireland, Italy, Portugal and the United Kingdom, it performed even more than 80 % of all inland transport.

Rail transport is taking care of more than a quarter of total transport in Austria, Finland and Sweden.

The most important Member State in inland waterway transport is the Netherlands; its extended inland waterway network and the geographical position on the Rhine delta are no doubt responsible for a remarkably high share of well over 40 % of all performed tkm in 1998. In Belgium and Germany inland shipping accounts for a considerable part of total transport, with 12 and 14 % respectively.

Table 5.4: Goods transport: modal split by country 1998 - in % based on tkm performed

	Road	Rail	Inland water ways	Pipelines
Belgium	69.3	15.1	12.5	3.1
Denmark	71.9	9.7	-	18.3
Germany	67.4	15.7	13.7	3.2
Greece	98.1	1.9	-	-
Spain	84.6	9.7	-	5.7
France	75.0	16.5	1.9	6.6
Ireland	92.7	7.3	-	-
Italy	86.1	8.8	0.0	5.1
Luxembourg	70.9	18.9	10.1	-
Netherlands	47.9	3.9	42.0	6.2
Austria	38.3	36.9	5.4	19.4
Portugal	87.4	12.6	-	-
Finland	72.0	26.9	1.1	-
Sweden	63.1	36.9	-	-
United Kingdom	84.7	9.2	0.1	5.9
EU-15	73.7	14.1	7.1	5.1

Sources: Energy and Transport DG, Eurostat.

5.1.2. National goods transport

The amount of national transport is largely dependent on the industrial and commercial development of the countries concerned.

Disregarding pipelines (restricted to liquid oil products), there are significant differences between Member States, as far as the division among the different modes of transport - the so-called 'modal split' is concerned.

Dominant position of road haulage

Table 5.5 indicates that for the European Union as a whole, in 1995 road haulage accounted for more than 10 000 million tonnes of national transport; this stands out in contrast to only 600 million tonnes for rail transport and about 185 million tonnes for inland navigation. Figures for 1998 show that the volume (in tonnes) of road transport progressed slightly at EU level (on the basis of data available). Increases were highest in Greece, France and Spain. Conversely, Belgium, Germany, Italy and Finland registered a decline in volumes forwarded. For Belgium, the decrease is quite noticeable.

When comparing the 1998 rail transport volume figures with those of 1995, a slight decrease at EU-15 level can be observed. Greece and Sweden display a clear drop in the number of tonnes forwarded whereas the decrease is less high in Belgium, Germany and Ireland. Denmark's rail transport progresses most.

Less tonnes but over longer distance

However, if performance of road versus rail is measured in tonne kilometres (see Table 5.6), the modal split shows different proportions: road transport was responsible for 857 000 million tkm and rail for nearly 130 000 million tkm of national transport. In other words, railways are responsible for 5.8 % of the volume, but for 15.2 % of the tkm performance of road haulage.

Table 5.5: National transport of goods by country and mode - in 1 000 tonnes

	1985			1990			1995			1998		
	Road (1)	Rail (2)	Inland waterways	Road (3)	Rail (4)	Inland waterways	Road (5)	Rail (6)	Inland waterways (7)	Road (8)	Rail	Inland waterways
Belgium	265 383	34 426	21 437	276 871	30 228	21 134	351 431	27 198	18 019	282 574	24 490	:
Denmark	199 933	2 351	-	194 451	2 145	-	175 950	1 932	-	190 428	2 657	-
Germany	2 213 709	238 935	63 716	2 715 149	312 118	62 605	2 949 929	232 836	72 328	2 735 922	211 401	63 911
Greece	158 371	1 205	-	176 596	898	-	163 903	575	-	259 661	390	-
Spain	913 335	25 028	-	973 708	22 428	-	588 150	20 948	-	690 808	20 137	-
France	1 360 000	114 293	30 461	1 647 000	98 502	32 872	1 548 000	80 817	17 621	1 702 457	91 415	23 754
Ireland	89 736	3 379	-	78 955	3 277	-	78 531	3 179	-	:	2 680	-
Italy	327 555	17 221	1 599	889 066	21 084	740	1 220 919	27 425	607	1 130 936	30 164	:
Luxembourg	11 126	2 539	23	24 034	2 816	40	26 192	2 702	14	:	:	:
Netherlands	338 660	5 529	74 992	386 940	4 972	84 031	391 766	4 349	76 387	403 180	:	96 327
Austria	:	:	:	:	:	:	217 895	15 980	521	229 087	17 256	965
Portugal	190 558	4 690	-	237 946	5 389	-	263 229	7 631	-	:	7 723	-
Finland	:	:	-	:	14 465	-	349 118	21 903	-	316 882	23 613	-
Sweden	327 100	58 767	-	388 100	56 408	-	355 800	58 300	-	336 000	55 500	-
United Kingdom	1 406 199	139 322	-	1 686 999	137 622	-	1 658 409	95 379	-	1 679 434	:	-
EU-15	:	:	:	:	:	:	10 339 222	601 153	185 497	:	:	:

(1): I, E: 1986; P: 1987 - (2): E, P: 1986 - (3): L: 1992 - (4): D:1991 - (5): IRL: 1993; - (6): UK: 1994; I: 1993; L, DK: 1992; - (7): L:1992; I: 1993; B: 1996; - (8): I, FIN: 1997.
Source: Eurostat.

Table 5.6: National transport of goods by country and mode - in million tkm

	1985			1990			1995			1998		
	Road (1)	Rail (2)	Inland waterways	Road (3)	Rail (4)	Inland waterways	Road (5)	Rail (6)	Inland waterways	Road	Rail	Inland waterways
Belgium	10 380	2 537	1 676	12 616	2 629	1 694	18 616	2 230	1 460	16 693	2 166	1 500
Denmark	8 342	608	-	9 354	568	-	9 327	448	-	10 108	476	-
Germany	98 615	37 802	12 964	120 168	33 092	14 108	201 299	35 700	17 152	202 230	35 763	14 483
Greece	10 352	291	-	12 485	222	-	12 357	152	-	19 322	121	-
Spain	74 144	8 795	-	69 924	8 750	-	78 744	7 992	-	91 329	9 174	-
France	91 100	37 494	4 503	118 200	33 482	4 266	135 300	28 797	2 258	145 459	32 267	3 449
Ireland	3 727	601	-	3 878	589	-	4 161	602	-	:	469	-
Italy	98 445	7 097	199	115 786	9 088	118	150 301	10 606	91	:	11 415	:
Luxembourg	206	87	1	454	113	1	531	104	1	:	:	1
Netherlands	18 189	1 062	6 718	22 581	1 020	6 897	26 683	721	5 746	28 240	763	8 845
Austria	:	:	:	:	:	:	11 069	2 999	83	11 715	3 093	127
Portugal	8 636	1 137	-	10 978	1 283	-	11 119	1 767	-	14 693	1 638	-
Finland	:	:	-	:	:	-	21 804	5 936	-	24 397	6 313	-
Sweden	21 177	18 419	-	26 519	19 102	-	29 324	19 391	-	32 674	18 635	-
United Kingdom	100 544	16 812	-	132 968	16 078	-	146 714	12 440	-	155 431	:	-
EU-15	:	:	:	:	:	:	857 348	129 885	26 791	:	:	:

(1): I, E: 1986; P: 1987 - (2): E, P: 1986 - (3): L: 1992 - (4): D: 1989 - (5): D, IRL: 1993; I, L: 1994 (6): UK: 1994
Source: Eurostat.

Expressed in tkm, it appears that the progress in road transport is quite substantial. At EU-level (with Ireland, Italy and Luxembourg excluded however), the number of tkm increased by nearly 7 % (1998 compared to 1995). Except for Belgium (- 10 %), road transport increased in all Member States, especially in Greece and Portugal.

Rail transport, displaying a decrease in the number of tonnes forwarded, increases when expressed in tkm (+ 4.1 %, based on data available). Figures show a decline of around 20 % in Greece and Ireland whereas Spain and France show a progress of over 10 %.

Rail: important in larger Member States

It is obvious that average distances for road and rail in national transport are very different: Graph 5.7 shows that only 11 % of the volume of goods (expressed in tkm) forwarded by rail have a distance of up to 150 km. The equivalent number for road haulage is 35 %. This shows the flexibility of road transport for shorter distances and the relative importance of rail for longer distances. It should however be noted that certain Member States (Belgium, Ireland, Luxembourg and the Netherlands) are not able to perform national journeys of more than 500 km. If national rail transport is to be promoted within the framework of 'intermodality', it is clear that this will mainly be appropriate for 'larger' Member States like Germany, France or the United Kingdom. This can be illustrated by the share of national rail transport, as a percentage of road haulage (in tkm) in some Member States (1998): 57 % in Sweden, 26 % in Finland, 22 % in France and 17 % in Germany. Certainly influenced by the topographic features of the country, Austria's share is also high (26 %).

Dutch waterways 'compete' with rail

In the Netherlands national rail transport remains extremely low: less than 3 % of road haulage; but this is certainly connected with the strong competition of inland navigation, which has the biggest share of all Member States.

A different situation occurs in Belgium; although one of the 'smaller' Member States, rail is responsible for nearly 13 % (1985: 24 %) of the volume of national road haulage. Traditionally, Belgian railways have a relatively strong position both in national and international goods transport.

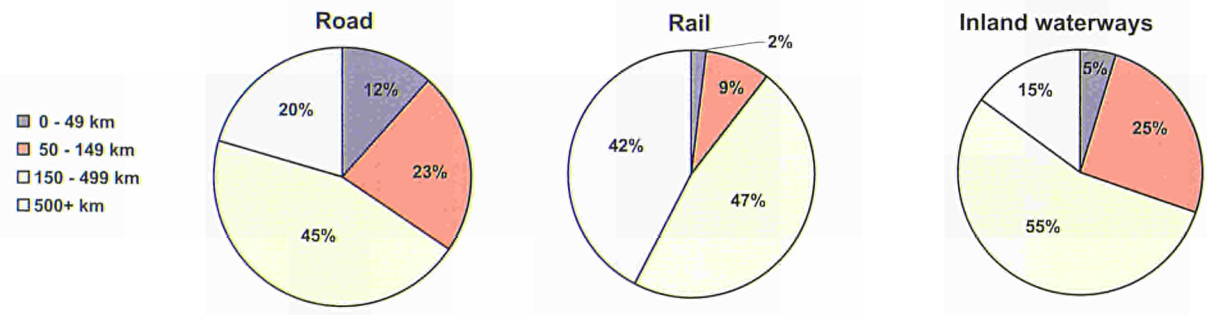
Inland waterway transport: mainly in Germany and the Netherlands

At national level, only four Member States have a substantial amount of inland waterway transport: Belgium, Germany, France and the Netherlands. Of course this situation is strongly determined by the geographical position: the Rhine and its delta may be regarded as the most important inland waterway network in the world, connecting important industrial areas and seaports.

The Netherlands, although a relatively small Member State, has the highest volume of national waterway transport of Europe, which in 1998 was about 12 times higher than the Dutch national rail transport. Figures in Tables 5.5 and 5.6 show that in Belgium and Germany inland waterways are of considerable importance for national transport; both countries feature a rather extended and connected inland waterway network. In France, the importance of inland navigation is more limited and restricted to some separated networks.

Although the increase of national waterway transport in the Member States concerned cannot match the development of road haulage, national transport by navigable waterways remains stable.

Graph 5.7: National goods transport by distance class, on the basis of tkm forwarded



NB: Road: without Ireland; rail: without DK, L, UK; inland waterways: countries considered: B, D, F, NL, A.
Source: Eurostat.

5.1.3. International goods transport

The globalisation of the economy and especially the increasing integration of the European economies has led to a considerable growth of the entire transport sector. Currently being deregulated, especially within rail transport, the sector is expected to increase efficiency and thus experience further growth.

European transport statistics, as provided by Eurostat, illustrate the structure and development of international European transport for all modes of inland transport over the years. This chapter highlights the developments of the last decade.

In 1998, international goods movements of Member States amounted to approximately 253 000 million tonne-kilometres (tkm) for road, 86 000 million tkm for rail and 69 500 million tkm for inland waterways. Compared to 1990, international road transport increased by 40 %, rail transport by 17 % and transport over navigable inland waterways by 12 %.

General structure of transport quite heterogeneous

The territory of the European Union includes several highly industrialised and densely populated areas; both are generating considerable inland transport flows of raw materials, final products and foodstuffs.

Many of the materials and products are imported by sea; in connection with their transshipment in European seaports (like Rotterdam, Antwerp, Marseille, Hamburg or Le Havre), they have to be carried to their destinations within Europe by the different modes of inland transport.

On the other hand, an opposite stream of goods is moving towards the seaports for export to overseas. These flows of transport between the seaports and their hinterland, by road, rail and inland waterways, are providing a substantial contribution to inland transport in Europe. However, there are considerable differences in the size of transport between the respective Member States, as well as in the modes to be used.

Rhine axis as important as ever

The importance of a particular mode is different for individual Member States. For some, like the Netherlands, Germany and Belgium, inland navigation is a very significant mode of international transport (see Table 5.8), taking care of respectively 39 %, 34 % and 14 % of the tonne-kilometres performed by the three transport modes together (see Table 5.11).

Consequently, the most important transport flows for inland shipping are to be found in the north-western European area. Germany, France and the Benelux countries generate the most important part of inland shipping in the European Union. A considerable part of these goods is transshipped in the big seaports, like Rotterdam, Antwerp or Hamburg.

Table 5.11: International goods transport: modal split[1] (%) for selected Member States - 1998

	road	rail	inl. ww
Belgium[2]	69	17	14
Germany	39	28	34
Greece	87	13	0
Spain	94	6	0
France	68	27	5
Italy[3]	64	36	0
Netherlands	57	5	39
Austria	62	34	5
Portugal	96	4	0
Finland	40	60	0
Sweden	37	63	0

1: On the basis of tonne-kilometres. Tkm figures for road includes transport performed outside of the country where hauliers are registered, whereas the territorial principle applies to tkm of rail and inland waterways.
2: Inland waterways : 1996.
3: Road: 1997.
Source: Eurostat (New Cronos).

Table 5.8: International transport by inland waterways - loaded and unloaded (million tkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	Change 1990 - 98 (%)
Belgium	3 264	3 242	3 186	:	:	:	3 897	:	:	:
Germany	31 952	32 126	32 691	32 979	:	34 998	34 466	35 693	36 660	15
France	2 895	2 521	2 651	2 464	2 432	2 575	2 352	2 530	2 743	-5
Luxembourg	7	5	8	8	6	:	6	28	35	400
Netherlands	22 739	22 448	21 659	20 006	22 995	22 551	:	:	24 939	10
Austria	:	:	:	:	974	943	1 077	1 030	1 079	:

Source: Eurostat (New Cronos).

Noticeable are also Austria's navigable waterways, with the Danube offering a major transport corridor to some central European countries: Austria handles 5 % of all tkm in international goods transport by inland waterways.

Rail: strong position in some Member States

Although railways are taking care of only 21 % of total international transport at EU-level (on the basis of tkm), the importance of this mode is substantial for some Member States; more than 60 % of the international transport of Sweden and Finland are carried out by railways. The modal comparison in international goods transport throughout the Member States is sometimes impossible. Italy for instance has no inland waterway connection with any other Member State, international goods transport by rail for the United Kingdom became only possible with the opening of the Channel tunnel. The Republic of Ireland records rail goods transport to and from Northern Ireland as national traffic.

Germany first in loading rail wagons

In absolute terms, Germany performed in 1998 more than 30 000 million tkm in rail goods transport, considerably ahead of France and Italy with 16 000 million and 11 000 million tkm respectively (see Table 5.9). In relative terms, Portugal's international rail transport progressed considerably between 1990 and 1998, whereas Sweden's transport recorded a decline of 40 %. Sweden's decline from 1996 onwards can largely be explained by the fact that transport on the so-called ore-line in Northern Sweden was taken over from the Swedish State Railways by MTAB (Malmtrafik i Kiruna AB) as from 1 July 1996. In Greece, the conflicts in the former Yugoslavia affected one of the main lines for international freight transport (from Thessaloniki to the border town of Idomeni), explaining the strong decrease in the period observed.

Spain's different rail gauge

Although there is no competition from inland shipping, rail transport from and to Spain appears remarkably low (2 148 million tkm in 1998). This may be a statistical anomaly caused by the very specific situation at the border with neighbouring France, where as a consequence of the different rail gauge in Spain, transshipment from one railway wagon to another is inevitable in many cases, so that movements of goods across the border are not included in international transport. Although a growing number of adaptable wagons is available, road haulage is still responsible for 94 % of Spanish international goods transport (see Table 5.11).

Road: impressive growth over the last decade

In 1998, the international goods transport by road at EU-level amounted to approximately 242 500 million tkm. This represents an increase in volume of nearly 40 % in less than a decade (1990-98). Its volume is nearly three times as big as international rail transport and three and a half times that of inland shipping.

Table 5.9: International rail transport - loaded and unloaded (million tkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	change 1990-98 (%)
Belgium	4 954	4 929	4 878	4 691	4 942	4 644	4 321	4 771	4 903	-1
Denmark	569	630	631	:	:	:	:	:	:	:
Germany	22 127	22 984	20 936	21 101	24 532	25 373	25 101	28 563	30 084	36
Greece	358	306	329	320	155	140	185	108	191	-47
Spain	1 381	1 365	1 253	1 049	1 490	1 741	2 009	2 261	2 148	56
France	12 983	12 802	13 003	11 506	13 551	13 803	15 227	16 683	16 241	25
Ireland	-	-	-	-	-	-	-	-	-	-
Italy	10 141	10 840	9 979	9 357	:	11 504	10 724	11 357	10 992	8
Luxembourg	419	408	376	:	:	:	:	:	:	:
Netherlands	2 016	2 017	1 770	1 673	1 934	2 280	2 375	2 605	3 015	50
Austria	:	:	:	:	:	8 098	8 523	9 660	7 990	:
Portugal	156	171	211	155	236	252	250	395	410	163
Finland	:	:	:	:	:	3 353	3 107	3 595	3 572	:
Sweden	8 039	7 208	8 492	8 156	7 920	7 833	6 842	4 854	4 803	-40
United Kingdom	193	192	353	336	529	:	:	:	:	:

Source: Eurostat (New Cronos).

Table 5.10 shows that the Member States with the most voluminous international road haulage in 1998 were Germany (41 884 million tkm), France (40 291), the Netherlands (36 809) and Spain (32 814). Road transport is by far the most important mode in international goods transport in most Member States, with some remarkable exceptions like Finland and Sweden (see Table 5.11).

Spain displays a share of 94 %, caused by the minor importance of Spanish railways (only 6 %), although, as mentioned earlier, this might be overstated due to reporting anomalies.

Cross-trade initially under quota system

All data and related comments on road transport in the previous sections of this chapter apply to 'regular' international road transport: reporting countries declaring international road transport (loaded and unloaded in the reporting country) by hauliers registered in their respective country. Road transport is however more important than suggested in the previous paragraphs since cabotage and cross-trade transport are also categories of road transport. A dedicated chapter (Chapter 5.1.4) focuses on cabotage (national transport performed in a country other than the declaring one). Cross-trade road transport (international road transport, carried out by vehicles neither registered in the Member State of loading, nor in the Member State of unloading) was, before 1993, only allowed under certain bilateral agreements between Member States, or under community quota authorisations, which permitted hauliers to make journeys between any two Member States. Since 1993 these quantitative restrictions for international road transport have been replaced by qualitative restrictions: holders of a 'community licence' can make journeys between any two Member States.

Cross-trade interesting for small Member States

Table 5.12 displays the number of tkm performed in cross-trade transport. The figures express the performance by nationality of the operators and not the territory where this transport took place. In fact, if cross-trade transport and 'regular' international transport are taken together, it appears that cross-trade transport is far from negligible (23 366 out of 266 011 million tonne-kilometres, or 8.8 %).

Table 5.10: International road transport - loaded and unloaded (million tkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	Change 1990 - 98 (%)
Belgium	19 433	20 604	18 210	20 178	23 073	22 833	21 084	21 920	19 900	2
Denmark	5 145	5 872	6 384	10 423	11 433	12 421	11 344	11 226	10 796	110
Germany	21 432	23 137	24 203	25 681	25 772	29 507	31 679	36 736	41 884	95
Greece	2 119	1 983	2 732	1 415	636	867	841	1 734	1 272	-40
Spain	12 271	13 086	14 187	16 277	20 171	22 513	25 250	28 348	32 814	167
France	34 064	34 381	37 070	34 911	38 360	40 041	40 333	39 439	40 291	18
Ireland	1 008	780	411	887	:	:	:	:	:	:
Italy	20 498	18 423	19 661	18 179	19 309	12 497	23 940	19 754	:	:
Luxembourg	:	:	1 661	1 615	1 395	:	:	1 213	:	:
Netherlands	30 896	29 033	30 468	31 232	32 719	33 901	35 147	35 999	36 809	19
Austria	:	:	:	:	:	12 474	13 103	13 613	14 610	:
Portugal	5 152	6 901	6 140	5 764	6 739	:	8 846	10 046	9 954	93
Finland	:	:	:	:	:	:	2 570	2 122	2 413	:
Sweden	:	:	:	:	:	3 057	2 827	2 662	2 916	:
United Kingdom	10 651	11 229	11 755	12 479	14 370	14 415	15 523	16 263	16 122	51

NB: Germany: break in series due to methodological changes.
Source: Eurostat (New Cronos).

Table 5.12: Cross-trade road goods transport performed by hauliers of the various Member States (million tkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	Change 1990 - 98 (%)
Belgium	2 298	1 975	3 129	3 166	3 822	3 799	3 746	2 933	3 848	67
Denmark	:	:	:	659	603	499	432	478	390	:
Germany	:	:	1 542	1 593	:	2 762	2 656	3 293	3 855	:
Greece	4	7	:	:	:	:	:	:	:	:
Spain	:	:	:	218	220	373	454	495	703	:
France	2 174	2 570	2 990	3 144	2 957	2 694	2 911	2 795	2 811	29
Ireland	184	112	:	:	:	:	:	:	:	:
Italy	:	:	149	143	153	186	237	:	:	:
Luxembourg	:	1 255	1 854	2 058	1 979	:	1 767	2 594	:	:
Netherlands	4 396	4 921	5 058	4 955	5 355	5 972	6 269	6 493	7 014	60
Austria	:	:	:	:	:	2 981	3 347	4 059	4 753	:
Portugal	133	247	219	326	440	468	361	332	352	165
Finland	:	:	:	:	:	:	153	21	64	:
Sweden	:	:	:	:	:	64	52	69	56	:
United Kingdom	361	541	269	216	277	291	401	392	403	12

NB: Germany: break in series due to methodological changes.
Source: Eurostat.

Especially smaller Member States with a geographically central location have a relatively high proportion of cross-trade transport, not only in absolute numbers but also when compared to 'regular' international transport. This is notably the case for Belgium and the Netherlands. Largely due to the small size of its home markets, Luxembourg's cross-trade transport was even more than twice the size of 'regular' international transport (in 1997). For all other Member States, and especially the peripheral ones, this type of transport is of lesser importance.

Data presented in Table 5.12 suggest that throughout the period observed, fluctuations occurred at Member State level. Even if a general upward trend can be noted for most countries, one cannot speak about a 'steady' increase. There can however be no doubt about the favourable effects (economical efficiency, reduction of environmental pressure) of cross-trade transport, which offers an important step for the realisation of a European common transport market.

High increases in air transport

The development of international freight transport by air is displayed in Table 5.13. Figures are expressed in tonnes of freight (cargo and mail) handled at the airports of the reporting countries. Most countries show a clear upward trend in the quantities loaded and unloaded. It should however be noted that countries report for 'major airports' only. Thus, the figures for the individual years sum up the volumes handled at a certain number of airports. If airports pass the threshold of compulsory reporting, the increase will be most noticeable. The number of reporting ('major') airports in Spain for instance passed from 20 in 1994 to 28 in 1995.

Luxembourg airport fifth in air cargo handling

These elements have not to be considered when looking at Table 5.14 which displays the 'top-20' airports in the EU with regards to cargo loaded and unloaded in worldwide international traffic. In 1999, the airports of Frankfurt/Main, London Heathrow and Amsterdam Schiphol handled over 1 million tonnes of cargo. Brussels airport (rank 5 in 1995 - see footnote) did not report in 1999 and is thus not present in the 1999 'top 20'. The French authorities reported for the airport-system Paris only (regrouping Charles de Gaulle, Orly and Le Bourget airports).

Within the 'top-10', Milan Malpensa, London Stansted and Luxembourg progressed most between 1995 and 1999.

Substantial differences can be detected when considering the percentage of cargo handled in international intra-EU and extra-EU traffic. Within the 'top-20', five airports handle more than 50 % of the air cargo in international intra-EU traffic: East Midlands (UK), Barcelona, Cologne/Bonn, Athens and Helsinki. On the other end, Milan Malpensa, Amsterdam Schiphol and especially London Gatwick have extremely high shares in extra-EU traffic.

Table 5.13: Development of the volume of cargo and mail handled in worldwide international air traffic (tonnes)

	1993	1994	1995	1996	1997	1998	1999	Average annual increase 1993 - 99.
Belgium	305 910	374 816	426 128	449 396	517 663	585 178	:	13.9[1]
Denmark	:	:	:	:	:	:	:	:
Germany	1 520 424	1 721 294	1 806 997	1 876 234	2 018 599	1 947 565	2 053 795	5.1
Greece	80 625	82 230	:	72 660	106 214	101 471	104 793	4.5
Spain	178 771	174 350	243 589	280 807	308 885	309 241	340 301	11.3
France	852 543	1 005 529	1 034 330	1 057 730	1 025 027	1 029 927	1 037 931	3.3
Ireland	50 019	42 703	58 128	38 769	69 976	58 685	66 117	4.8
Italy	402 501	438 104	458 879	474 913	454 430	445 529	419 808	0.7
Luxembourg	:	:	286 846	281 358	340 446	382 605	448 377	11.8[2]
Netherlands	772 675	841 873	982 407	1 084 373	1 162 979	1 173 509	1 182 283	7.3
Austria	73 351	85 203	96 441	98 017	108 760	110 689	121 955	8.8
Portugal	86 478	93 663	101 486	102 040	:	:	:	:
Finland	:	:	:	:	92 459	94 263	91 332	:
Sweden	103 000	128 000	145 000	171 000	195 000	198 000	185 000	10.3
United Kingdom	1 215 474	1 485 910	1 584 054	1 657 409	1 846 581	1 990 050	2 094 840	9.5

1 : 1993 - 98 ; 2 : 1995 - 99.
Sources: Eurostat; Sweden: SIKA-Institute/Swedish Civil Aviation Agency.

Table 5.14: Top 20 airports in EU-15 based on cargo loaded/unloaded worldwide

Rank 1999	Airport	1999 Worldwide	1999 of which intern. intra-EU	1995 Worldwide	1995 of which intern. intra-EU	Rank 1995	Change 1995-1999
		1000 t		1000 t			
1	Frankfurt/Main	1 460.8	14.2%	1 353.9	14.8%	1	+8%
2	London Heathrow	1 257.4	13.9%	1 021.5	17.2%	2	+23%
3	Amsterdam/Schiphol	1 180.5	10.2%	976.8	9.7%	4	+21%
4	Airport-system Paris	914.8	12.2%	978.1	13.9%	3	-6%
5	Luxembourg	448.4	12.3%	286.8	6.2%	7	+56%
6	Cologne/Bonn	357.2	58.0%	256.8	54.6%	8	+39%
7	London/Gatwick	290.8	3.6%	227.0	7.7%	10	+28%
8	Milano/Malpensa	227.0	10.8%	116.9	1.9%	12	+94%
9	Madrid/Barajas	208.4	32.2%	158.4	30.3%	11	+32%
10	London/Stansted	166.8	28.0%	87.8	31.3%	14	+90%
11	Rome/Fiumicino	134.2	23.6%	242.4	20.1%	9	-45%
12	Vienna/Schwechat	117.6	39.3%	91.9	47.7%	13	+28%
13	East/Midlands	112.1	85.9%	79.9	79.4%	16	+40%
14	Manchester/International	106.4	15.6%	77.6	23.8%	17	+37%
15	Munich	104.5	30.8%	59.5	36.8%	18	+76%
16	Athens	96.5	55.7%		not reported		
17	Helsinki	88.4	53.1%		not reported		
18	Bâle/Mulhouse	63.4	40.8%	16.2	71.0%	30	+290%
19	Düsseldorf	56.5	39.5%	49.5	45.2%	20	+14%
20	Barcelona	52.9	73.2%	37.2	78.7%	22	+42%

NB: Greece and Finland did not report in 1995. Belgium did not report in 1999. Brussels airport handled 429.9 thousand tonnes in worldwide traffic in 1995 and thus took rank 5.
Source: Eurostat.

5.1.4. Cabotage

Road cabotage transport is national road transport performed by a motor vehicle registered in another country. Apart from being a big step towards the liberalisation of transport, it reduces the number of empty journeys and thus increases transport efficiency.

The principle of cabotage has been introduced in several modes of transport, however, this chapter only deals with road goods transport.

Cabotage transport has been gradually introduced in 1990 by granting authorisations with limited validity. The quotas were steadily increased and completely abolished as from the 1 July 1998. In the Benelux countries, quotas were already abolished at the end of 1992. Following the creation of the EEA, the EFTA States (except Switzerland) joined the cabotage regime on 1 July 1994.

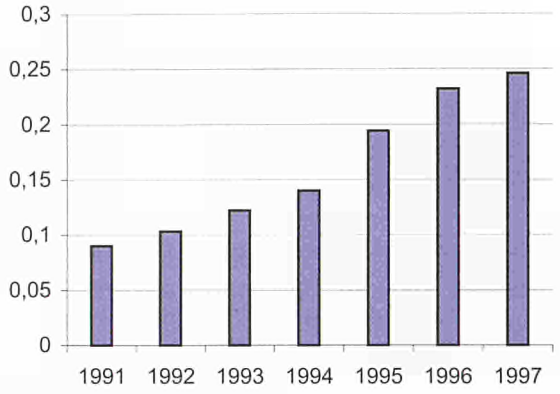
Graph 5.15 shows the progression of cabotage at EEA level expressed as penetration rate in national transport.

Impressive progression - but still of minor importance

The impressive upward trend should however not lead to misunderstandings: when compared to the national transport markets (transport within a state by resident hauliers), overall influence of cabotage remains small: from the entire national transport market of countries in 1997 (904 400 million tkm), only 0.24 % (2 224 million tkm) represented cabotage transport. This corresponds to 1 part in 400.

Table 5.16 details the progression of cabotage: figures express the cabotage transport performed by hauliers from each reporting country: data for Germany for instance indicate the number of tkm hauled by German hauliers within other countries (and not the volume of cabotage transport in Germany, which is presented in Table 5.18).

Graph 5.15: Evolution of cabotage 1991 - 97: overall penetration rate in EEA national transport (%)



Source: Energy and Transport DG.

Table 5.16 : Cabotage by hauliers from each reporting country (1 000 tkm)

Reporting State	1991	1992	1993	1994	1995	1996	1997	Jan - June 1998	1997 - share (%)
Belgium	139 233	142 233	233 747	236 641	319 838	355 784	383 711	161 634	17.3
Denmark	58 409	69 160	58 768	78 956	105 808	98 658	141 700	83 525	6.4
Germany	73 960	70 322	43 667	55 983	63 633	72 068	104 299	48 130	4.7
Greece	196	0	0	0	0	0	0	0	0.0
Spain	5 497	12 822	19 169	38 211	18 152	*22 244*	*22 244*	*11 122*	*1.0*
France	109 835	98 457	125 161	172 218	187 596	232 247	254 211	125 342	11.4
Ireland	12 757	7 501	5 409	11 130	13 882	17 496	7 865	5 068	0.4
Italy	33 183	40 516	45 280	37 786	45 754	47 586	46 456	23 582	2.1
Luxembourg	48 047	65 557	80 131	78 038	114 351	146 614	198 820	129 075	8.9
Netherlands	128 279	201 685	226 233	350 103	588 582	720 804	745 614	286 186	33.5
Austria	.	.	.	.	.	.	32 315	15 423	1.5
Portugal	3 319	2 660	2 619	5 799	8 366	9 528	14 594	11 811	0.7
Finland	.	.	.	5 099	30 000	59 030	61 123	35 380	2.7
Sweden	.	.	.	33 099	128 715	158 705	151 960	58 333	6.8
United Kingdom	32 819	34 176	40 617	41 097	47 531	62 912	46 317	8 761	2.1
Liechtenstein	.	.	.	.	21	132	412	1 468	0.0
Norway	.	.	.	1 419	4 484	10 053	12 180	4 768	0.5
EU-15 TOTAL	645 534	745 089	880 801	1 144 160	1 672 208	2 003 676	2 211 229	1 003 372	99.4
EEA TOTAL	645 534	745 089	880 801	1 145 579	1 676 713	2 013 861	2 223 821	1 009 608	100

Source: Energy and Transport DG.

Estimates in italic.

Since the cabotage regime was extended to the EFTA States (except Switzerland) on 1 July 1994 (Liechtenstein joined upon adhesion to the EEA - 1 May 1995), data for those countries have also been included. Austria joined the cabotage regime only at the beginning of 1997, explaining the lack of data for the previous years.

Benelux carriers account for 60 % of total cabotage

It appears that right from the beginning, Benelux hauliers have been taking most advantage of the cabotage regime: over the entire observation period, their position remained extremely strong. Dutch hauliers are especially dynamic: in 1997, they performed 33.5 % of the entire cabotage transport in Europe. Belgium, the 'top' cabotage haulier in 1991, is second with 17 %. Luxembourg is in fourth position with nearly 9 %. Together, Benelux hauliers were responsible for nearly 60 % of the entire cabotage transport. Hauliers from geographically small countries have more incentive to do cabotage because their national markets are often small and other national markets are geographically quite close. However, France (11.4 %) and Sweden (6.8 %) have also 'active' hauliers.

The dramatic increase in cabotage operations by vehicles registered in Luxembourg is noteworthy: in 1997, the figure of nearly 200 million tkm for Luxembourg was equal to the combined total cabotage of Germany, Italy and the United Kingdom.

Fears for unfair competition not justified

Fears have been expressed in the past that cabotage by so-called 'low labour cost' countries might lead to unfair competition. These fears appear to be unfounded: in 1997, the share of Greek, Spanish and Portuguese hauliers together reached only an (estimated) 1.7 %. In practice, many factors affect the willingness of hauliers in different countries to undertake cabotage operations. It is not expected that the deregulation of cabotage from mid-1998 will change this situation.

Data for the first semester of 1998, the last period for which authorisations were required, suggest no change in the general picture. Total cabotage by hauliers from all States summed up to 1 010 million tonne-kilometres. This would mean that a small absolute decline occurred (- 12 %, compared to the first half year of 1997), despite a 30 % increase of authorisations. Due to the fact that no justifications for authorisations would be required for the following quarters, an under-reporting seems very likely.

In general, provisional conclusions based on sample-survey data from five States show only a 2 % increase in cabotage tkm after quantitative restrictions were lifted (see last section of this chapter). It is recalled that before 1 July 1998, cabotage transport was subject to prior authorisation. Table 5.17 gives an insight how cabotage authorisations have been used in the last full year before quotas were abolished (1997).

Table 5.17: Number of authorisations allocated in 1997 and their use

	Authorisations allocated		Average cabotage per author.	
	number	% of total	1 000 tkm	% of total
B	6 292	7,4	61,0	17,3
DK	6 106	7,2	23,2	6,4
D	10 318	12,1	10,1	4,7
EL	2 785	3,3	0,0	0,0
E	6 525	7,7	*3,4*	*1,0*
F	8 531	10,0	29,8	11,4
IRL	2 837	3,3	2,8	0,4
I	8 539	10,0	5,4	2,1
L	2 934	3,4	67,8	8,9
NL	8 888	10,4	83,9	33,5
A	4 256	5,0	7,6	1,5
P	3 701	4,4	3,9	0,7
FIN	3 063	3,6	20,0	2,7
S	4 018	4,7	37,8	6,8
UK	5 355	6,3	8,6	2,1
FL	57	0,1	7,2	0,0
N	870	1,0	14,0	0,5
Total	85 075	100	26,1	100

Source: Energy and Transport DG. Estimates in italic.

Dutch carriers use authorisations best

The efficiency of Benelux hauliers should again be emphasised here: Dutch, Luxembourg and Belgian hauliers made best use of each authorisation with respectively 83 900, 67 800 and 61 000 tkm per authorisation.

Sweden (37 800 tkm) and France (29 800 tkm), other major 'caboteurs' follow behind. France shows a balanced ratio in 1997: with 10 % of the authorisations, French hauliers performed 11 % of the entire cabotage.

Interesting is also the ratio between authorisations allocated and the final share in cabotage transport: with 10 % of the authorisations allocated, hauliers from the Netherlands performed 34 % of the total cabotage. Similar ratios can be observed for Belgium and Luxembourg (see Table 5.17).

On the other end, despite having been allocated 10 % of all authorisations in 1997, Italy is only responsible for 2 % of the entire cabotage transport. A low activity is also observed for Germany, Ireland and the United Kingdom.

The so-called 'low labour cost' countries (Greece, Spain and Portugal) together were allocated 15 % of all authorisations in 1997, but were responsible for only 1.7 % of total cabotage that year. Data from Spain should be looked at cautiously, since figures had to be estimated; even just prior to that, there were signs of under-reporting. Spanish hauliers might thus be somewhat more active than indicated.

Some 68 % of the cabotage in Germany ...

Table 5.18 shows the volume of cabotage transport in the various countries subject to the cabotage regime. It appears that Germany is the country where most cabotage transport occurs. Ever since its introduction, the number of cabotage tonne-kilometres has been increasing and reached 68 % of the total cabotage in 1997.

France was the second most 'cabotaged' country in 1997 with a share of 13 %. Italy, at the beginning of the 1990s the second most 'cabotaged' country, follows with 5.5 %. These three countries together stand for 87 % of the entire European cabotage. All other countries are obviously less 'preferred': apart from Spain with a clear upward trend (3.5 % of the entire cabotage in 1997), progression is less steady.

The question raised here is the effect of cabotage in national transport. The penetration rate expresses the share non-resident hauliers take in a national market. Table 5.17e shows the penetration rates between 1991 and 1997.

... but less then 1 % of the German domestic market 'lost' to foreign hauliers

It appears that cabotage transport plays only a minor role. The overall penetration rate rose steadily from 0.09 % in 1991 to 0.25 % in 1997.

A look at the individual countries is interesting: Germany, as most 'cabotaged' country, sees nearly 0.75 % of its domestic transport performed by non-resident hauliers. Luxembourg, as one of the leading caboteurs, 'looses' 0.34 % of its domestic market to foreign hauliers, France gives way 0.21 %. In all other countries, the penetration rate lies below 0.2 %.

Figures in Table 5.19 suggest that the penetration rate dropped slightly to 0.22 % for the first half year of 1998; however, this is considered to be due to under-reporting.

The often expressed fear that cabotage would severely disturb national transport markets remains unfounded. Provisional results from sample surveys for the period after the quantitative restrictions were lifted indicate that there is no 'explosion' in cabotage transport.

Who 'cabotages' where?

The matrix below (Table 5.20) gives a complete overview of the activity of the various hauliers in the countries where cabotage is allowed. Data refer to the period January 1996 to July 1998.

The last row of Table 5.20 expresses the country share of the entire cabotage transport volume. It indicates that the global image one gets of this 30-month period is roughly the same as the one presented in Table 5.18 (share in %, last column, which data relate to the year 1997 only). The matrix enables however to identify the main single relations.

Table 5.18: Cabotage transport by country in which cabotage takes place (1 000 tkm)

Partner State	1991	1992	1993	1994	1995	1996	1997	Jan - June 1998	1997 - share (%)
Belgium	16 741	23 172	11 232	21 806	30 967	28 849	31 677	12 310	1.4
Denmark	2 989	2 310	4 357	1 009	1 909	4 683	2 395	1 070	0.1
Germany	402 470	470 038	578 950	785 512	1 229 711	1 417 816	1 516 105	687 969	68.2
Greece	83	368	3 132	4 199	7 717	10 168	22 530	5 766	1.0
Spain	14 835	21 871	34 900	35 332	47 332	56 977	76 839	35 738	3.5
France	54 737	61 439	107 128	151 304	200 319	306 064	297 410	135 865	13.4
Ireland	4 965	5 489	3 119	3 653	5 476	6 807	7 614	1 653	0.3
Italy	98 633	103 194	89 483	84 907	71 033	80 967	121 277	53 153	5.5
Luxembourg	115	306	464	262	665	559	1 239	1 031	0.1
Netherlands	13 398	12 286	5 609	5 644	8 692	11 504	11 489	3 677	0.5
Austria	.	.	.	.	.	.	10 797	4 302	0.5
Portugal	920	9 996	14 537	8 115	8 874	9 526	8 474	4 064	0.4
Finland	.	.	.	138	1 506	609	2 187	494	0.1
Sweden	.	.	.	4 977	13 224	22 766	40 602	25 699	1.8
United Kingdom	35 648	34 620	27 890	36 935	41 548	42 805	50 677	21 974	2.3
Liechtenstein	.	.	.	.	0	0	5	2	0.0
Norway	.	.	.	1 786	7 740	13 761	22 504	14 841	1.0
Total EU-15	645 534	745 089	880 801	1 143 793	1 668 973	2 000 100	2 201 312	994 765	99.0
Total EEA	645 534	745 089	880 801	1 145 579	1 676 713	2 013 861	2 223 821	1 009 608	100

Source: Energy and Transport DG.

Table 5.19: Cabotage penetration rate - in parts per thousand

	1991	1992	1993	1994	1995	1996	1997	Jan - June 1998
Belgium	1.26	1.68	0.77	1.25	1.63	1.68	1.76	1.34
Denmark	0.33	0.25	0.50	0.11	0.21	0.50	0.25	0.21
Germany	2.18	2.50	3.14	3.98	6.11	7.12	7.46	6.78
Greece	0.01	0.04	0.27	0.39	0.62	0.81	1.73	0.87
Spain	0.21	0.30	0.46	0.46	0.60	0.75	0.98	0.89
France	0.46	0.50	0.91	1.22	1.48	2.24	2.14	1.87
Ireland	1.18	1.17	0.74	0.83	1.22	1.45	1.62	0.69
Italy	0.69	0.71	0.63	0.58	0.44	0.49	0.71	0.61
Luxembourg	0.29	0.61	0.93	0.52	1.33	1.40	3.10	5.16
Netherlands	0.58	0.46	0.22	0.22	0.32	0.42	0.42	0.26
Austria	.	.	.	.	.	.	0.96	0.74
Portugal	0.08	0.94	1.45	0.72	0.80	0.84	0.74	0.69
Finland[1]	.	.	.	0.01	0.07	0.03	0.09	0.04
Sweden[1]	.	.	.	0.40	0.48	0.76	1.29	1.81
United Kingdom	0.29	0.29	0.22	0.27	0.29	0.29	0.34	0.28
Liechtenstein	.	.	.	.	.	:	:	:
Norway[1]	.	.	.	0.43	0.82	1.32	1.94	2.52
Total	0.90	1.03	1.22	1.40	1.94	2.32	2.46	2.19

[1] Figures for 1994 relate to July to December (adhesion to cabotage regime).

Source: Energy and Transport DG.

Table 5.20: Cabotage by relation (thousand tkm) (Period: January 1996 - June 1998)

Hauliers	Cabotage transport performed in:																	
from:	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK	FL	N	TOTAL
B		359	388 938	245	6 917	433 386	30	19 336	2	194	420	20	71	983	50 228	0	0	901 129
DK	364		258 249	0	267	1 217	0	1 214	0	1 365	0	1 755	924	34 619	4 119	0	19 790	323 883
D	10 802	604		30 709	20 533	55 388	0	67 930	852	15 721	12 539	774	5	3 718	4 578	5	339	224 497
EL	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	10	0	2 710	0		35 580	0	600	0	0	0	16 700	10	0	0	0	0	55 610
F	55 293	5	336 463	1 615	69 932		0	136 104	1 955	1 122	0	1 605	0	32	7 674	0	0	611 800
IRL	6	0	6 526	0	0	124		0	0	0	0	0	0	294	23 479	0	0	30 429
I	144	110	98 159	55	3 842	13 135	0		0	240	0	76	0	140	1 723	0	0	117 624
L	0	181	462 609	0	820	4 672	0	5 989		0	0	238	0	0	0	0	0	474 509
NL	1 734	4 413	1 542 995	21	32 500	121 753	335	8 665	3		1 034	500	101	14 135	22 743	0	1 672	1 752 604
A	129	0	36 046	0	54	263	0	9 937	3	153		27	0	1 096	28	2	0	47 738
P	79	24	93	0	32 422	3 098	0	208	0	2	0		0	0	7	0	0	35 933
FIN	3	1 866	126 303	0	507	78	0	218	0	40	1	0		19 770	0	0	6 747	155 533
S	86	530	341 936	0	242	124	0	353	0	105	0	9	2 178		877	0	22 558	368 998
UK	4 152	0	6 729	5 819	1 515	70 519	15 709	4 828	0	7 710	0	303	0	706		0	0	117 990
FL	22	0	886	0	0	0	0	0	0	0	1 104	0	0	0	0		0	2 012
N	12	56	13 248	0	3	2	0	15	14	18	1	57	1	13 574	0	0		27 001
Total	72 836	8 148	3 621 890	38 464	169 554	739 339	16 074	255 397	2 829	26 670	15 099	22 064	3 290	89 067	115 456	7	51 106	5 247 290
Share (%)	1.4	0.2	69.0	0.7	3.2	14.1	0.3	4.9	0.1	0.5	0.3	0.4	0.1	1.7	2.2	0.0	1.0	100

Source: Energy and Transport DG.

The 'top-10' looks as follows (in brackets: share in total cabotage, i.e. by all hauliers in all States):

- 1. Dutch hauliers in Germany (29.4 %)
- 2. Luxemb. hauliers in Germany (8.8 %)
- 3. Belgian hauliers in France (8.3 %)
- 4. Belgian hauliers in Germany (7.4 %)
- 5. Swedish hauliers in Germany (6.5 %)
- 6. French hauliers in Germany (6.4 %)
- 7. Danish hauliers in Germany (4.9 %)
- 8. French hauliers in Italy (2.6 %)
- 9. Finnish hauliers in Germany (2.4 %)
- 10. Dutch hauliers in France (2.3 %)

These combinations together account for 79 % of all cabotage.

Reporting after the deregulation

With the deregulation of cabotage in mid-1998, administrative data is no longer available to monitor cabotage operations; hence a new form of data collection is required. Cabotage data are now obtained via the regular sample surveys on road freight transport. Council Regulation (EC) No 1172/98 on road freight transport statistics provides for the transmission of data on all types of transport operations, including cabotage operations, replacing an earlier directive which did not cover cabotage.

Reporting under Regulation (EC) No 1172/98 started officially on 1.1.1999, but some Member States provided cabotage data from sample surveys on a voluntary basis from 1997 onwards.

Progressive under-reporting likely

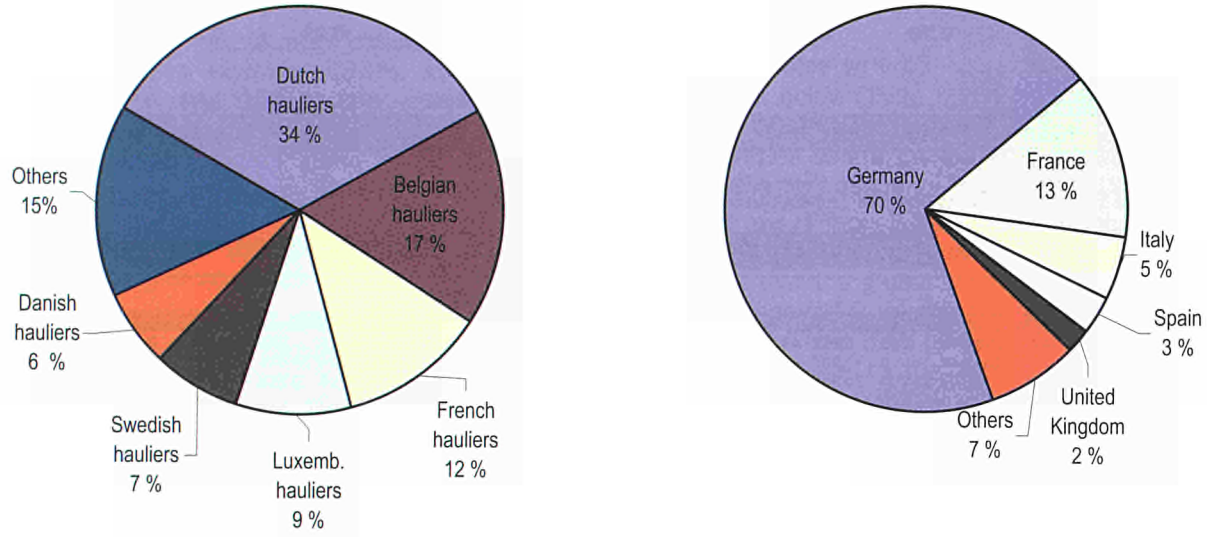
The comparison of the data from the cabotage regulation (essentially based on administrative data) with that received so far from the sample surveys indicates that there was increasing under-reporting in the cabotage regulation. The adjustment factor has been estimated as 1.1 for 1996, 1.6 for 1997 and 2.4 for the first half of 1998. It is assumed that no adjustment is required prior to 1996.

Table 5.22 outlines the total cabotage figures taking into account these adjustment factors (cf. last line of Table 5.16 for unadjusted figures).

Consequently, the overall penetration rate of cabotage in national transport markets in the EEA area would rise to about 0.40 (0.25 % without adjustment) in 1997 and about 0.52 % (0.22 % without adjustment) in 1998.

In absolute terms, the adjusted data show a large increase in total cabotage over the period 1991-98, but even in 1998 (1998 taken on an annual basis), national road transport by resident hauliers would still be more than 190 times larger than cabotage.

Graph 5.21: The most active 'caboteurs' in 1997 and the most 'cabotaged' countries



Source: Energy and Transport DG

Table 5.22: Total cabotage by hauliers from all countries - adjusted (1 000 tkm)

	1991	1992	1993	1994	1995	1996	1997	Jan.- June 1998
TOTAL	645 534	745 089	880 801	1 145 579	1 676 713	2 215 247	3 558 113	2 423 059

Source: Energy and Transport DG

5.1.5. Transport by group of goods

A common nomenclature for the classification of goods (NST - Nomenclature des Statistiques de Transport) came into force in 1961. This nomenclature was to be used for the statistics of transport in the European Community. The NST consisted of 176 headings, 52 groups and 10 chapters. In 1967, a revised version (NST/R) was made with a view to harmonisation and improvement.

NST/R well used

The NST/R is widely used in EU-15. Nearly all Member States use it at some level in their national statistics. Some countries use other specific classifications alongside the NST/R.

The information presented in the frame of this publication is limited to the 10 chapters of the NST/R nomenclature and refers to national and international transport. Depending on data availablility, statistical information of various Member States were compiled to give the best possible view. This means that footnotes attached to the various graphs should be carefully read. The 10 chapters consist of a grouping of the 24 groups of goods, derived from the NST/R. The window on the right offers a concise description of this grouping.

Chapter 9 most important in international, Chapter 6 in national transport

Table 5.23 (national transport) and Table 5.24 (international transport) outline the transport performances (expressed in million tonnes) of the three inland modes for selected Member States. It should be noted that data were compiled on the basis of data availability. This does however not distort the significance in the relative distribution by NST/R chapters. Furthermore, not all Member States contribute to the account of inland waterway transport.

NST/R chapters	
0	Agricultural products and live animals
1	Foodstuffs and animal fodder
2	Solid mineral fuels
3	Petroleum products
4	Ores and metal waste
5	Metal products
6	Crude and manuf. minerals, building materials
7	Fertilizers
8	Chemicals
9	Machinery, transport equipment, manufactured and miscellaneous articles

It is recalled that figures presented in this chapter are based on tonnes forwarded and not on tonne-kilometres (tkm) performed. The results of this analysis cannot be compared with equivalent data expressed in tkm (that take into account the distances travelled).

Apart from showing the importance of national transport with regard to the volumes forwarded, Table 5.23 shows the absolute dominance of road transport. When the three transport modes are taken together, Chapter 6 of the NST/R (crude and manufactured minerals, building materials) appears to be the most important group of all

Table 5.23: National transport in 1998 - by group of goods (NST/R chapter) - (million tonnes)

	NST/R chapters											
	0	1	2	3	4	5	6	7	8	9	Total	Modal split %
Road transport	746 832	945 489	39 638	387 136	105 954	257 331	4 163 966	83 037	412 554	1 171 327	8 313 264	92.7
Rail transport	33 576	14 082	63 332	34 017	51 283	76 816	63 432	9 546	28 983	72 677	447 744	5.0
IWW transport	5 332	15 669	20 944	36 843	4 284	3 235	96 211	4 291	10 428	5 739	202 976	2.3
Total	785 740	975 240	123 914	457 996	161 521	337 382	4 323 609	96 874	451 965	1 249 743	8 963 984	100
Share %	9	11	1	5	2	4	48	1	5	14	100	

NB: Road and rail: countries considered: B, D, EL, E, F, I (road: 1996), NL, A, P (road: 1995), FIN (road:1997), S; Inl.waterw: B, D, F, NL, A.
Source: Eurostat.

Table 5.24: International transport in 1998 - by group of goods (NST/R chapter) (million tonnes)

	NST/R chapters											
	0	1	2	3	4	5	6	7	8	9	Total	Modal split %
Road transport	29 846	26 152	1 411	3 221	3 290	17 671	26 546	2 396	29 022	73 806	213 361	39
Rail transport	6 106	2 879	2 809	8 307	8 307	17 376	7 373	2 721	8 749	46 222	110 849	20
IWW transport	9 891	13 559	20 483	38 608	39 953	10 590	49 842	7 425	16 137	21 620	228 108	41
Total	45 843	42 590	24 703	50 136	51 550	45 637	83 761	12 542	53 908	141 648	552 318	100
Share %	8	8	4	9	9	8	15	2	10	26	100	

NB: Road and rail: countries considered: B, D, EL, E, F, I (road: 1997), NL, A, P, FIN, S; Inl.waterw: B, D, F, NL, A.
Source: Eurostat.

types of goods forwarded (48 %). Chapter 9 (machinery, transport equipment, manufactured and miscellaneous articles) and Chapter 1 (foodstuffs and animal fodder) follow with 14 % and 11 % respectively.

Some 41 % of the total weight forwarded in international transport by inland waterways

The situation is quite different in international transport (see Table 5.24). Surprisingly, it appears that 'only' 39 % of the total amount of tonnes forwarded use the road as mode of transport; the majority of the goods in terms of weight are forwarded by inland waterways.

All modes considered, Chapter 9 has the most important share with 26 %, followed by minerals and building materials (Chapter 6) and chemicals (Chapter 8) with 15 % and 10 % respectively.

Inland waterway vessels forward the highest volume in five out of ten NST/R chapters (Chapter 2, 3, 4, 6 and 7).

The most complete picture can however be obtained when looking at Graphs 5.25 to 5.30: they offer both an insight by mode of transport, show the modal particularities and demonstrate the relative importance of rail and inland waterway transport for heavy and bulky goods like building materials, ores and petroleum products.

The following paragraphs will focus on the characteristics of the distribution of the NST/R chapters within the transport modes.

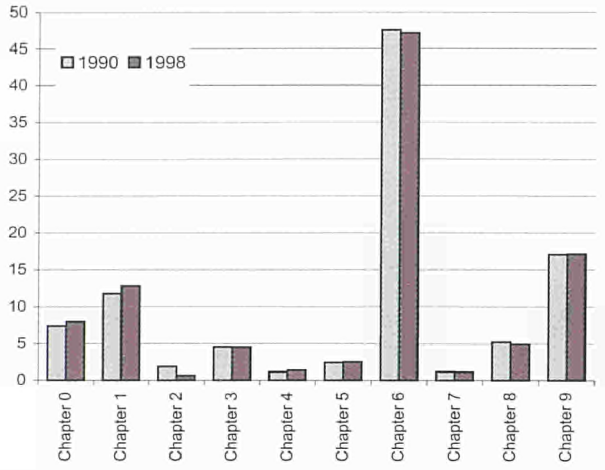
Minerals and building materials very dominant only in national road transport

Looking at the two graphs of road transport individually (Graph 5.25 and 5.26), it appears that there have been no major changes in the percentage shares of the various goods groups between 1990 and 1998. More interesting is the comparison of the various NST/R chapters between national and international transport. It then appears that the transport of crude and manufactured minerals and building materials (Chapter 6) alone accounts for nearly half (47 %) of the total volume of national road transport whereas the same goods category represents only around 15 % in international traffic.

The other most remarkable difference concerns NST/R Chapter 9 (Machinery, transport equipment, manufactured articles and miscellaneous goods): here, the opposite applies: in national transport, the share amounts to 17 %, whereas in international transport, this same group accounts for 33 %.

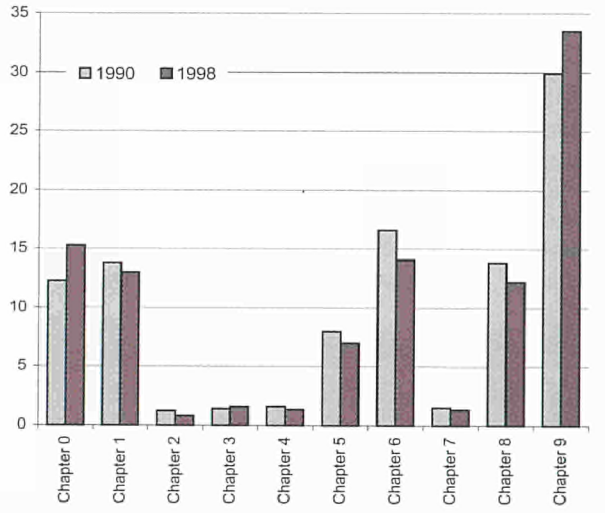
Graph 5.26 further outlines that apart from NST/R Chapter 9, there is a much more equal distribution in the kind of goods.

Graph 5.25: Share of NST/R goods chapters in national road transport in 1990 compared to 1998 (%)



NB: Data are based on tonnes forwarded in the following Member States: B, DK, D, EL, E, F, NL, P, UK.
Source: Eurostat.

Graph 5.26: Share of NST/R goods chapters in international road transport in 1990 compared to 1998 (%)



NB: Data are based on tonnes forwarded in the following Member States: B, DK, D, EL, E, F, NL, P, UK.
Source: Eurostat.

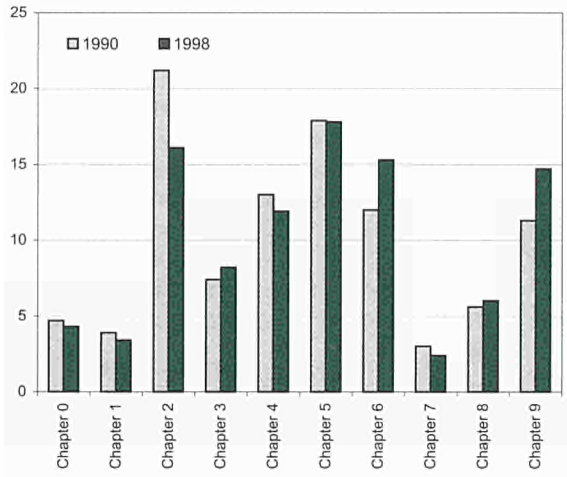
Goods in containers increasingly allocated to 'miscellaneous goods'

Although not visible in Graph 5.26, it should be noted that NST/R goods Group 24 - 'miscellaneous articles' -, a subgroup of Chapter 9, is largely responsible for the higher share in 1998 compared to 1990: whereas group 24 was responsible for 30 % of the volume in tonnes of Chapter 9 in 1990, it increased to 42 % in 1998. It has been experienced that goods in containers, for which the content is not exactly known by reporting authorities, are increasingly allocated to 'miscellaneous goods'. Similar remarks can be made for rail transport.

Rail important for solid fuels

Rail transport shows quite different characteristics when comparing national and international transport. In national transport (see Graph 5.27), the share of solid mineral fuels (NST/R Chapter 2), still dominant in 1990, decreased on behalf of minerals and building materials (Chapter 6) and machinery, transport equipment and miscellaneous articles (Chapter 9). The transport of metal products (Chapter 5) remained important and had the highest share in 1998.

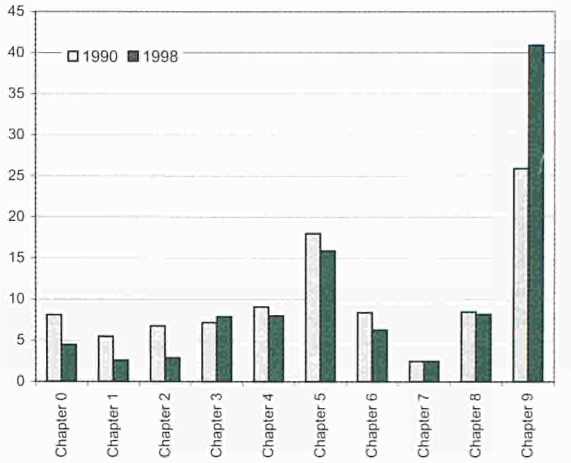
Graph 5.27: Share of NST/R goods chapters in national rail transport in 1990 compared to 1998 (%)



NB: Data are based on tonnes forwarded in the following Member States: B, D, EL, E, F, IRL, I, NL and P.
Source: Eurostat.

In international transport (see Graph 5.28), metal products are the second most important group of goods, dominated only by machinery, transport equipment and miscellaneous articles (Chapter 9), which increased substantially compared to 1990.

Graph 5.28: Share of NST/R goods chapters in international rail transport in 1990 compared to 1998 (%)

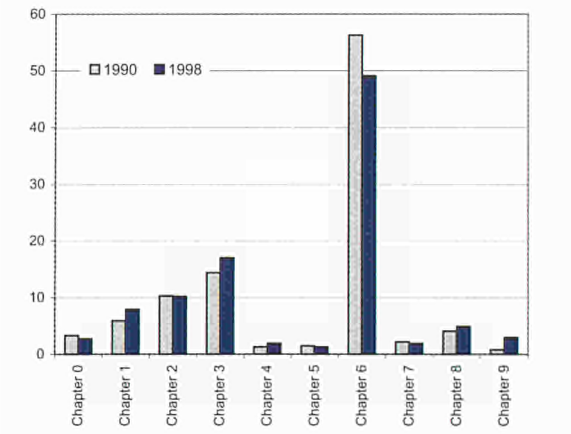


NB: Data are based on tonnes forwarded in the following Member States: B, D, EL, E, F, I, NL, P and FIN.
Source: Eurostat.

Ores and metal waste: low share in national, high share in international transport

With a share of close to 50 % in 1998, crude and manufactured minerals and building materials (Chapter 6) dominate national inland waterway transport (see Graph 5.29). The second most important group of goods consist of petroleum products (Chapter 3). Between 1990 and 1998, their share increased from 14 to 17 %. Solid minerals fuels (Chapter 2) follow with 10 %. These three NST/R chapters together account for 76 % of the entire national transport on inland waterways in 1998.

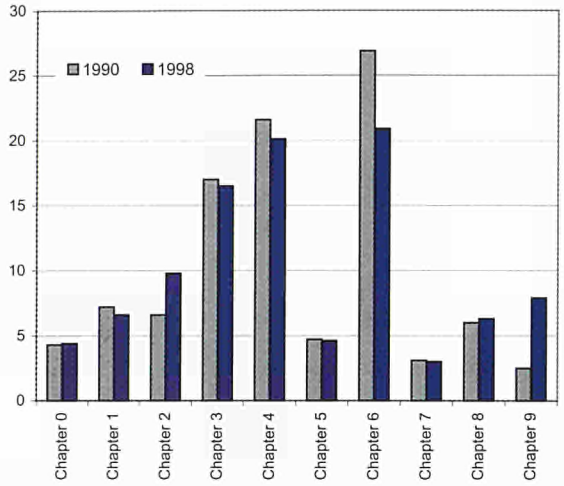
Graph 5.29: Share of NST/R goods chapters in national inl. waterway transport in 1990 compared to 1998 (%)



NB: Data are based on tonnes forwarded in the following Member States: D, F, NL.
Source: Eurostat.

Chapter 6 takes the highest share in international inland waterways transport as well (see Graph 5.30), but only by a small margin (share: 21 % in 1998). Ores and metal waste (Chapter 4), having a very low share in national transport (2 %) are of considerable importance in international transport with a share of 20 %. The share of petroleum products is, with 17 %, the third most important type of goods (the same share as in national transport). Overall, there is a more even distribution in the type of goods in international transport than in national transport. Finally, the increase of the share of Chapter 9 in 1998 compared to 1990 is noticeable. The remark on the problems in reporting procedures made earlier (road transport) also seems to apply to a certain extent to inland waterway transport.

Graph 5.30: Share of NST/R goods chapters in international inl. waterw. transport in 1990 comp. to 1998 (%)



NB: Data are based on tonnes forwarded in the following Member States: D, F, L, NL.
Source: Eurostat.

5.2. Passenger transport

5.2.1. General development

Efficient passenger transport systems are essential for European economies and the quality of life of every individual. They should meet the requirements of citizens and be sufficiently flexible to follow the evolution of transport demand.

25 % of EU-15 households without a car

In the past, this demand for mobility has largely been satisfied by an increased use of private cars, performing roughly three quarters of all trips. The use of a car offers a high degree of independence and flexibility but it should be kept in mind that about a quarter of European households do not dispose of a private car.

The main factors for an increased mobility have mainly been the geographical spreading of economic acitivities with a clear tendency of abandoning old urban production sites, and consequently:

- a separation of places of work and residential areas with the subsequent necessity of commuting;
- the rapid growth of the services sector with requirements on professional mobility;
- a higher average disposable income resulting in a higher level of motorisation;
- increased leisure time resulting in more frequent holiday journeys and recreational trips.

Everybody performs 35 km every day

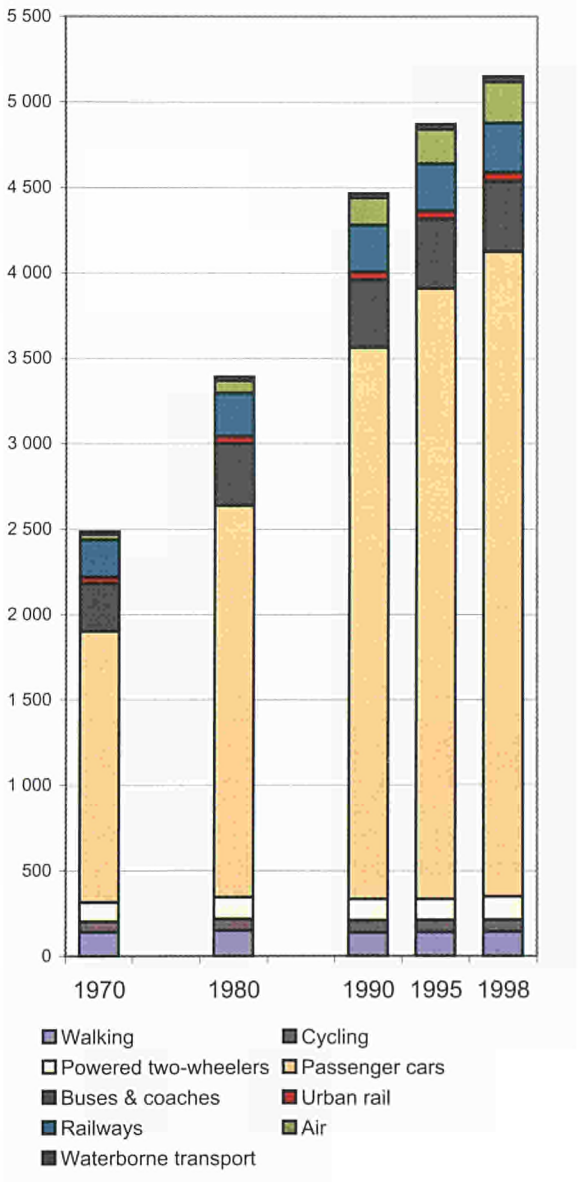
In 1998, transport demand in EU-15 (considering transport in passenger cars, buses and coaches, subways, trams, trolleys, railways and airplanes) could be established at 4 770 billion passenger kilometres (pkm) per year: this corresponds to a daily 34.9 kilometres performed each day by every single person in the European Union (1970: 16.5 km).

More than double as 'mobile' as in 1970

Graph 5.31 illustrates that the total passenger transport performance in EU-15 more than doubled between 1970 and 1998, passing from 2 485 to 5 150 million pkm (+ 107 %). If transport by car, buses and coaches, rail, urban rail and airplane were to be considered the 'main' modes, their share would be 86.8 % in 1970 and 92.7 % in 1998.

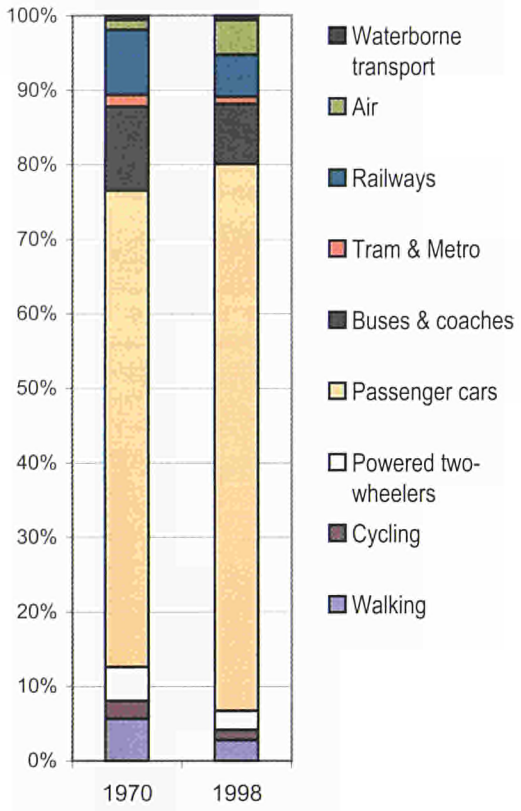
Graph 5.32 offers an insight into the modal split: the share of 'walking' for instance dropped from 5.6 % in 1970 to 2.8 % in 1998. This does not mean that we walked less: walking increased from 140 to 142 million pkm; however, performances of other modes increased much more, resulting in a relative drop of this mode.

Graph 5.31: EU-15 passenger trips by mode (million pkm)



Source: Energy and Transport DG.

Graph 5.32: EU-15 passenger trips modal split (%)



Source: Energy and Transport DG.

Air travel progresses most

If one looks only at the 'main modes' (see Table 5.33 and Graph 5.34), overall passenger transport performance in EU-15 rose by 121 % between 1970 and 1998. As could be expected, passenger car transport progressed more than the average (+ 138 %) but it is air transport that saw the biggest increase passing from 33 billion pkm in 1970 to 241 billion pkm in 1998 (+ 630 %). Air transport data mentioned here refer to international intra-EU and domestic travel only.

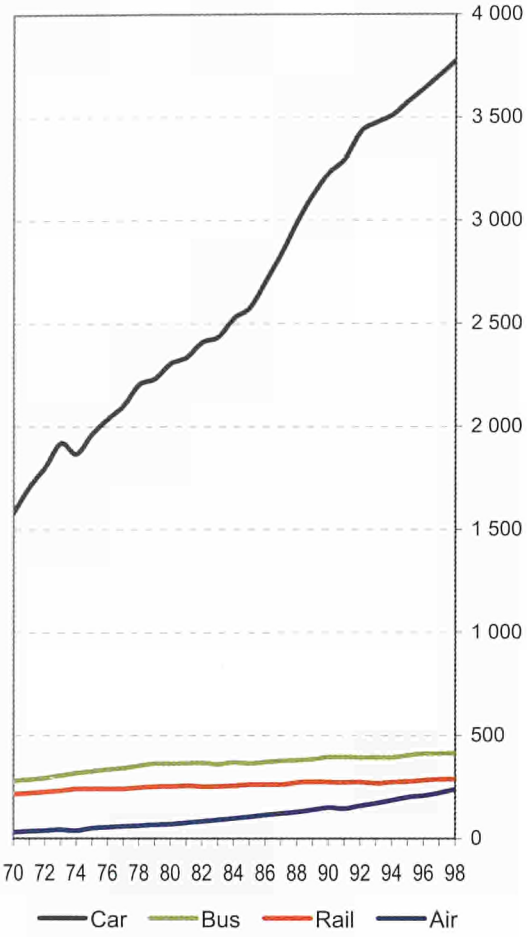
Table 5.33: Passenger transport performance by mode in EU-15

1 000 million pkm

	Passenger cars	Buses & coaches	Tram & metro	Rail-way	Air	Total
1970	1 588	280	39	217	33	2 157
1980	2 294	364	41	253	74	3 026
1990	3 231	395	49	274	157	4 106
1995	3 577	405	48	277	202	4 508
1998	3 776	415	50	290	241	4 772
1970-80 %	+ 44	+ 30	+ 5	+ 17	+ 124	+ 40
1980-90 %	+ 41	+ 8	+ 19	+ 8	+ 113	+ 36
1990-96 %	+ 17	+ 5	+ 3	+ 6	+ 53	+ 16
1970-96 %	+ 138	+ 48	+ 29	+ 34	+ 630	+ 121

Sources: ECMT, UIC, UITP, Energy and Transport DG, national statistics, estimates.

Graph 5.34: Evolution of passenger transport in EU-15 (1 000 million pkm)

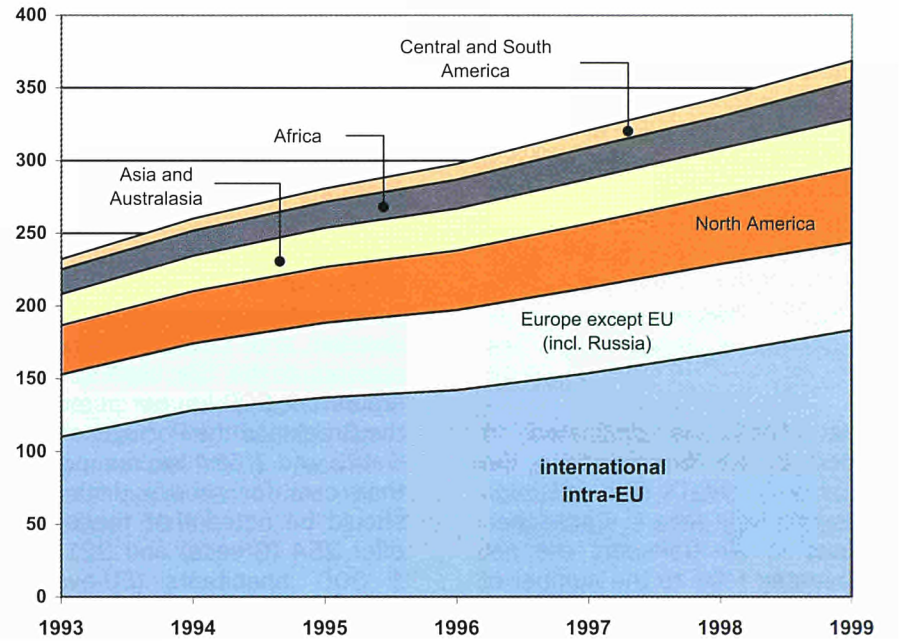


Source: Energy and Transport DG.

Graph 5.35 offers an insight on the development of total international air traffic (both intra- and extra-EU) between 1993 and 1999, based on the number of passengers carried. On average, nearly 50 % of the 369.3 million passengers carried are registered in international intra-EU traffic.

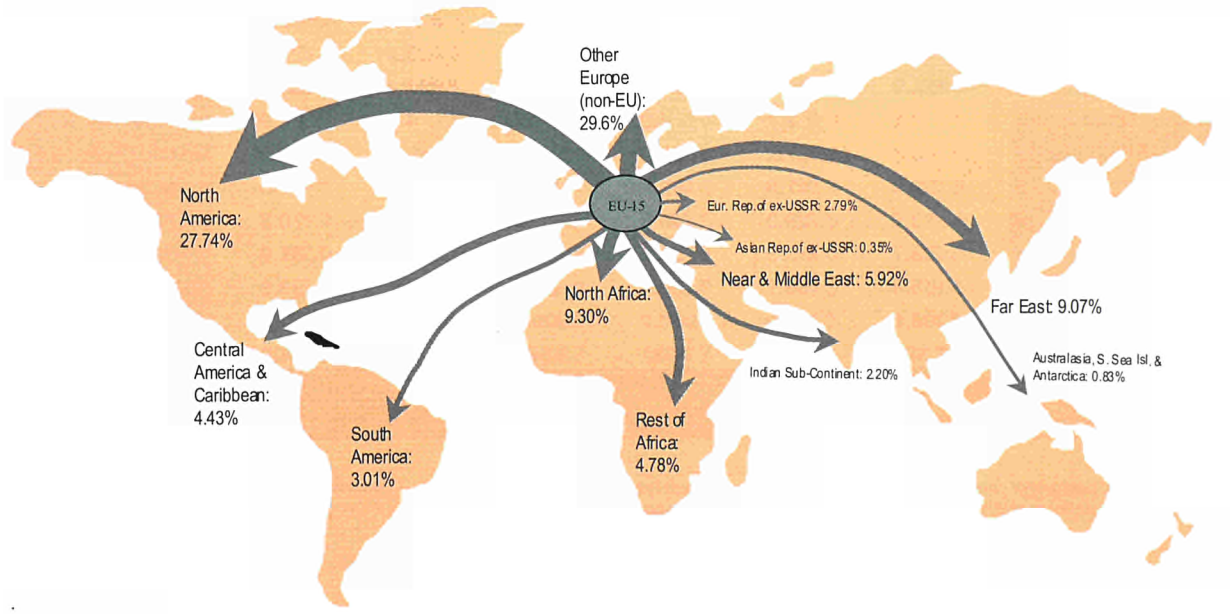
If extra-EU traffic is set at 100 %, it appears that the main share in 1999 is taken by non-EU European countries (29.6 %), closely followed by North America (see Graph 5.36). The African continent accounts for 14 % of extra-EU traffic; however, North Africa alone (with popular holiday destinations in Morocco and Tunisia) is responsible for 9.3 % of this share.

Graph 5.35 : Development of international passenger air transport by world region between 1993 and 1999 (million passengers)



Source: Eurostat

Graph 5.36: Extra-EU traffic: share in world destinations (% of total extra-EU traffic)



Source: Eurostat.

5.2.2. Passenger transport by country

The statistics on passenger transport performances by country basically reflect the general EU trends described in Chapter 5.2.1. However, the situation differs notably when taking a closer look at the modal split and the daily performance in various countries. Since passenger transport by inland waterways does not play a significant role, except perhaps at a local level like for instance in and around Venice, the following paragraphs offer a first insight on national particularities of the three main motorized transport modes (passenger cars, buses and coaches and railways).

The end of this chapter is dedicated to passenger transport by air. Compared to the other transport modes, Eurostat's data collection on air transport is relatively recent. Passenger-kilometre indications in air transport are not available; data presented refer to the number of passengers carried.

Average of 12 000 pkm in France

At EU-15 level, transport performance by car increased by 138 % between 1970 and 1998 (see Table 5.37). As could be expected, transport performances developed particularly fast in Greece, Spain and Portugal, where both road network construction and car ownership developed rapidly compared to other Member States.

A more interesting picture is obtained when looking at the average number of kilometres performed by passenger cars in 1998: In France, Sweden and Luxembourg passenger car use appears to be the highest with an average of around 12 000 km per person per year whereas the Greek and the Portuguese, with an average of 6 423 and 7 584 km respectively, obviously use their cars for shorter distances. In addition, it should be noted that these two countries only offer 254 (Greece) and 321 (Portugal) cars per 1 000 inhabitants (EU-average: 451 - see Chapter 3 - Means of transport).

Table 5.37: Transport performed by passenger cars (1 000 million pkm)

	1970	1980	1990	1995	1996	1997	1998	1998 pkm per person per year
Belgium	49.3	65.4	80.7	91.2	92.4	94.0	95.7	9 376
Denmark	33.3	38.1	47.8	54.3	55.8	57.1	58.5	11 027
Germany	394.6	513.7	683.1	730.5	730.8	735.3	740.3	9 025
Greece	8.6	27.6	48.8	58.8	61.7	64.4	68.0	6 423
Spain	*77.2*	*172.2*	*259.3*	*312.4*	*327.8*	*335.4*	*351.8*	8 935
France	304.7	452.5	585.6	664.3	674.3	687.1	708.4	12 038
Ireland	*11.0*	*17.6*	*18.1*	*23.2*	*25.1*	*27.1*	*28.5*	7 663
Italy	211.9	324.0	522.6	614.7	627.4	638.8	647.1	11 237
Luxembourg	2.1	2.7	4.0	4.7	4.8	4.9	5.0	11 725
Netherlands	66.3	107.1	136.2	146.8	145.9	151.2	150.6	9 589
Austria	32.9	47.8	62.4	68.1	65.7	*67.0*	*68.5*	8 479
Portugal	13.8	29.0	40.5	*62.0*	*66.3*	70.8	75.6	7 584
Finland	23.7	33.9	51.2	50.1	50.4	51.9	53.3	10 342
Sweden	55.4	66.7	90.0	87.0	92.7	93.6	*95.0*	10 733
United Kingdom	303.5	396.0	600.2	609.0	619.1	627.5	630.0	10 655
EU-15	1 588	2 294	3 231	3 577	3 640	3 706	3 776	10 073
index 1970 = 100	100	144	203	225	229	233	238	
Modal share % (1)	73.6	75.8	78.7	79.4	79.2	79.2	79.1	

(1) Considered: passenger cars; buses and coaches; tram, metro and rail; air.
Sources: ECMT, national statistics, Energy and Transport DG studies and estimates (in italic).

Bus and coach performance highest in Italy, but Danish use this mode more

Between 1970 and 1998, the average transport by buses and coaches in EU-15 has been increasing by nearly 50 %, arriving at a total of 415 billion pkm (see Table 5.38). Most countries present an increase of this mode, especially in the period 1970-90, with the exception of the United Kingdom, where a significant drop was registered. Some countries saw a sharp increase like Portugal (+ 221 % between 1970-98), Italy (+ 179 %) and Greece (+ 125 %).

With 89.2 billion pkm Italy offers the highest figure in the EU - this corresponds to 4.2 km per person per day. Only Greece's and Denmark's population travel more on bus and coach with 5.5 and 5.7 km per day respectively. The high figure for Greece can partly be explained by a restricted rail network. The Danish figure constitutes nearly double of the EU average (3.0 km).

Lower rail use only in Belgium

Compared to the other modes, transport performances of rail experienced only a modest increase: + 34 % at EU level between 1970 and 1998 (see Table 5.39). Since the early 1990s, growth has been slow in most countries and a certain stagnation can be seen in Germany, Greece, Italy, Austria and Portugal.

Compared to 1970 however, the number of passenger kilometres by rail progressed in all the Member States with the exception of Belgium, presenting a 6 % decrease. Highest growth was achieved in Ireland and the Netherlands (+ 85 % for both countries). The Scandinavian countries and France display an increase between 50 and 60 %.

It is on average the French who travel most by rail (2.9 km per person per day), followed by the Austrians (2.8 km). The EU-15 average is established at 2.1 km per person per day.

Table 5.38: Transport performed by buses and coaches (1000 million pkm)

	1970	1980	1990	1995	1996	1997	1998	1998 pkm per person per year
Belgium	9.3	9.1	10.9	*12.5*	*11.4*	*11.9*	*12.0*	1 176
Denmark	4.6	7.3	9.3	10.6	11.4	11.2	11.1	2 100
Germany	67.7	90.0	82.5	71.6	70.7	69.7	69.4	846
Greece	9.4	15.6	17.7	20.2	20.4	20.7	21.2	2 015
Spain	20.9	28.1	33.4	39.6	*44.0*	44.0	*45.9*	1 166
France	*35.2*	*53.0*	*57.6*	58.3	*58.7*	*58.9*	*58.8*	999
Ireland	3.3	4.5	3.9	5.2	5.3	5.5	*5.7*	1 533
Italy	32.0	57.8	84.0	87.1	88.7	88.5	89.2	1 548
Luxembourg	*0.3*	*0.3*	*0.4*	*0.4*	*0.4*	*0.4*	*0.4*	938
Netherlands	11.1	13.2	13.0	14.5	14.4	14.5	14.5	923
Austria	9.1	9.8	8.7	10.5	12.5	*12.5*	*12.7*	1 572
Portugal	4.4	7.6	10.3	13.1	13.5	*13.5*	*14.0*	1 404
Finland	7.0	8.5	8.5	8.0	8.0	8.0	7.8	1 514
Sweden	5.5	7.3	9.0	8.8	9.3	9.4	*9.5*	1 073
United Kingdom	60.2	52.2	46.2	44.3	44.2	44.2	43.2	731
EU-15	280.0	364.3	395.3	404.7	412.9	412.9	415.4	1 108
index 1970 = 100	100	130	141	144	147	147	148	
Modal share % (1)	13.0	12.0	9.6	9.0	9.0	8.8	8.7	

(1) Considered: passenger cars; buses and coaches; tram, metro and rail; air.
Sources: ECMT, national statistics, Energy and Transport DG studies and estimates (in italic).

Danes and French the most 'mobile'

Graph 5.40 presents the average daily distances travelled in 1998 using the three landborne transport modes. It should be noted that the use of tram and metro has not been considered. Furthermore, the figures are of course influenced by the availability (or non-availability) of transport modes. In many cases, there will be no modal choice for trips. However, the graph should give an impression on the availability and acceptance of the different modal networks.

With an average of 38.6 km per person per day, the Danes and the French are by far the most mobile in the EU (considering distances travelled in passenger cars, trains and buses/coaches only, excluding cycling and walking). Italy comes next with 37.5 km. The population in Greece and Portugal travels least with an average of 23.6 and 25.9 km respectively.

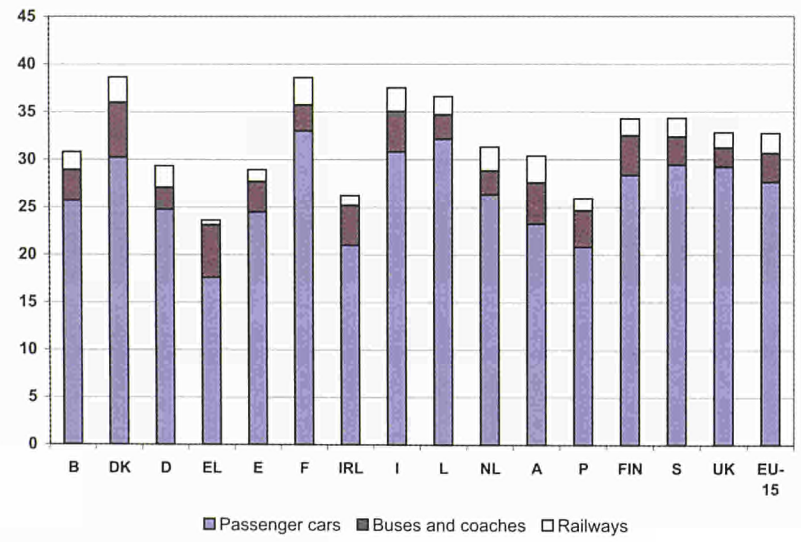
The share of rail in Greece is low and can partly be explained by a relatively poor rail network density (Greece: 19.0 km/1 000 km^2, EU-15 average: 47.5 km/1 000 km^2 - see Chapter 2.2 - Length of transport networks by country).

Table 5.39: Transport performed by railways (1 000 million pkm)

	1970	1980	1990	1995	1996	1997	1998	1998 pkm per person per year
Belgium	7.6	7.0	6.5	6.8	6.8	7.0	7.1	685
Denmark	3.6	4.5	5.1	5.0	4.9	5.2	5.6	978
Germany	56.9	63.0	62.1	69.0	69.2	67.9	66.5	828
Greece	1.5	1.5	2.0	1.6	1.8	1.9	1.8	179
Spain	15.0	14.8	16.7	16.6	16.6	17.9	18.9	454
France	41.0	54.7	63.8	55.6	59.8	61.8	64.5	1 050
Ireland	0.8	1.0	1.2	1.3	1.3	1.4	1.4	373
Italy	34.9	42.9	48.3	52.5	53.1	52.5	50.3	912
Luxembourg	0.2	0.2	0.2	0.3	0.3	0.3	0.3	692
Netherlands	8.0	8.9	11.1	14.0	14.1	14.4	14.8	918
Austria	6.4	7.6	8.7	9.8	9.9	8.3	8.2	1 030
Portugal	3.5	6.1	5.7	4.8	4.5	4.6	4.6	458
Finland	2.2	3.2	3.3	3.2	3.3	3.4	3.4	655
Sweden	4.6	7.0	6.0	6.4	6.4	6.4	7.1	723
United Kingdom	30.6	30.4	33.4	30.2	32.3	34.5	35.4	583
EU-15	216.7	252.8	274.0	276.9	284.2	287.5	289.9	767
index 1970 = 100	100	117	127	128	131	133	134	
Modal share % (1)	10.0	8.4	6.7	6.1	6.2	6.1	6.1	

(1) Considered: passenger cars; buses and coaches; tram, metro and rail; air.
Sources: ECMT, UIC and national statistics.

Graph 5.40: Average daily distance travelled per person in 1998 (km)



Source: Energy and Transport DG.

Air traffic since 1993: + 8 % every year

As mentioned at the first paragraph of this chapter, Eurostat's aviation data collection is relatively recent (since 1993) and does not include passenger-kilometre (pkm) data. Anyway, pkm data in the aviation domain are difficult to obtain. In the frame of this chapter, figures presented refer to the number of passengers carried.

The total number of passengers carried in international traffic from and to the EU countries in 1999 was 369.3 million, an increase of 7.5 % compared to 1988. International intra-EU traffic increased by 9.3 %, extra-EU traffic by 5.6 %.

Table 5.41 outlines at what pace air traffic has been growing in the individual Member States.

Table 5.41: Total international passenger air traffic: development by country

	Average annual growth 1993-98 (%)	Change 1998-99 (%)
EU-15	8.0	7.5
Belgium	13.0	8.2
Denmark	8.8[1]	8.0
Germany	6.7	7.9
Greece	1.0[2]	13.7
Spain	8.7	10.8
France	6.2	8.3
Ireland	13.1[3]	10.6
Italy	8.2	6.4
Luxembourg	7.2	5.8
Netherlands	10.7	7.6
Austria	8.4	4.3
Portugal	7.1	7.0
Finland	10.4	3.5
Sweden	9.5	10.1
United Kingdom	7.8	6.4

[1] Estimated; [2] 1996-98; [3] 1994-98
Source: Eurostat.

It appears that the average annual growth between 1993 and 1999 has been highest in Belgium and Ireland (over 12 %), followed by the Netherlands (10 %). It is quite remarkable that in the observation period, not a single Member State displayed an average annual growth of less than 5 %.

50:50 for intra and extra-EU air traffic at Community level

Taking into account departures and arrivals, the share of international intra-EU traffic is high in most Member States: in general over 60 % except for Germany, France, the Netherlands and the United Kingdom (see Graph 5.42). These countries coincide with those having Europe's major airports considered as gateways for intercontinental and long-haul air traffic, like the Paris airports, Amsterdam Schiphol, Frankfurt/Main and the London airports.

Table 5.43 lists the 15 busiest airports in international intra-EU traffic. The ranking is based on the total number of passengers carried (arrivals and departures). Ten out of 15 airports display passenger figures of over 10 million. The airport of London Stansted experienced an exceptionally high growth and climbed from 21st to 15th position. Other airports with high growth rates (over 10 %) were Madrid Barajas, Munich and Stockholm Arlanda.

Table 5.43: Top-15 airports - Total passengers carried in international intra-EU traffic

Rank 1999	Airport	Total pass. carried 1999	Change 1998-99 (%)	Rank 1998
1	London/Heathrow	24 098 568	3.0	1
2	Airport system/Paris	21 111 959	8.0	2
3	Amsterdam/Schiphol	20 003 853	8.7	3
4	Frankfurt/Main	15 783 960	9.6	4
5	London/Gatwick	14 388 102	2.2	5
6	Brussels/National	14 230 076	8.8	6
7	Palma de Mallorca	13 846 800	10.0	7
8	Copenhagen	12 123 674	:	:
9	Dublin	10 813 253	8.6	9
10	Manchester Internat.	10 301 849	2.3	8
11	Munich	8 634 178	13.5	11
12	Madrid/Barajas	8 172 549	14.9	13
13	Düsseldorf	8 171 674	6.1	10
14	Stockholm/Arlanda	7 935 192	10.1	12
15	London/Stansted	7 215 294	46.4	21

Source: Eurostat.

More than a third of the traffic with America and Asia by the UK

With regards to extra-EU passenger traffic, Table 5.44 details the information provided in the map displayed in the previous chapter at Member State level. Germany leads in traffic to non-EU European countries with 26.5 % of the passengers carried, well in front of the United Kingdom with 22.1 %. Instead, the UK has a clear dominance in traffic with America (37.7 %), followed by Germany, France and the Netherlands. The latter three countries together handle roughly the same traffic with America as the United Kingdom alone. The same ranking prevails for traffic with Asia and Australasia.

France holds the first position in traffic with Africa. The high share of 33.6 % is mainly due to important traffic with North African destinations.

Extraordinary growth for Milan Malpensa

Finally, Table 5.45 shows the ranking of the 15 most important airports in extra-EU traffic (arrivals and departures) for 1999. The first five positions are taken by very large airports (except for the airport system of Paris, regrouping Charles de Gaulle, Orly and Le Bourget airports), all handling more than 10 million passengers per year. The progress made in 1999 by the airport of

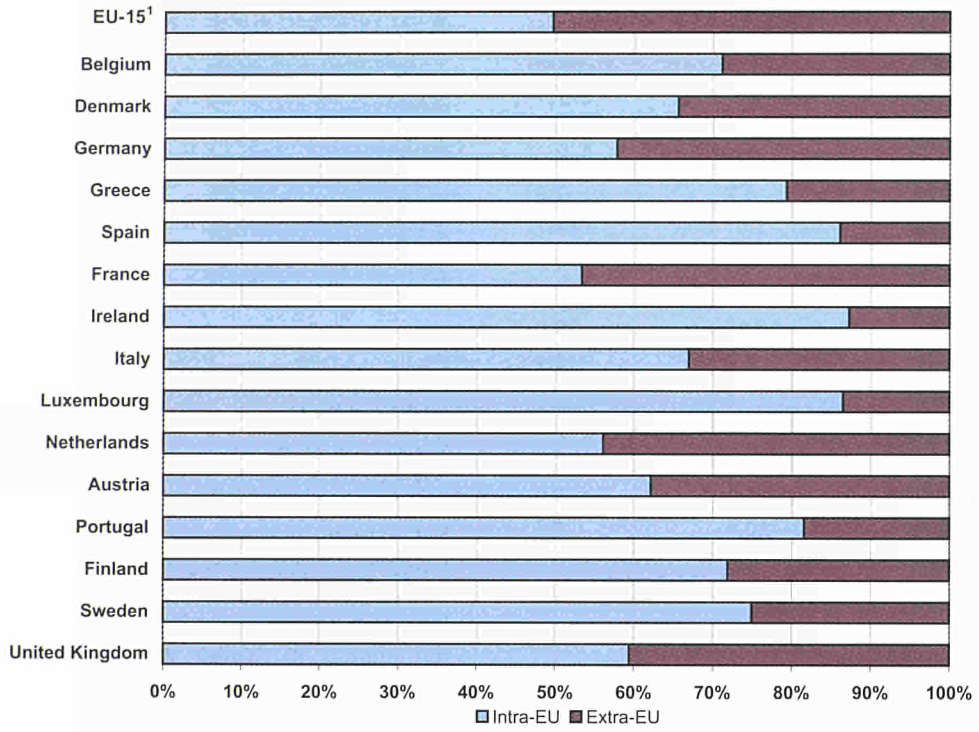
Milan Malpensa compared to 1998 is striking: the extraordinary growth (+ 94 %) was registered after important infrastructural improvements (new terminals, doubling of traffic capacity) were made. Malpensa airport is one of the 14 priority projects of the transport TENs (see Chapter 2.4). Conversely, the other major Italian airport of this ranking, Rome Fiumicino, lost nearly 20 % in just one year.

Table 5.45: Top-15 airports - passengers carried in extra-EU traffic

Rank 1999	Airport	Total pass. carried 1999	change 1998-99 (%)	Rank 1998
1	London/Heathrow	30 742 947	3.2	1
2	Airport system/Paris	23 154 185	6.6	2
3	Frankfurt/Main	21 329 717	7.7	3
4	Amsterdam/Schiphol	16 256 367	5.9	4
5	London/Gatwick	13 237 515	8.3	5
6	Madrid/Barajas	5 811 913	11.1	8
7	Brussels/National	5 768 162	6.7	7
8	Milano/Malpensa	5 567 574	93.7	13
9	Copenhagen	5 411 118	:	:
10	Rome/Fiumicino	4 911 483	-19.4	6
11	Munich	4 782 838	12.6	10
12	Manchester/Intern.	4 425 173	-1.2	9
13	Vienna/Schwechat	4 363 905	5.3	11
14	Düsseldorf	3 875 351	-3.7	12
15	Stockholm/Arlanda	3 222 006	14.1	14

Source: Eurostat.

Graph 5.42: Distribution between international intra-EU and extra-EU passenger traffic by air in 1999



[1] For EU-15, in order to avoid double counting of intra-EU passengers (at the departure and arrival airports), only departures have been taken into account, whereas for the breakdown of each individual Member State, passengers at departures and arrivals have both been considered. Thus a person flying for instance from France to Spain, is counted as one intra-EU passenger for France (departure airport), for Spain (arrival airport) and also as only one Intra-EU passenger for EU-15 (as a passenger departing from France, but not as a passenger arriving in Spain).
Source: Eurostat.

Table 5.44: Extra-EU passenger air traffic to world regions in 1999: shares of individual Member States (%).

	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK	EU-15
Total extra-EU traffic	3.1	:	20.9	2.5	5.7	15.0	1.0	6.6	0.1	8.8	2.7	1.2	1.1	2.1	29.2	100
Europe except EU	3.3	:	26.5	5.2	7.5	9.6	0.6	5.1	0.2	7.0	4.9	1.3	2.2	4.6	22.1	100
America	2.9	:	16.8	0.7	7.2	12.7	2.2	5.8	0.1	10.3	0.6	1.7	0.4	0.9	37.7	100
Asia & Australasia	1.2	:	21.0	2.5	1.6	14.9	0.0	7.2	0.0	11.7	3.1	0.1	1.1	1.0	34.7	100
Africa	5.9	:	18.5	1.0	3.5	33.6	0.3	11.4	0.2	5.7	2.4	1.6	0.2	0.5	15.3	100

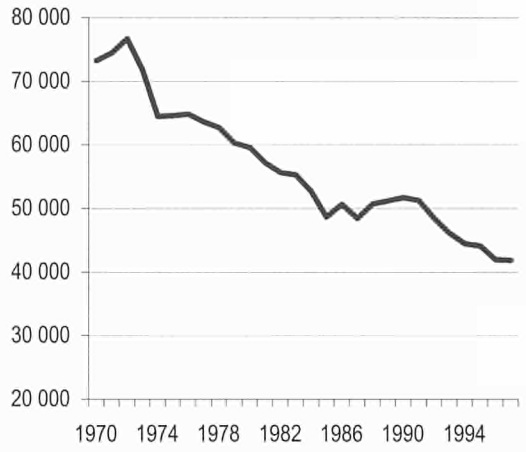
NB: No data available for Denmark.
Source: Eurostat.

6. Transport safety

Traffic accidents in road and rail transport claimed about 44 000 lives in the EU in 1998. More than 1.7 million persons were injured.

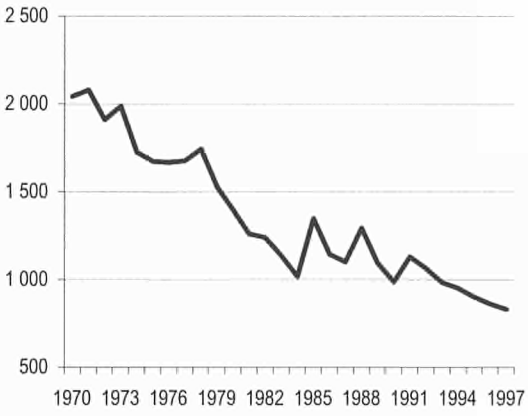
The vast majority of deadly accidents occurred in road traffic. For the age category of under 45 years old, road accidents continue to be the the first cause of mortality. Still, despite the fact that road transport at Community level more than doubled between 1970 and 1998, the number of victims decreased by 44 % (see Graph 6.1). It should however be noted that important differences between the individual Member States still exist.

Graph 6.1: Number of persons killed in road accidents / EU-15



Source: Eurostat.

Graph 6.2: Number of persons killed in accidents involving railways / EU-15



Source: UIC.

The number of victims in rail accidents is relatively low. At Community level, the absolute number of victims fluctuate around 1 000 since the mid-1980s. A slight tendency towards a further decline can be recorded but figures continue to vary from year to year (see Graph 6.2). A single major accident can seriously influence the statistics.

The following paragraphs highlight the situations in the individual Member States. Due to the diverging definitions of 'injured persons', the analysis is limited to the number of deaths (see note of Table 6.3).

General downward trend since the 1970s

A large number of measures for increased road safety have been taken in the past - both at Community, national and local level: improved road design, more motorways (for the same distance travelled, motorways are much safer than any other roads) higher safety standards, better monitoring of the roadworthiness of the vehicle fleet and a stricter legislation on drink-driving are only a few examples.

Since the beginning of the 1970s, a general downward trend has been predominant in the EU. Only in Greece, Spain and Portugal, where the number of cars has been rapidly increasing, was this tendency not followed. A significant decline was registered in Spain from the early 1990s, in Portugal from the mid-1990s onwards.

Some 25 % less road deaths in less than a decade

Table 6.3 shows that the total number of road accident victims at Community level decreased from 56 414 in 1990 to 42 608 in 1998. This corresponds to a decrease of nearly 25 % in less than a decade. Greece is the only country where the number of road fatalities does not show a downward trend during the last decade.

Fatalities per inhabitant: Sweden lowest

Table 6.4 outlines that in 1998, Sweden recorded the lowest number of deaths per million inhabitants (60), followed by the United Kingdom (62) and the Netherlands (68). On the other extreme, Portugal's rate is four times higher (243). Austria and Italy display figures close to the EU-15 average (114). The EU average stood at 155 in 1990.

Graph 6.5 (EU-15) and Table 6.6 (by Member State) show the number of deadly victims per 1 000 million passenger-kilometres travelled. It should be noted that cyclists and pedestrians killed in car accidents are included in these

Table 6.3: Number of persons killed in road accidents (harmonised)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
EU-15	56 414	55 997	52 769	48 409	46 359	46 098	43 538	43 402	42 608
index 1990 = 100	100	99	94	86	82	82	77	77	76
Belgium	1 976	1 873	1 672	1 660	1 692	1 449	1 356	1 364	1 500
Denmark	634	606	577	559	546	582	514	489	449
Germany	11 046	11 300	10 631	9 949	9 814	9 454	8 758	8 549	7 792
Greece	2 050	2 112	2 158	2 159	2 253	2 411	2 068	2 199	2 226
Spain	9 032	8 836	7 818	6 378	5 615	5 751	5 483	5 604	5 957
France	11 215	10 483	9 900	9 867	9 019	8 891	8 541	8 444	8 918
Ireland	478	445	415	431	404	437	453	472	429
Italy	7 137	8 083	8 014	7 163	7 091	7 020	6 676	6 712	6 314
Luxembourg	71	80	73	78	66	70	71	60	57
Netherlands	1 376	1 281	1 285	1 252	1 298	1 334	1 180	1 163	1 066
Austria	1 558	1 551	1 403	1 283	1 338	1 210	1 027	1 105	963
Portugal	3 017	3 218	3 084	2 700	2 504	2 711	2 730	2 521	2 425
Finland	649	632	601	484	480	441	404	438	400
Sweden	772	745	759	632	589	572	537	541	531
United Kingdom[1]	5 402	4 753	4 379	3 814	3 650	3 765	3 740	3 741	3 581

[1] Data refer to Great Britain only.
NB: Persons dying within 30 days following the accident.For countries that do not follow this definition (Greece: 3 days (until 1996) - Spain: 1 day (until 1992) ; France: 6 days ; Italy: 7 days ; Austria: 3 days (until 1991) and Portugal: 1 day), correction factors have been applied: Greece: 1.18, Spain: 1.3, France: 1.09 until 1993 and 1.057 from 1994 onwards, Italy: 1.078, Austria 1.12 and Portugal: 1.3.
Source: Eurostat.

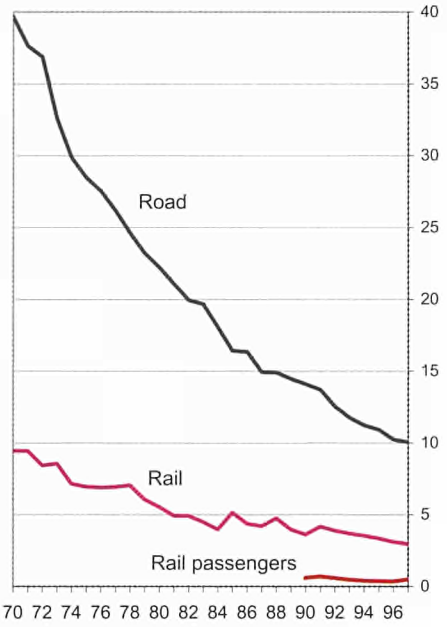
Table 6.4: Number of persons killed in road accidents per million inhabitants

	1990	1991	1992	1993	1994	1995	1996	1997	1998
EU-15	155	153	143	131	125	124	117	116	114
index 1990 = 100	100	99	93	85	81	80	75	75	73
Belgium	198	187	166	165	167	143	134	134	147
Denmark	123	118	112	108	105	111	98	93	85
Germany	139	141	132	123	121	116	107	104	95
Greece	202	206	209	208	216	231	197	209	212
Spain	232	227	200	163	143	147	140	143	151
France	198	184	173	171	156	153	146	144	152
Ireland	136	126	117	121	113	121	125	129	116
Italy	126	142	141	126	124	123	116	117	110
Luxembourg	186	207	186	196	163	171	171	143	143
Netherlands	92	85	85	82	84	86	76	75	68
Austria	202	199	177	161	167	150	127	137	119
Portugal	305	326	313	273	253	273	275	253	243
Finland	130	126	119	96	94	86	79	85	78
Sweden	90	86	88	72	67	65	61	61	60
United Kingdom[1]	97	85	78	68	64	66	66	65	62

[1] Data refer to Great Britain only.
Source: Eurostat

figures. Sweden, the United Kingdom, Denmark and the Netherlands display the lowest number of deaths. The risk of being killed in a car accident in Portugal is nearly 4 and in Greece 5 times higher. On average, the risk of being killed in a road accident is 1 % per million kilometres travelled.

Graph 6.5: Number of killed persons in EU 15 (1000 million pkm)

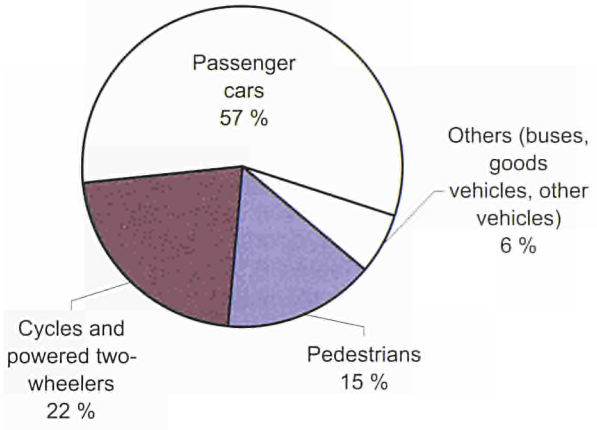


Source: Eurostat, UIC.

Some 15 % of all road accident deaths are pedestrians

In 1997, 57 % of all road accident victims were the drivers and passengers of passenger cars, 22 % cyclists and drivers and passengers of powered two-wheelers (see Graph 6.7). Pedestrians implied in car accidents account for 15 % of the deaths. Among the pedestrians, the age group of 65 and over continues to be the most exposed (44 % of all pedestrians killed). As shown in Graph 6.8, more than 14 % of all fatal road accidents involve pedestrians.

Graph 6.7 : EU-15: Deadly victims in road accidents in 1997: share by type of user



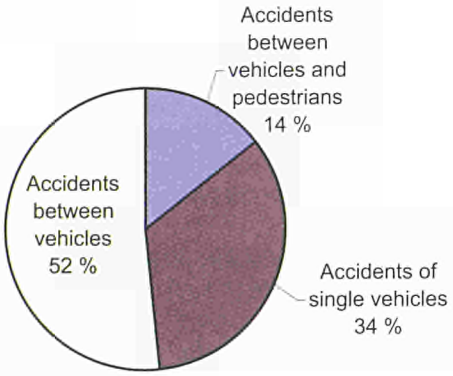
Source: Eurostat.

Table 6.6: Deaths in road accidents (1 000 million pkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
EU-15	15	15	14	12	12	11	11	10	10
Belgium	22	20	17	17	17	14	13	13	14
Denmark	11	10	10	9	9	9	8	7	6
Germany	14	15	13	12	12	12	11	11	10
Greece	31	31	31	30	30	31	25	26	25
Spain	31	29	24	19	16	16	15	15	15
France	17	16	15	14	13	12	12	11	12
Ireland	22	19	17	17	15	15	15	14	13
Italy	12	13	12	10	10	10	9	9	9
Luxembourg	16	17	15	16	13	14	14	11	10
Netherlands	9	9	8	8	8	8	7	7	6
Austria	22	20	18	16	17	15	13	14	12
Portugal	40	41	37	29	24	24	23	21	19
Finland	11	11	10	8	8	8	7	7	7
Sweden	8	7	8	6	6	6	5	5	5
United Kingdom	8	7	7	6	6	6	6	6	5

Source: Eurostat

Graph 6.8: EU-15: Deadly victims in road accidents in 1997: share by type of accident



Source: Eurostat.

Rail accidents: most victims are not train passengers

The situation differs for accidents linked to railways. Graph 6.5 displays how the number of deaths per 1 000 million passenger-kilometres travelled have been decreasing at Community level since 1970. Tables 6.9 and 6.10 show the same information at Member States level for the period 1990-98.

Graph 6.5 and Table 6.10 indicate that only a minority of rail accident victims are actually passengers travelling in trains. Most fatalities have been recorded in accidents occuring at railway level crossings and in shunting procedures as well as track maintenance works without however claiming victims among passengers travelling in the trains. This should be taken into account when looking at Graph 6.2 and Table 6.9.

Expressed in passenger-kilometres travelled, it then appears that at Community level, rail transport is 20 times safer than road transport. A single major accident can however considerably influence the general image.

Victims in air transport accidents

Since 1993, Eurostat has been collecting and processing various aviation data at EU level. The collection of these data is on voluntary base.

Various definition problems have to be agreed upon in the forefield: should accidents involving EU carriers have been taken into account or rather accidents on EU-15 territory regardless of the nationality of the carrier? How should accidents that happen outside territorial waters have been dealt with?

Graph 6.11 displays two curves for the period 1970 to 1999 (included): one curve expresses the number of deadly victims in accidents on or over EU territory (accidents happening over international waters are excluded), the other curve represents the number of victims in accidents involving carriers registered in EU Member States. Please note that the figures include only passengers and crew members and exclude victims on the ground.

Table 6.9: Number of killed in accidents involving railways (1 000 million pkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
EU-15	3.6	4.2	3.9	3.7	3.5	3.3	:	:	:
Belgium	3.1	2.7	3.2	3.4	4.5	3.0	3.8	2.6	4.2
Denmark	1.2	2.6	3.3	1.7	1.8	2.0	:	:	:
Germany	4.0	5.3	5.7	4.8	4.4	4.3	3.9	3.7	3.8
Greece	17.2	25.0	14.0	35.3	30.0	31.2	24.0	22.6	29.4
Spain	1.8	1.8	1.7	1.9	1.9	1.4	1.3	2.1	0.7
France	2.9	3.6	3.2	2.9	2.6	2.3	2.3	1.9	2.1
Ireland	11.4	8.5	9.0	2.4	8.7	5.4	6.2	10.0	:
Italy	1.7	2.0	2.3	1.7	1.6	2.3	2.0	1.9	2.3
Luxembourg	9.6	17.4	3.9	15.3	17.3	10.5	10.6	10.0	3.3
Netherlands	3.9	2.6	2.2	2.3	2.4	3.5	2.6	:	:
Austria	6.2	8.1	3.2	6.9	5.5	6.9	4.8	2.8	4.4
Portugal	23.1	24.4	26.0	24.5	29.2	19.8	27.1	25.9	21.1
Finland	10.8	10.5	10.1	6.7	9.9	5.3	3.7	6.2	7.1
Sweden	3.0	4.7	5.4	3.3	1.9	1.5	2.7	1.7	2.4
United Kingdom	2.3	2.1	1.2	1.3	1.4	0.9	0.8	1.4	1.0

Sources: Eurostat, UIC.

Despite the very important increase in air traffic, both curves show a general decline over the last 30 years, although particularly strong fluctuations characterise the first decade observed. 1972 was a year marked by 15 accidents, 5 of which caused the death of more than 100 persons. Another particularly tragic year was 1977 when a single accident (collision between two large aircrafts) claimed 583 lives. The fact that one aircraft was operated by a EU company and the other by a non-EU operator explains the strong difference between the two curves for that year. 1988 was marked by the Lockerbie disaster (259 victims - victims on the ground not included). These victims are included in the 'EU territory' curve but are disconsidered in the 'EU-operator' curve since the aircraft was operated by a North American company.

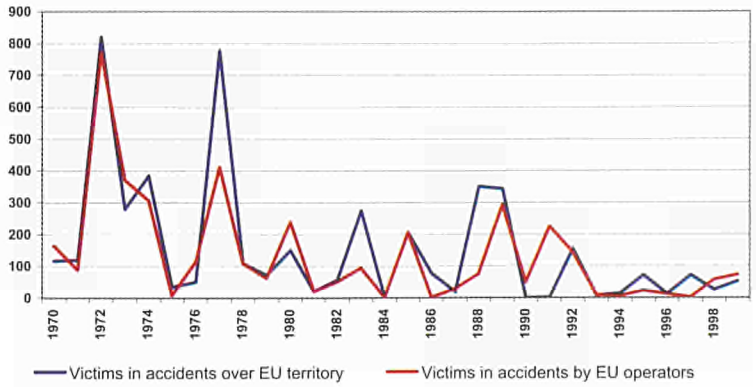
Comparisons with safety in road and rail transport are difficult. Reliable statistics on the passenger-kilometres performed in air traffic are scarce. But even with reliable figures, the image would be distorted since only few accidents happen en route. The vast majority of accidents happen either at take-off/initial climb or during final approach/landing. According to the independent and non-profit Flight Safety Foundation and based on a long-term study, only 4.7 % of the accidents occur during the cruise phase although this phase constitutes 57 % of the flight time (based on an average total flight time of 1.5 hours). Some 24 % of the accidents happen during take-off and initial climb (2 % of the flight time), 45 % during final approach and landing (4 % of the flight time). Long-haul flights are thus not particularly more dangerous than short-haul flights. The establishment of the 'victims per 1 000 million passenger-kilometre'-ratio has therefore only very limited value. The same would apply for the establishment of the ratio 'victims per flying hours'.

Table 6.10: Number of killed railway passengers in accidents involving railways (1 000 million pkm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
EU-15	0.6	0.7	0.6	0.5	0.4	0.4	:	:	:
Belgium	0.0	0.3	0.0	0.1	0.5	0.4	0.9	0.1	0.4
Denmark	0.2	0.8	0.8	0.2	0.4	0.0	:	:	:
Germany	0.8	0.7	0.9	0.6	0.4	0.5	0.4	0.4	1.9
Greece	0.0	0.5	1.0	1.2	4.3	1.9	0.0	1.1	0.0
Spain	0.2	0.0	0.0	0.1	0.0	0.0	0.0	1.2	0.1
France	0.5	0.8	0.6	0.6	0.3	0.4	0.2	0.4	0.2
Ireland	0.8	0.8	0.0	0.0	0.8	0.0	0.0	0.7	:
Italy	0.2	0.5	0.2	0.0	0.0	0.1	0.3	0.3	0.4
Luxembourg	0.0	0.0	0.0	7.6	3.5	0.0	0.0	0.0	0.0
Netherlands	0.2	0.0	0.0	0.0	0.0	0.0	0.1	:	:
Austria	0.7	0.9	1.0	1.2	0.6	0.7	0.3	0.1	0.5
Portugal	3.9	2.6	4.6	3.5	3.7	2.5	2.2	3.0	1.7
Finland	0.0	2.8	0.3	0.0	1.0	0.3	0.9	0.3	2.9
Sweden	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.3	0.0
United Kingdom	1.1	1.0	0.6	0.5	0.6	0.3	0.5	0.8	0.5

Sources: Eurostat, UIC.

Graph 6.11 : Number of deaths in air accidents* 1970-1999.



* Accidents during training and test flights, accidents involving aircrafts of armed forces and accidents in business flying excluded. In-flight accidents due to sabotage, terrorist attacks and war risks included.
Source : Airclaims CASE2 database

7. Environment and energy

7.1. General development

It has been recognised for many years that the transport sector is one of the main sources of pressure on the environment, particularly in relation to air pollution and noise. Numerous measures have been taken in the past; it is true that notably road vehicles are substantially more energy-efficient and pollute less than they did 10 or 20 years ago. In most countries however, environmental measures failed to keep pace with growing transport volumes.

CO_2: + 44 % between 1985 and 1997

The transport sector accounted for 31.6 % of the total energy consumption in the EU in 1998. With regards to CO_2 emissions, it is responsible for 842 million tonnes (1997), corresponding to 27.5 % of the total. The transport sector saw its CO_2 emissions rise by 44 % over the period 1985 to 1997. The fact that total CO_2 emissions increased only by a moderate 2 % in this same period is due to the fact that the industry consumes considerably less (- 18 % - see Table 7.9 in Emissions chapter).

Improving the sustainability of the transport sector clearly requires a more comprehensive and integrated transport and environment policy approach, combining legislation and economic instruments in a transparent way across all transport modes. An integration implies a change in policy-making focus from 'end-of-pipe' actions to a greater focus on preventative actions.

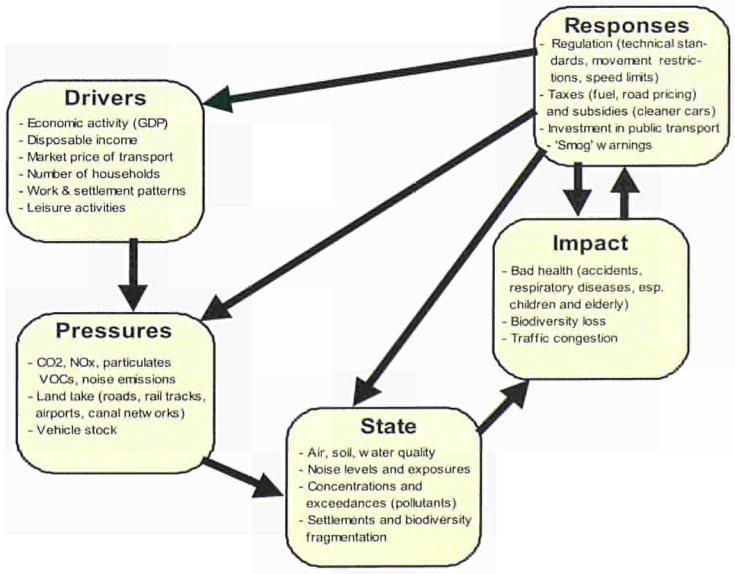
Preventative and integrated

More than ever, there is a need for better integration of environmental concerns into transport policies and decision-making. This integration has been given a high political priority following the Treaty of Amsterdam. As part of this process, a transport and environment reporting mechanism (TERM) for the EU was initiated by the Commission and the European Environmental Agency (EEA), generating an indicator-based report. The report will include a set of indicators most relevant to EU policy needs and decision-making. It should allow for the evaluation of whether transport develops in line with the objectives of sustainable mobility (EU's fifth environmental action programme).

Graph 7.1 outlines the DPSIR approach (driving forces, pressures, state, impact and responses), a generic tool to support understanding of the complex relationships across the whole range of environmental issues.

It is not the aim of this introductory chapter to go into detail of the TERM project. However Eurostat would like to outline the integrated approach of TERM, where most facets of the transport sector are covered. The TERM indicator list not only covers transport demand and intensity, but also aspects like landuse, access to basic transport services and expenditure on personal mobility, topics not covered by the present publication.

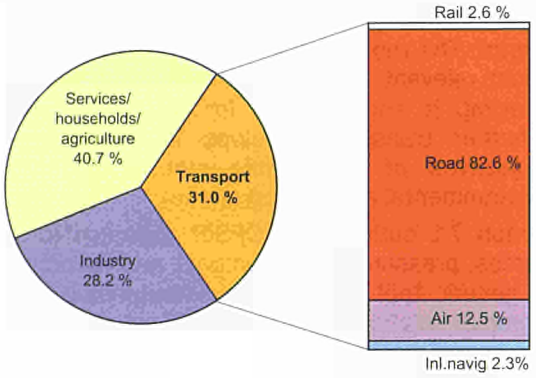
Graph 7.1: The DPSIR framework for reporting in the environmental impact of transport



Consumption and emissions closely linked

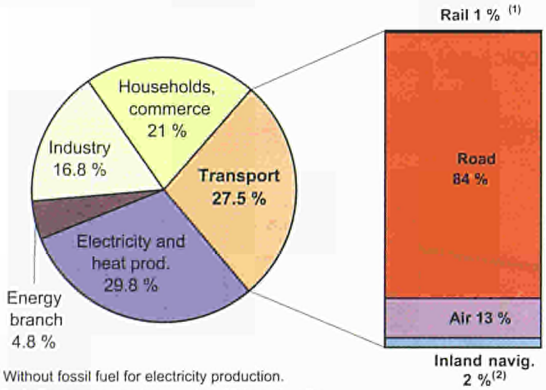
With regards to fossil fuels, less consumption in general means less CO_2 emissions. Graph 7.2 shows the transport share in final energy consumption. Within the transport sector, road transport has a share of over 80 %, followed by air transport with 12.5 %. Graph 7.3 outlines a similar picture with regard to the shares of the various transport modes in CO_2 emissions from fossil fuels.

Graph 7.2: Share of transport in final energy consumption - 1997 (% of mioTOE)



Source: Eurostat

Graph 7.3: CO_2 emissions from fossil fuels in EU-15 - share of transport in 1997



(1) Without fossil fuel for electricity production.
(2) Including passenger transport and leisure boating.

Source: Eurostat

Reformulated fuels

Although CO_2 emissions are often in the focus of public discussion, it should be noted that substantial efforts are made to reduce other pollutants as well.

In road traffic, lead emissions have been drastically reduced following the introduction of unleaded petrol. Catalyst technology has brought a constant reduction in the quantities of nitrogen oxides (NO_x), carbonmonoxides (CO) and volatile organic compounds (HC) emitted per vehicle. Improved motor vehicle engine technology (direct petrol injection, particulate filters on diesel-engined cars), the gradual introduction of fuels with a considerably reduced content of sulphur (less than 50 parts per million) and the coming into force of new EU emission standards had and will continue to have positive effects.

The situation in certain Member States is now such that a small percentage of old vehicles emit a proportionally large amount of noxious substances. Various national scrappage schemes have contributed in getting these old vehicles off the road.

Electricity for traction in rail transport is constantly increasing in most Member States (see Chapter 3 - Means of transport). It should however be noted that emissions corresponding to electricity used in transport appear under electricity production and not transport.

Scrappage schemes also for vessels

Although transport by inland waterways is of minor importance compared to the other modes, it should be mentioned that the fleet of vessels has undergone substantial changes over the last 20 years: scrappage schemes in various countries have eliminated smaller and less efficient vessels from the fleet. From the environmental point of view, inland navigation is of considerable interest and still has potential for further development at EU level.

Tropopause emissions

Liberalisation of air traffic has certainly brought further positive effects with regard to the 'democratisation' of air travel, but it is increasing rapidly, at rates outperforming the impact of technological improvements reducing engine emissions. Aircraft emissions are small compared to other man-made emissions, but within the transport sector, its share is rapidly increasing. The main difference with other transport modes is the fact that a substantial part of aircraft emissions occur in the critical altitude region below and above the tropopause, between 9 and 14 km altitude. This could significantly affect atmospheric ozone and cloud coverage. Substantial research is needed to sufficiently understand how aircraft perturb the atmosphere. Unless new, less-polluting engines and significantly more fuel-efficient aircraft technologies are introduced, the relative contribution of aviation to environmental changes will become more significant.

7.2. Energy consumption

Some 26 % of total energy consumption for road transport alone

Since 1960 the share of transport (road, rail, inland navigation and aviation) in the total final energy consumption has been constantly increasing. In the beginning of the early 1990s, it overtook that of industry and stood at 32 % in 1998 (1960: 17 %). As can be seen in Table 7.4 road transport alone accounts for more than a quarter of the total final energy consumption in the EU.

Within the transport sector (not considering international maritime transport and pipelines), the share of road transport is over 82 % (1960: 57 %). Rail transport stands at less than 3 % (1960: 31 %) and transport via inland waterways at 2 % (1960: 5 %). The remaining 13 % are attributed to air transport.

Upward trend despite increasing fuel efficiency

Road transport is by far the largest consumer of petroleum products and although future developments may lead to a greater use of alternative fuels, there is presently little possibility for substitution. Increased car ownership and mobility, the trend towards larger engines as well as a growing share of goods transport by road offset the general tendency of lower consumption through more fuel-efficient vehicles.

Table 7.5 displays the consumption of main fuels by country and by transport mode. It considers the main fuels used for propulsion and does not include lubricants. Indications for road include liquefied petroleum gas (LPG), leaded and unleaded motor spirits as well as diesel fuel. LPG plays a very limited role in most Member States. Exceptions are the Netherlands and Italy, where LPG contributes 8 % and 5 % respectively. Given the small amounts actually consumed at EU level, compressed natural gas (CNG) has been disregarded. Coal used for rail traction has not been taken into account because of its very small share. Electricity consumption for rail traction, which includes urban transport systems, has been converted to 'tonne of oil equivalent' (toe) to enable comparison. Attention should be given to the consumption of the inland waterways transport mode. In fact, the indicated figures include consumption used by small vessels (including leisure boats) performing coastal shipping and not using fuel from international maritime bunkers. This explains data from countries who do not dispose of a significant inland waterway network.

Road share of over 75 % for all countries

All countries show a high road transport share. At EU-15 level, the consumption of road transport increased by 3 % in 1998 compared to 1997. All individual countries display an increase except for the Netherlands, Austria and the United Kingdom where consumption decreased by around 1 %.

Due to the growing share of electrified lines, the consumption of electricity for rail traction is increasing to the detriment of diesel fuel. Greece and Spain have the highest consumption for inland navigation. Its modal share is relatively high and can partly be explained by the importance of the tourism sector. It further appears that at EU-15 level, aviation recorded the highest increase in fuel consumption between 1985 and 1998: + 84 %.

Price influences fuel mix

The price of road transport fuels influence consumers choice, both in terms of the quantities and the type of fuel purchased. The basic fuel price is set by oil production and the world market

Table 7.4: Final energy consumption (all products) of the transport sector - EU-15 (million toe)

	1985	1990	1995	1996	1997	1998	Share 1998 (%)
Final energy consumption	823.2	862.2	897.5	935.2	931,0	944.7	100
			of which:				
Industry	264.4	265.2	257.5	259.6	262.6	261.5	27.7
Services, households	355.9	343.1	364.3	392.2	379.6	384.3	40.7
TRANSPORT	202.8	253.8	275.7	283.4	288.8	298.8	31.6
			of which:				
Rail	6.9	6.9	7.4	7.6	7.6	7.6	0.8
Road	170.4	212.5	229,0	234.6	238.6	246,0	26.0
Air	21.1	27.8	32.5	34.4	36.0	38.9	4.1
Inland navigation	4.3	6.7	6.7	6.9	6.5	6.4	0.7

Source: Eurostat.

Table 7.5: Energy consumption of main fuels by transport mode (1 000 toe)

		1985	1990	1993	1994	1995	1996	1997	1998	change 1985-98 (%)	share in consump. 1998 (%)
Belgium	road	5 119	6 442	6 905	7 061	7 084	7 211	7 285	7 504	47	79.7
	rail - diesel	113	70	82	80	77	74	61	63	-45	0.7
	rail - electric	102	107	117	119	126	109	108	117	15	1.2
	inl.navigation	214	129	114	166	134	173	143	:	-33	1.5
	aviation	556	955	915	905	947	1 072	1 342	1 591	186	16.9
Denmark	road	2 791	3 200	3 335	3 499	3 540	3 583	3 653	3 677	32	77.4
	rail - diesel	115	98	106	94	97	96	94	79	-32	1.7
	rail - electric	12	18	18	20	20	22	23	26	119	0.6
	inl.navigation	72	397	138	137	174	159	139	:	94	3.8
	aviation	574	702	724	773	766	849	818	829	44	17.4
Germany	road	36 574	44 237	54 030	53 164	54 193	53 770	54 734	55 687	52	86.1
	rail - diesel	479	441	803	772	731	732	677	624	30	1.0
	rail - electric	960	973	1 289	1 324	1 392	1 423	1 450	1 383	44	2.1
	inl.navigation	403	637	716	701	554	509	402	369	-9	0.6
	aviation	4 161	5 627	5 577	5 980	5 988	6 120	6 423	6 633	59	10.3
Greece	road	3 056	3 903	4 383	4 441	4 584	4 805	4 918	5 164	69	76.2
	rail - diesel	53	64	48	53	43	45	42	42	-19	0.6
	rail - electric	3	11	11	12	13	14	14	15	413	0.2
	inl.navigation	238	339	354	328	288	231	238	356	49	5.2
	aviation	1 187	1 273	1 464	1 364	1 246	1 230	1 187	1 201	1	17.7
Spain	road	11 811	17 676	19 451	20 205	20 466	21 713	21 941	24 029	103	79.5
	rail - diesel	182	212	222	253	288	354	404	455	150	1.5
	rail - electric	242	315	361	430	338	298	310	322	33	1.1
	inl.navigation	487	1 273	1 414	1 465	1 481	1 616	1 414	1 458	199	4.8
	aviation	1 968	2 467	2 690	2 854	3 105	3 386	3 649	3 974	102	13.1
France	road	29 385	36 171	38 169	37 067	37 300	38 851	39 600	40 944	39	84.7
	rail - diesel	491	387	454	319	386	339	417	454	-8	0.9
	rail - electric	656	763	803	837	834	918	934	955	46	2.0
	inl.waterways	79	497	464	483	478	469	472	482	510	1.0
	aviation	2 687	3 870	4 392	4 554	4 716	5 023	5 154	5 493	104	11.4
Ireland	road	1 434	1 559	1 736	1 810	1 730	2 171	2 365	2 706	89	82.7
	rail - diesel	43	47	56	59	48	77	87	102	135	3.1
	rail - electric	1	1	1	1	1	2	2	2	100	0.1
	inl.navigation	5	7	9	8	7	12	13	15	202	0.5
	aviation	207	354	253	401	376	416	434	449	116	13.7
Italy	road	24 750	30 185	33 002	33 011	33 702	33 834	34 366	36 381	47	89.5
	rail - diesel	192	198	190	192	194	174	194	192	0	0.5
	rail - electric	418	540	571	583	625	658	664	676	62	1.7
	inl.navigation	192	198	210	223	227	218	227	213	11	0.5
	aviation	1 770	1 884	2 216	2 283	2 424	2 624	2 720	3 173	79	7.8
Luxembourg	road	512	871	1 146	1 167	1 107	1 140	1 204	1 258	146	:
	rail - diesel	9	8	4	1	2	2	5	5	-44	:
	rail - electric	4	4	6	6	7	9	7	7	85	:
	inl.navigation	:	:	:	:	:	:	:	:	:	:
	aviation	74	131	131	166	189	205	251	282	282	:
Netherlands	road	7 468	8 038	8 588	8 711	8 949	9 522	9 663	9 545	28	:
	rail - diesel	40	33	27	:	:	:	:	:	:	:
	rail - electric	95	109	119	124	127	135	135	140	47	:
	inl.navigation	:	556	672	687	697	657	687	657	:	:
	aviation	1 239	1 614	2 157	2 250	2 595	2 772	3 003	3 266	164	:
Austria	road	4 017	4 754	5 303	5 281	5 369	5 462	5 477	5 428	35	:
	rail - diesel	71	70	80	95	101	78	81	:	:	:
	rail - electric	190	229	264	263	269	275	246	188	-1	:
	inl.navigation	:	:	:	:	:	:	:	:	:	:
	aviation	220	327	396	417	459	507	525	553	151	:
Portugal	road	2 059	3 026	3 758	3 948	4 104	4 362	4 526	4 929	139	86.4
	rail - diesel	58	56	54	54	55	50	54	47	-18	0.8
	rail - electric	23	27	28	37	26	28	29	31	37	0.6
	inl.navigation	52	43	47	50	46	46	44	46	-11	0.8
	aviation	466	582	589	597	622	626	604	650	39	11.4
Finland	road	2 896	3 631	3 468	3 555	3 505	3 416	3 602	3 635	26	85.4
	rail - diesel	72	63	65	68	62	54	55	54	-25	1.3
	rail - electric	31	36	39	41	43	40	43	44	43	1.0
	inl.navigation	65	30	32	42	42	38	34	42	-35	1.0
	aviation	256	463	383	399	411	440	463	483	89	11.3
Sweden	road	5 371	6 073	6 158	6 397	6 431	6 385	6 424	6 510	21	84.1
	rail - diesel	83	39	35	37	39	39	35	16	-81	0.2
	rail - electric	225	213	201	212	234	242	254	241	7	3.1
	inl.navigation	82	87	45	45	67	69	71	94	15	1.2
	aviation	555	764	836	847	856	852	876	883	59	11.4
United Kingdom	road	28 621	36 312	36 904	37 053	36 687	38 063	38 516	38 260	34	76.6
	rail - diesel	750	621	619	606	609	585	588	589	-21	1.2
	rail - electric	254	454	641	599	636	638	667	645	154	1.3
	inl.navigation	913	1 193	1 110	981	915	1 053	1 047	992	9	2.0
	aviation	5 173	6 794	7 326	7 511	7 844	8 245	8 611	9 448	83	18.9
EU-15	road	165 865	206 077	226 335	226 370	228 750	234 288	238 273	245 654	48	:
	rail - diesel	2 749	2 406	2 845	:	:	:	:	:	:	:
	rail - electric	3 217	3 802	4 469	4 610	4 692	4 811	4 885	4 794	49	:
	inl.navigation	:	:	:	:	:	:	:	:	:	:
	aviation	21 092	27 807	30 048	31 302	32 544	34 366	36 059	38 907	84	:
EU-15 index (1985 = 100)	road	100	124	136	136	138	141	144	148	:	:
	rail - diesel	100	88	103	:	:	:	:	:	:	:
	rail - electric	100	118	139	143	146	150	152	149	:	:
	inl.navigation	100	:	:	:	:	:	:	:	:	:
	aviation	100	132	142	148	154	163	171	184		

NB: Road fuels include LPG, motor spirits and diesel. Rail - electric: conversion factor used : 1 GWh = 86 toe Inland waterways: diesel oil; includes small crafts and coastal ships, using no fuel from international maritime bunkers. Germany: series affected by German re-unification
Source: Eurostat.

but excise duties and VAT rates can be set by individual countries. Persistent substantial price differences can influence decisions on the type of vehicle purchased, leading to changes in the vehicle stock and fuel mix over time. Table 7.6 indicates the share in fuels sales in the second quarter of 1998 and gives an insight on how this fuel mix differs between the countries. It should be noted that the information in Table 7.6 includes fuel used by goods transport, which is almost entirely diesel fuel.

Certain Member States display a zero share for leaded petrol; these countries were in the vanguard as regards the phasing out of this fuel type at Community level by the 1 January 2000. However, derogations for Italy, Greece and Spain exist (see chapter on emissions).

Table 7.6: Share of fuel in sales (%)

(Second quarter 1998)

	Diesel	Unleaded petrol	Leaded petrol
EU-15	49.8	38.5	11.7
Belgium	65.9	27.6	6.5
Denmark	49.5	50.5	0.0
Germany	41.5	58.1	0.4
Greece	45.5	25.9	28.6
Spain	57.3	20.0	22.8
France	63.0	21.0	16.0
Ireland	42.6	47.9	9.6
Italy	48.0	29.0	23.0
Luxembourg	56.3	39.6	4.1
Netherlands	56.0	43.9	0.1
Austria	62.7	37.3	0.0
Portugal	57.1	22.5	20.3
Finland	47.2	52.8	0.0
Sweden	34.3	65.7	0.0
United Kingdom	40.3	46.5	13.2

Source: Eurostat.

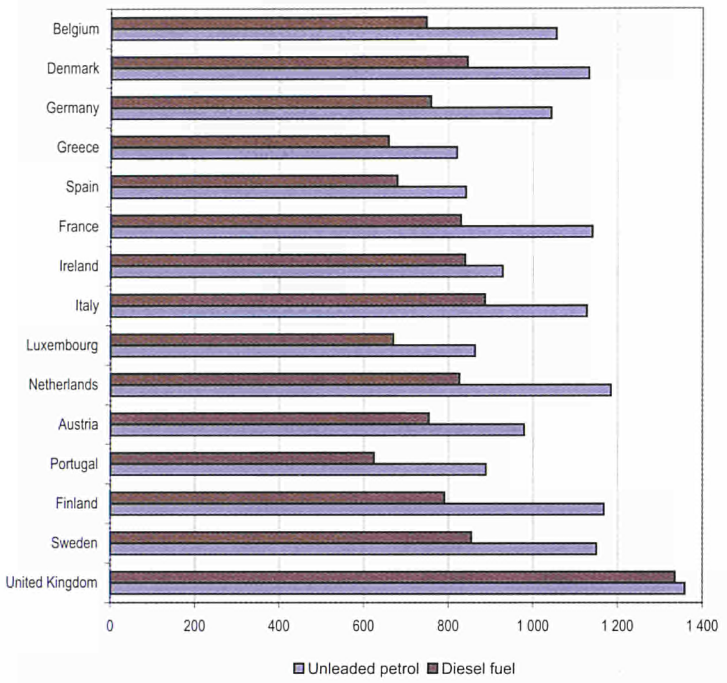
Luxembourg: low in euro, lower in PPS

Graph 7.7 outlines the sales price (second half of 2000) of unleaded petrol and diesel fuel in the individual Member States. The highest prices for both fuel types are recorded in the United Kingdom. The lowest price for unleaded petrol is paid in Greece, for diesel fuel in Portugal.

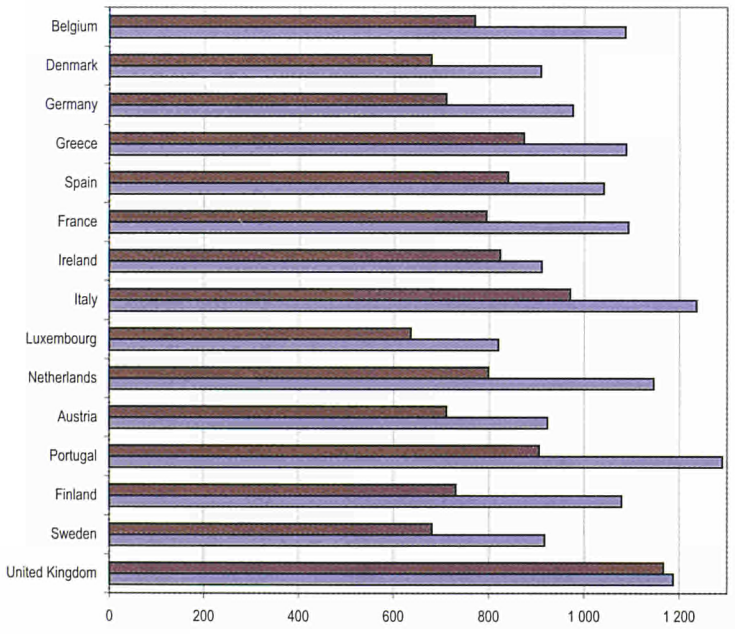
The most substantial price differences between unleaded petrol and diesel fuel exist in Finland, the Netherlands, France and Belgium. The difference is negligible in the UK and low in Ireland.

If one looks at the sales price of fuels expressed in purchase power standards (Graph 7.8 - indicating the price of fuels relative to other products) it appears that in Luxembourg, prices are even lower than those expressed in euro, whereas in Greece and Spain, they were far higher. Portugal displays the highest prices in purchasing power standard, yet rather low in euro prices.

Graph 7.7: Sales price of unleaded petrol and diesel fuel - Second half of 2000 (Euro per 1 000 litres)



Graph 7.8: Sales price of unleaded petrol and diesel fuel - Second half of 2000 (Purchasing power standard per 1 000 litres)



Source: Eurostat.

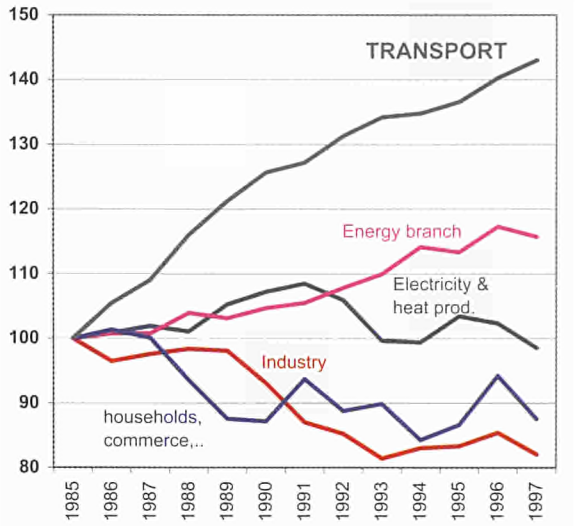
7.3. Emissions

The transport share (not including maritime and pipeline transport) of total energy consumption in the EU reached 31.6 % in 1998. Nearly the entire consumption of this sector consists of fossil fuels.

Fossil fuel combustion produces carbon dioxide (CO_2) and other emissions, some of them noxious. The quantities and profile of these emissions depend on the quantity and quality of fuel used, the technology used in the combustion, the end-of-pipe technologies (filters, catalysers) and other factors such as speed, loading factor, temperature and state of maintenance of combustion engines.

CO_2 emissions remain the most significant indicator for the use of fossil fuels. Electricity and heat production is the sector producing the highest CO_2 emissions, followed by transport. In recent years, electricity and heat production has seen its CO_2 emissions slightly reduced, the transport sector shows however a constant increase (see Table 7.9 and Graph 7.11). Within the transport sector, road transport takes the lion's share (see Table 7.10).

Graph 7.11: Evolution of CO_2 emissions from fossil fuels - EU-15 (1985=100)



Source: Eurostat.

Table 7.9: EU-15: total internal emissions of CO_2 by sector (million t of CO_2)

	1985	1990	1991	1992	1993	1994	1995	1996	1997	Change 1985-97 (%)
Total internal emissions	2 999	3 090	3 114	3 072	3 017	2 997	3 061	3 149	3 059	+ 2
Electr. and heat production	926	993	1 005	982	923	921	958	948	913	- 1
Energy sector	127	133	134	137	140	145	144	149	147	+ 16
Final energy consumption	1 943	1 961	1 976	1 954	1 955	1 931	1 960	2 053	1 998	+ 3
Industry	625	582	544	533	509	519	521	534	513	- 18
Households, services, etc.	734	640	688	652	660	619	636	692	643	- 12
Transport	585	739	748	772	789	793	803	825	842	+ 44
					of	which:				
Belgium	18	23	23	24	25	25	25	26	27	+ 51
Denmark	11	13	13	13	13	14	14	14	14	+ 32
Germany	136	169	172	175	181	179	182	181	184	+ 35
Greece	14	17	18	18	19	19	19	19	20	+ 44
Spain	44	66	71	73	72	75	77	82	83	+ 88
France	97	122	121	124	130	127	129	134	137	+ 42
Ireland	5	6	6	6	6	7	7	8	9	+ 80
Italy	81	97	100	104	106	106	109	110	112	+ 39
Luxembourg	2	3	4	4	4	4	4	4	4	+ 122
Netherlands	26	30	31	33	34	34	36	38	39	+ 53
Austria	13	15	17	17	17	17	18	18	18	+ 41
Portugal	8	11	12	13	13	14	14	15	16	+ 103
Finland	10	13	12	12	12	12	12	12	12	+ 22
Sweden	18	21	20	21	21	22	22	22	22	+ 21
United Kingdom	104	132	130	133	136	137	137	142	144	+ 38

Source: Eurostat.

Table 7.10: EU-15: total emissions of CO_2: share by transport mode (million t of CO_2)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	Change 1985-95 (%)
Total transport sector	588	620	641	682	713	739	748	772	789	793	803	825	842	+ 43
of which:														
rail transport	11.1	10.8	10.6	9.8	9.4	8.9	8.8	8.8	8.8	8.3	8.4	8.4	8.4	- 24
road transport	501	527	546	582	606	627	635	656	670	670	678	694	706	+ 41
air transport	62.5	65.4	68.9	75.4	79.5	82.4	82.6	85.4	89.1	92.8	96.5	101.9	106.8	+ 71
inland navigation	13.3	16.9	15.5	15.4	18.7	20.6	21.1	22	21.3	21.5	20.6	21.1	20.1	+ 51

Source: Eurostat.

Air transport displays the highest increase (+ 71 % in the period 1985-98), but at a lower level in absolute numbers.

With the very strong growth in traffic, the environmental impacts of air transport are growing as well. Air transport has its corresponding share of the greenhouse effect and of the depletion of the ozone layer, where high altitude emissions might be a specific problem. At local level, in the immediate vicinity of airports, concerns focus on the potential health and environmental effects of noise and air pollution from such as oxides of nitrogen (NO_x), volatile organic compounds and particulates.

Secondary pollutants

Resulting from an incomplete combustion of fuels, harmful pollutants may interact chemically or physiologically to produce secondary pollutants like 'summer smog' and high ozone levels, mainly registered in large urban areas.

Ever tighter emission standards

Progress has been made mainly in reducing emissions levels of road vehicles. This not only concerns the level of CO_2 emitted (whose reduction is mainly linked to the use of more fuel efficient vehicles) but mainly the levels of noxious substances. Table 7.12 outlines the various emission standards applying to vehicles of serial production in the European Union. Standards applicable for the year 2005 (passenger cars and lorries) and even 2008 (lorries) have been set. The establishment of these standards remain important mainly for the automotive industry, since it allows an early preparation on the introduction of environmentally more sustainable vehicles.

From the year 2005 onwards, new model cars should pollute about 70 % less than they do today. Certain Member States have begun to make fuels available with a sulphur content reduced to less than 50 ppm (parts per million), about one tenth of the values generally common at the end of the 1990s.

Fuels with reduced sulphur content will be mandatory in the EU by 2005. Hence, the oil industry is currently investing substantially in the adaptation of its refineries. Also, new model cars are now increasingly fitted with an onboard diagnosis system, constantly monitoring emission levels produced.

Leaded petrol disappears completely

In 2000, leaded petrol was banned in most of the EU Member States. Italy, Greece and Spain obtained derogations: in these countries, leaded petrol will disappear from the pump at the end of January 2001. In the past 15 years, lead emissions were reduced proportionally to the increase of the share of unleaded petrol. In certain countries however, second quarter 1998 figures indicate that sales of leaded petrol still exceeded, by a small margin, those of unleaded petrol in Greece and Spain (Table 7.6 in Chapter 7.2 - Energy consumption). By February 2001, that situation changed, reducing lead emissions from road transport to almost zero.

Manufacturers anticipate standard

In the aviation industry, ICAO (International Civil Aviation Organisation) continues to play a leading role in developing policy guidance on the application of regulatory and economic measures related to aviation environmental protection. In the past, standards recommended at ICAO level have been used as benchmarks for Community legislation. The Committee on Aviation Environmental Protection (CAEP) reached a compromise in 1998 for a new recommendation ('CAEP/4') on the limits of oxides of nitrogen (NO_x). Without going into details, this compromise means a reduction in NO_x emissions of 5 to 16 % depending on the operating conditions. A similar proposal had already been made in 1995, but at that time it was not agreed upon. The lack of consensus in 1995 is explained by doubts over technical feasibility and environmental benefit, together with a fear that the value of the existing aircraft fleet would be affected by the introduction of restrictive operating rules when new proposals would come into effect. The fact that a consensus was reached in 1998 was influenced by various factors: if no widespread consensus were reached, the EU would have opted for 'regional action'; furthermore, some aircraft engine manufacturers have taken action in anticipation

Table 7.12: European emission standards (applying to vehicles of serial production)

Cars

Petrol engine		g/km		
	as from:	CO [1]	NO_x [1]	VOCs [1]
EURO I	01.07.1992	4.05	0.49	0.66
EURO II	01.01.1996	3.28	0.25	0.34
EURO III	01.01.2000	2.30	0.15	0.20
EURO IV	01.01.2005	1.00	0.08	0.10

Diesel engine		g/km			
	as from:	CO [1]	NO_x [1]	VOCs [1]	PM1
EURO I	01.07.1992	2.88	0.78	0.2	0.14
EURO II	01.01.1996	1.06	0.73	0.19	0.10
EURO III	01.01.2000	0.64	0.50	0.06	0.05
EURO IV	01.01.2005	0.50	0.25	0.05	0.025

Heavy duty vehicles (lorries)			g per kW/h				
	as from:	Test cycle	CO [1]	VOCs [1]	NO_x [1]	Particulate matter <85 kW	>85 kW
EURO I	01.10.1993	13-mode	4.5	1.1	8	0.612	0.36
EURO II	01.10.1996	13-mode	4.0	1.1	7	0.15	
EURO III	01.01.2000	ESC2	2.1	0.66	5	0.10	
EURO III	01.01.2000	ESC2	5.5	0.78	5	0.16	
EURO IV	01.10.2005	ESC2	1.5	0.46	3.5	0.02	
EURO IV	01.10.2005	ESC2	4.0	0.55	3.5	0.03	
EURO V	01.10.2008	ESC2	1.5	0.46	2	0.02	
EURO V	01.10.2008	ESC2	4.0	0.55	2	0.03	

[1] CO = carbonmonoxide; NOx = nitrogenoxide; VOCs = volatile organic compounds; PM = particulate matter.
[2] ESC = European steady cycle, ETC = European transient cycle.
Source: Eurostat.

of more stringent NO_x standards. The new requirements apply to new engine designs only. Since future production of existing engines is not immediately subject to the new standard, it is believed that the value of the existing fleet is protected. Existing engines must comply with the new standards by 2008.

New parameters necessary

In recent years, research has been carried out on aircraft emissions at high altitude. However, all standards so far, including the recent 'CAEP/4' standard, are based on landing and take-off (LTO) cycle-based parameters. The development of new parameters for the assessment of an aircraft's emissions to replace the existing LTO parameters and to establish climb and cruise parameters is a high priority in the frame of the 'CAEP/5' work programme, in which the Commission actively participates.

Noise often underestimated

The traffic and transport linked emission of noise has been getting increased attention over the last years.

The present scarcity of consistent statistics at European level should change in the future. Table 7.13 outlines the European Union's efforts to reduce noise emissions by setting production standards for various types of vehicle. It should be noted that an increase of 3 dB(A) corresponds to a doubling of sound intensity; however, humans perceive a 10 dB(A) increase as a doubling of noise (loudness).

Measures taken in road transport include the wider use of 'quieter' car tyres with low rolling resistance (for increased fuel efficency) and the use of noise-absorbing tarmac as well as mitigation measures like the construction of noise barriers along roads through or near residential areas. Newly constructed high-speed train tracks are mostly planned and built with noise barriers along sensitive areas.

Noise 'footprints' reduced

In the three decades since aviation and the environment first rose as an issue, there has been much change. The noise levels of modern aircraft are 10 to 15 decibels lower than previous generations of aircraft. As an example, a modern

Airbus A320 has an 80 % smaller noise 'footprint' (noise area contour measured on the ground) than the older Boeing 727.

Lately, many European States have expressed the need for more stringent noise emission standards for their airports. From April 2002 onwards, the EU will enforce the use of aircraft that comply with the 'Chapter 3' noise emission standards. The United States have already phased out the previous 'Chapter 2' standard in 1999.

Awaiting 'Chapter 4'

The 'Chapter 2' standards, currently still applicable in Europe, were actually formulated in 1971. Table 7.14 shows that only a few 'Chapter 2' aircraft (11 passenger and 2 cargo aircrafts) in the current EU airfleet are still in service. The 'Chapter 3' standards were formulated 25 years ago (1976). In the absence of an agreement on a further step in the process (potentially 'Chapter 4'), the Council of Ministers, with the support of the European Parliament, has adopted, as an interim step, a non-addition regime for so-called hush-kitted aircraft (modified aircraft to comply with latest noise certification rules). This would prevent the further registration in the EU of such aircraft. In December 2000, 92 aircraft of the EU fleet were fitted with a hushkit. Latest technology aircraft are already beating 'Chapter 3' standards by a substantial margin.

Should ICAO fail to agree, in 2001 as foreseen, on more stringent noise certification standards, the Commission may have to propose specific European requirements.

Better air space management

Another area that offers potential for reducing the environmental impact of aviation concerns the improvement of air space management and air traffic control. Air traffic management delays and inefficient routings increase aircraft noise and gaseous emissions. There is a broad consensus that there is potential for improvement, not only with regard to fuel savings but also in increased safety, reliability and efficiency. Based on previous studies, the Association of European Airlines (AEA) estimates that the elimination of these inefficiencies in Europe could result in a CO_2 reduction of 6 to 12 %. Eurocontrol, the European Organisation for the Safety of Air Navigation, estimated fuel savings of 7 to 8 % for gate-to-gate direct routes (less if applied within en route airspace only). The European Commission is aware of this and supports the strengthening of the existing body Eurocontrol, which has 28 European members, 14 of them in EU Member States.

It is however not known to what extent the introduction of capacity and efficiency enhancing measures may result in attracting additional air traffic ('rebound effect').

Table 7.13: Noise emission limits - EU standards - dB(A)1

Vehicle category	1972	1980	1982	1989-90	1995-96	1997
Passenger car[2]	82	.	80	77	74	.
Urban bus[2]	89	.	82	80	78	.
Heavy lorry[2]	91	.	88	84	80	.
Motorcycles <80cm[3 3]	.	78	.	77	.	75
Motorcycles >80 - <175cm[3 3]	.	80-83	.	79	.	77
Motorcycles >175cm[3 3]	.	83-86	.	82	.	80
Motor assisted cycle <25 km/h	.	.	.	.	.	66
Motor assisted cycle >25 km/h	.	.	.	.	.	71

[1] db (A): A-weighted decibels: logarithmic scale, +3db(A) = doubling of sound intensity. [2] Method of measurement described in Council Directive 92/97/EEC of 10 November 1992, Official Journal L371 of 19/12/1992. [3] Directive 97/24/EC of 17 June 1997, Official Journal L226 of 18/8/1997. *Source:* Energy and Transport DG.

Table 7.14: Number of commercial passenger and cargo aircraft according to ICAO noise emissions standards[1] (aircrafts in service only - situation: December 2000)

	Passenger aircraft				Freight/cargo aircraft			
	Chapter 2[2] (hushkitted)	Chapter 3 (hushkitted)	Chapter 3	Total	Chapter 2[2] (hushkitted)	Chapter 3 (hushkitted)	Chapter 3	Total
EU-15	11	45	3512	3568	2	47	296	345
Belgium	0	0	127	127	0	17	33	50
Denmark	0	5	119	124	0	7	9	16
Germany	0	0	598	598	0	0	54	54
Greece	0	0	84	84	0	0	3	3
Spain	0	7	342	349	0	9	43	52
France	0	2	493	495	0	2	23	25
Ireland	0	11	81	92	0	7	3	10
Italy	0	2	322	324	0	0	18	18
Luxembourg	0	0	21	21	1	2	14	17
Netherlands	0	0	168	168	0	0	14	14
Austria	0	0	97	97	0	0	4	4
Portugal	0	0	66	66	0	0	2	2
Finland	0	1	70	71	0	0	0	0
Sweden	0	12	139	151	0	0	13	13
United Kingdom	11	3	785	799	1	3	63	67

[1] ICAO, Annex 16 classification. [2] Chapter 2: to be phased out by 1.1.2002.
Source: Airclaims CASE2 database.

Statistical sources

1. *Main European legal acts on transport statistics*

- Council Directive 80/1119/EEC of 17 November 1980 on statistical returns in respect of carriage of goods by inland waterways (OJ L 339, 15.12.1980)
- Council Directive 80/1177/EEC of 4 December 1980 on statistical returns in respect of carriage of goods by rail as part of regional statistics (OJ L 350, 23.12.1980)
- Draft Council Regulation (EC) on statistical returns in respect of carriage of passengers, freight and mail by air (COM(95) 353 final, 14.9.1995)
- Council Regulation (EC) No 1172/98 of 25 May 1998 on statistical returns in respect of carriage of goods by road (OJ L163, 6.6.1998 replaces Council Directive 78/546/EEC of 12 June 1978 and Council Directive 89/462/EEC of 18 July 1989).

2. *European Commission*

Eurostat

Statistical Office of the European Communities

Jean Monnet Building

L-2920 Luxembourg

http://europa.eu.int/comm/eurostat/
E-mail: estat-transport@cec.eu.int

Directorate-General for Energy and Transport

Unit B/1

Rue de la Loi/Wetstraat 200

B-1049 Brussels

http://europa.eu.int/comm/dgs/energy_transport/
E-mail: tif@cec.eu.int

3. *International statistical sources*

- **United Nations - Economic Commission For Europe (UN-ECE)**

  Palais des Nations, CH-1200 Geneva

  Tel. (41-22) 917 24 53 fax: (41-22) 917 00 39

  http://www.unece.org/

- **European Conference of Ministers of Transport (ECMT)**

  2-4, rue Louis David, F-75016 Paris

  Tel. (33-1) 45 24 97 22 fax: (33-1) 45 24 97 42

  http://www.oecd.org/cem/

- **Association of European Airlines (AEA)**

  Avenue Louise 350, B-1050 Brussels

  Tel. (32-2) 639 89 89 fax: (32-2) 639 89 99

  http://www.aci-europe.org/
  E-mail: aeasec@aea.be

- **Airports Council International (ACI)**

  European Region: square de Meeûs 6, B-1000 Brussels

  Tel. (32-2) 552 09 78 fax: (32-2) 513 26 42

  http://www.aci-europe.org/

- **Airclaims Limited (Airclaims)**

  Cardinal Point, Newall Road - Heathrow Airport, HounslowTW6 2AS

  Tel. (44) 208 897 1066 fax: (44) 208 897 0300

  http://www.airclaims.co.uk
  E-mail: info@airclaims.co.uk

- **European Cyclists' Federation (ECF)**

  Rue de Londres 15 (b3), B-1050 Brussels

  Tel. (32-2) 771 87 68 fax: (32-2) 762 30 03

  http://www.ecf.com/
  E-mail: office@ecf.com

- **European Automobile Manufacturers' Association (ACEA)**

  Rue du Noyer 211, B-1000 Brussels

  Tel. (32-2) 732 55 50 fax: (32-2) 732 60 01

  http://www.acea.be/

- **European Federation of Inland Ports (EFIP)**

  Place des Armateurs 6, B-1000 Brussels

  Tel. (32-2) 420 70 37 fax: (32-2) 420 69 74

  E-mail: efip@skynet.be

- **International AirTransport Association (IATA)**

  Route de l'Aéroport 33, Geneva Airport, CH-1215 Geneva

  Tel. (41-22) 799 25 25 fax: (41-22) 799 26 80

  http://www.iata.org/

- **International Road Federation (IRF)**

  Chemin de Blandonnet 2, CH-1214 Vernier

  Tel. (41-22) 306 02 60 fax: (41-22) 306 02 70

  http://www.irfnet.org/

- **International Union (Association) of Public Transport (UITP)**

  Rue Sainte-Marie 6, B-1080 Brussels

  Tel. (32-2) 673 61 00 fax: (32-2) 660 10 72

  http://www.uitp.com
  E-mail: administration@uitp.com

International Union of Railways (UIC)

16, rue Jean Rey, F-75015 Paris

Tel. (33-1) 44 49 22 80 fax: (33-1) 44 49 21 36

http://www.uic.asso.fr

Union Internationale des Societés de Transport Combiné Rail-Route (UIRR)

avenue Montoyer 31, bte 11, B-1000 Brussels

Tel. (32-2) 548 78 90 fax: (32-2) 512 63 93

http://www.uirr.com
E-mail: headoffice.brussels@uirr.com

4. National statistical sources

Belgique/België

Institut National de Statistique (INS)

rue de Louvain 44, B-1000 Brussels

Tel. (32-2) 548 62 11 fax: (32-2) 548 62 62

http://statbel.fgov.be

Danmark

Danmarks Statistik

Sejrøgade 11, Postboks 2550,
DK-2100 Copenhagen

Tel. (45) 39 17 39 17 fax: (45) 39 17 39 99

http://www.dst.dk
E-mail: dst@dst.dk

Deutschland

Statistisches Bundesamt

Gustav-Stresemann-Ring 11, PB 5528,
D-65189 Wiesbaden

Tel. (49-611) 751 fax: (49-611) 75 39 66

http://www.statistik-bund.de
E-mail: pressestelle@stba.bund400.de

Ellas (Greece)

National Statistical Service of Greece

14-16 Lycourgou street, GR-10166 Athens

Tel. (30-1) 324 85 11 fax: (30-1) 322 22 05

http://www.statistics.gr

España

Instituto Nacional de Estatística (INE)

Paseo de la Castellana 183, E-28071 Madrid

Tel. (34) 15 83 91 00 fax: (34) 15 79 27 13

http://www.ine.es
E-mail: info@ine.es

France

Institut National de la Statistique et des Etudes Economiques (INSEE)

18, boulevard Adolphe Pinard,
F-75675 Paris Cedex 14

Tel. (33-1) 41 17 50 50 fax: (33-1) 41 17 66 66

http://www.insee.fr

Ireland

Central Statistical Office

Skehard Road, Cork, Ireland

Tel. (353-21) 35 90 00 fax: (353-21) 35 90 90

http://www.cso.ie
E-mail: webmaster@cso.ie

Italia

Instituto Nazionale di Statistica (ISTAT)

Via Cesare Balbo 16, I-00184 Rome

Tel. (39-06) 488 46 73 fax: (39-06) 488 47 97

http://www.istat.it
E-mail: dipdiff@istat.it

Luxembourg

Service central de la statistique et des études économiques (STATEC)

6, boulevard Royal, BP 304, L-2013 Luxembourg

Tel. (352) 4781 42 52 fax: (352) 46 42 89

http://www.statec.lu
E-mail: statec.post@statec.etat.lu

Nederland

Centraal Bureau voor de Statistiek (CBS)

Prinses Beatrixlaan 428, PB 959,
NL - 2270 AZ Voorburg, Netherlands

Tel. (31-70) 337 38 00 fax: (31-70) 387 74 29

http://:www.cbs.nl
E-mail: verkoop@cbs.nl

Österreich

Statistik Austria

Hintere Zollamtstrasse 2b, Postfach 9000,
A-1033 Vienna

Tel. (43-1) 711 28 79 85 fax: (43-1) 711 28 77 28

http://www.statistik.gv.at
E-mail: info@statistik.gv.at

Portugal

Insitut Nacional de Estatistica (INE)

Av. Antonio de Almeida, P-1078 Lisbon Cedex

Tel. (351) 218 47 00 50 fax: (351) 218 47 39 64

http://www.ine.pt
E-mail: ine@ine.pt

Suomi/Finland

Statistics Finland

Työpajakatu 13, FIN-00022 Helsinki

Tel. (358-9) 17 34-1 fax: (358-9) 17 34 22 91

http://www.stat.fi
E-mail: webmaster@stat.fi

Sverige

Statistics Sweden

SCB, Karlavägen 100, Box 24300, S-10451 Stockholm

Klostergatan 23, S-70189 Örebro

Tel. (46-8) 783 40 00 fax: (46-8) 661 52 61

http://www.scb.se
E-mail: swestat@scb.se

Swedish Institute for Transport and Communications Analysis (SIKA)

PO Box 17 213, S-10462 Stockholm

Tel. (46-8) 506 206 00 fax: (46-8) 506 206 10

http://www.sika-institute.se
E-mail: sika@sika-institute.se

United Kingdom

Office for National Statistics

1, Drummond Gate - London SWIV 2QQ, United Kingdom

Tel. (44-20) 75 33 56 76 fax: (44-20) 75 33 56 89

http://www.ons.gov.uk

..... Eurostat Data Shops

BELGIQUE/BELGIË

Eurostat Data Shop
Bruxelles/Brussel
Planistat Belgique
Rue du Commerce 124
Handelsstraat 124
B-1000 Bruxelles/Brussel
Tél. (32-2) 234 67 50
Fax (32-2) 234 67 51
E-mail: datashop@planistat.be
URL: http://www.datashop.org/

DANMARK

DANMARKS STATISTIK
Bibliotek og Information
Eurostat Data Shop
Sejrøgade 11
DK-2100 København Ø
Tlf. (45) 39 17 30 30
Fax (45) 39 17 30 03
E-mail: bib@dst.dk
Internet:
http://www.dst.dk/bibliotek

DEUTSCHLAND

Statistisches Bundesamt
Eurostat Data Shop Berlin
Otto-Braun-Straße 70-72
(Eingang: Karl-Marx-Allee)
D-10178 Berlin
Tel. (49) 1888-644 94 27/28
Fax (49) 1888-644 94 30
E-Mail: datashop@destatis.de
URL:
http://www.eu-datashop.de/

ESPAÑA

INE
Eurostat Data Shop
Paseo de la Castellana, 183
Oficina 009
Entrada por Estébanez
Calderón
E-28046 Madrid
Tel. (34) 91 583 91 67
Fax (34) 91 579 71 20
E-mail:
datashop.eurostat@ine.es
URL: http://www.datashop.org/
Member of the MIDAS Net

FRANCE

INSEE Info service
Eurostat Data Shop
195, rue de Bercy
Tour Gamma A
F-75582 Paris Cedex 12
Tél. (33) 1 53 17 88 44
Fax (33) 1 53 17 88 22
E-mail: datashop@insee.fr
Member of the MIDAS Net

ITALIA - ROMA

ISTAT
Centro di informazione statistica — Sede di Roma
Eurostat Data Shop
Via Cesare Balbo, 11a
I-00184 Roma
Tel. (39) 06 46 73 31 02/06
Fax (39) 06 46 73 31 01/07
E-mail: dipdiff@istat.it
Member of the MIDAS Net

ITALIA - MILANO

ISTAT
Ufficio regionale per la Lombardia
Eurostat Data Shop
Via Fieno, 3
I-20123 Milano
Tel. (39) 02 80 61 32 460
Fax (39) 02 80 61 32 304
E-mail: mileuro@tin.it
Member of the MIDAS Net

LUXEMBOURG

Eurostat Data Shop
Luxembourg
BP 453
L-2014 Luxembourg
4, rue Alphonse Weicker
L-2721 Luxembourg
Tél. (352) 43 35-2251
Fax (352) 43 35-22221
E-mail:
dslux@eurostat.datashop.lu
URL: http://www.datashop.org/
Member of the MIDAS Net

NEDERLAND

STATISTICS NETHERLANDS
Eurostat Data Shop — Voorburg
Postbus 4000
2270 JM Voorburg
Nederland
Tel. (31-70) 337 49 00
Fax (31-70) 337 59 84
E-mail: datashop@cbs.nl

PORTUGAL

Eurostat Data Shop Lisboa
INE/Serviço de Difusão
Av. António José de Almeida, 2
P-1000-043 Lisboa
Tel. (351) 21 842 61 00
Fax (351) 21 842 63 64
E-mail: data.shop@ine.pt

SUOMI/FINLAND

STATISTICS FINLAND
Eurostat DataShop Helsinki
Tilastokirjasto
PL 2B
FIN-00022 Tilastokeskus
Työpajakatu 13 B, 2. Kerros,
Helsinki
P. (358-9) 17 34 22 21
F. (358-9) 17 34 22 79
Sähköposti: datashop@stat.fi
URL:
http://tilastokeskus.fi/tk/kk/
datashop/

SVERIGE

STATISTICS SWEDEN
Information service
Eurostat Data Shop
Karlavägen 100
Box 24 300
S-104 51 Stockholm
Tfn (46-8) 50 69 48 01
Fax (46-8) 50 69 48 99
E-post: infoservice@scb.se
Internet:
http://www.scb.se/info/
datashop/eudatashop.asp

UNITED KINGDOM

Eurostat Data Shop
Enquiries & advice and publications
Office for National Statistics
Customers & Electronic
Services Unit B1/05
1 Drummond Gate
London SW1V 2QQ
United Kingdom
Tel. (44-20) 75 33 56 76
Fax (44-1633) 81 27 62
E-mail:
eurostat.datashop@ons.gov.uk
Member of the MIDAS Net

Eurostat Data Shop
Electronic Data Extractions, enquiries & advice r.cade
1L Mountjoy Research Centre
University of Durham
Durham DH1 3SW
United Kingdom
Tel. (44-191) 374 73 50
Fax (44-191) 384 49 71
E-mail: r-cade@dur.ac.uk
Internet:
http://www-rcade.dur.ac.uk

NORWAY

Statistics Norway
Library and Information Centre
Eurostat Data Shop
Kongens gate 6
Boks 8131 Dep.
N-0033 Oslo
Tel. (47) 21 09 46 42/43
Fax (47) 21 09 45 04
E-mail: Datashop@ssb.no

SCHWEIZ/SUISSE/SVIZZERA

Statistisches Amt des Kantons Zürich
Eurostat Data Shop
Bleicherweg 5
CH-8090 Zürich
Tel. (41-1) 225 12 12
Fax (41-1) 225 12 99
E-mail:
datashop@statistik.zh.ch
Internet:
http://www.zh.ch/statistik

USA

HAVER ANALYTICS
Eurostat Data Shop
60 East 42nd Street
Suite 3310
New York, NY 10165
Tel. (1-212) 986 93 00
Fax (1-212) 986 69 81
E-mail: eurodata@haver.com

EUROSTAT HOME PAGE
www.europa.eu.int/comm/eurostat/

MEDIA SUPPORT EUROSTAT
(only for professional journalists)
Postal address:
Jean Monnet building
L-2920 Luxembourg
Office: BECH A3/48 —
5, rue Alphonse Weicker
L-2721 Luxembourg
Tel. (352) 43 01-33408
Fax (352) 43 01-32649
E-mail:
Eurostat-mediasupport@cec.eu.int

Venta • Salg • Verkauf • Πωλήσεις • Sales • Vente • Vendita • Verkoop • Venda • Myynti • Försäljning
http://eur-op.eu.int/general/en/s-ad.htm

BELGIQUE/BELGIË

Jean De Lannoy
Avenue du Roi 202/Koningslaan 202
B-1190 Bruxelles/Brussel
Tél. (32-2) 538 43 08
Fax (32-2) 538 08 41
E-mail: jean.de.lannoy@infoboard.be
URL: http://www.jean-de-lannoy.be

La librairie européenne/ De Europese Boekhandel
Rue de la Loi 244/Wetstraat 244
B-1040 Bruxelles/Brussel
Tél. (32-2) 295 26 39
Fax (32-2) 735 08 60
E-mail: mail@libeurop.be
URL: http://www.libeurop.be

Moniteur belge/Belgisch Staatsblad
Rue de Louvain 40-42/Leuvenseweg 40-42
B-1000 Bruxelles/Brussel
Tél. (32-2) 552 22 11
Fax (32-2) 511 01 84
E-mail: eusales@just.fgov.be

DANMARK

J. H. Schultz Information A/S
Herstedvang 12
DK-2620 Albertslund
Tlf. (45) 43 63 23 00
Fax (45) 43 63 19 69
E-mail: schultz@schultz.dk
URL: http://www.schultz.dk

DEUTSCHLAND

Bundesanzeiger Verlag GmbH
Vertriebsabteilung
Amsterdamer Straße 192
D-50735 Köln
Tel. (49-221) 97 66 80
Fax (49-221) 97 66 82 78
E-Mail: vertrieb@bundesanzeiger.de
URL: http://www.bundesanzeiger.de

ΕΛΛΑΔΑ/GREECE

G. C. Eleftheroudakis SA
International Bookstore
Panepistimiou 17
GR-10564 Athina
Tel. (30-1) 331 41 80/1/2/3/4/5
Fax (30-1) 323 98 21
E-mail: elebooks@netor.gr
URL: elebooks@hellasnet.gr

ESPAÑA

Boletín Oficial del Estado
Trafalgar, 27
E-28071 Madrid
Tel. (34) 915 38 21 11 (libros)
913 84 17 15 (suscripción)
Fax (34) 915 38 21 21 (libros),
913 84 17 14 (suscripción)
E-mail: clientes@com.boe.es
URL: http://www.boe.es

Mundi Prensa Libros, SA
Castelló, 37
E-28001 Madrid
Tel. (34) 914 36 37 00
Fax (34) 915 75 39 98
E-mail: libreria@mundiprensa.es
URL: http://www.mundiprensa.com

FRANCE

Journal officiel
Service des publications des CE
26, rue Desaix
F-75727 Paris Cedex 15
Tél. (33) 140 58 77 31
Fax (33) 140 58 77 00
E-mail: europublications@journal-officiel.gouv.fr
URL: http://www.journal-officiel.gouv.fr

IRELAND

Alan Hanna's Bookshop
270 Lower Rathmines Road
Dublin 6
Tel. (353-1) 496 73 98
Fax (353-1) 496 02 28
E-mail: hannas@iol.ie

ITALIA

Licosa SpA
Via Duca di Calabria, 1/1
Casella postale 552
I-50125 Firenze
Tel. (39) 055 64 83 1
Fax (39) 055 64 12 57
E-mail: licosa@licosa.com
URL: http://www.licosa.com

LUXEMBOURG

Messageries du livre SARL
5, rue Raiffeisen
L-2411 Luxembourg
Tél. (352) 40 10 20
Fax (352) 49 06 61
E-mail: mail@mdl.lu
URL: http://www.mdl.lu

NEDERLAND

SDU Servicecentrum Uitgevers
Christoffel Plantijnstraat 2
Postbus 20014
2500 EA Den Haag
Tel. (31-70) 378 98 80

ÖSTERREICH

Manz'sche Verlags- und Universitätsbuchhandlung GmbH
Kohlmarkt 16
A-1014 Wien
Tel. (43-1) 53 16 11 00
Fax (43-1) 53 16 11 67
E-Mail: manz@schwinge.at
URL: http://www.manz.at

PORTUGAL

Distribuidora de Livros Bertrand Ld.ª
Grupo Bertrand, SA
Rua das Terras dos Vales, 4-A
Apartado 60037
P-2700 Amadora
Tel. (351) 214 95 87 87
Fax (351) 214 96 02 55
E-mail: dlb@ip.pt

Imprensa Nacional-Casa da Moeda, SA
Sector de Publicações Oficiais
Rua da Escola Politécnica, 135
P-1250-100 Lisboa Codex
Tel. (351) 213 94 57 00
Fax (351) 213 94 57 50
E-mail: spoce@incm.pt
URL: http://www.incm.pt

SUOMI/FINLAND

Akateeminen Kirjakauppa/ Akademiska Bokhandeln
Keskuskatu 1/Centralgatan 1
PL/PB 128
FIN-00101 Helsinki/Helsingfors
P./tfn (358-9) 121 44 18
F./fax (358-9) 121 44 35
Sähköposti: sps@akateeminen.com
URL: http://www.akateeminen.com

SVERIGE

BTJ AB
Traktorvägen 11-13
S-221 82 Lund
Tlf. (46-46) 18 00 00
Fax (46-46) 30 79 47
E-post: btjeu-pub@btj.se
URL: http://www.btj.se

UNITED KINGDOM

The Stationery Office Ltd
Customer Services
PO Box 29
Norwich NR3 1GN
Tel. (44) 870 60 05-522
Fax (44) 870 60 05-533
E-mail: book.orders@theso.co.uk
URL: http://www.itsofficial.net

ÍSLAND

Bokabud Larusar Blöndal
Skólavördustig, 2
IS-101 Reykjavik
Tel. (354) 552 55 40
Fax (354) 552 55 60
E-mail: bokabud@simnet.is

NORGE

Swets Blackwell AS
Østenjoveien 18
Boks 6512 Etterstad
N-0606 Oslo
Tel. (47) 22 97 45 00
Fax (47) 22 97 45 45
E-mail: info@no.swetsblackwell.com

SCHWEIZ/SUISSE/SVIZZERA

Euro Info Center Schweiz
c/o OSEC
Stampfenbachstraße 85
PF 492
CH-8035 Zürich
Tel. (41-1) 365 53 15
Fax (41-1) 365 54 11
E-mail: eics@osec.ch
URL: http://www.osec.ch/eics

BĂLGARIJA

Europress Euromedia Ltd
59, blvd Vitosha
BG-1000 Sofia
Tel. (359-2) 980 37 66
Fax (359-2) 980 42 30
E-mail: Milena@mbox.cit.bg
URL: http://www.europress.bg

ČESKÁ REPUBLIKA

ÚVIS
odd. Publikaci
Havelkova 22
CZ-130 00 Praha 3
Tel. (420-2) 22 72 07 34
Fax (420-2) 22 71 57 38
URL: http://www.uvis.cz

CYPRUS

Cyprus Chamber of Commerce and Industry
PO Box 21455
CY-1509 Nicosia

EESTI

Eesti Kaubandus-Tööstuskoda
(Estonian Chamber of Commerce and Industry)
Toom-Kooli 17
EE-10130 Tallinn
Tel. (372) 646 02 44
Fax (372) 646 02 45
E-mail: einfo@koda.ee
URL: http://www.koda.ee

HRVATSKA

Mediatrade Ltd
Pavla Hatza 1
HR-10000 Zagreb
Tel. (385-1) 481 94 11
Fax (385-1) 481 94 11

MAGYARORSZÁG

Euro Info Service
Szt. István krt.12
II emelet 1/A
PO Box 1039
H-1137 Budapest
Tel. (36-1) 329 21 70
Fax (36-1) 349 20 53
E-mail: euroinfo@euroinfo.hu
URL: http://www.euroinfo.hu

MALTA

Miller Distributors Ltd
Malta International Airport
PO Box 25
Luqa LQA 05
Tel. (356) 66 44 88
Fax (356) 67 67 99
E-mail: gwirth@usa.net

POLSKA

Ars Polona
Krakowskie Przedmiescie 7
Skr. pocztowa 1001
PL-00-950 Warszawa
Tel. (48-22) 826 12 01
Fax (48-22) 826 62 40
E-mail: books119@arspolona.com.pl

ROMÂNIA

Euromedia
Str.Dionisie Lupu nr. 65, sector 1
RO-70184 Bucuresti
Tel. (40-1) 315 44 03
Fax (40-1) 312 96 46
E-mail: euromedia@mailcity.com

SLOVAKIA

Centrum VTI SR
Nám. Slobody, 19
SK-81223 Bratislava
Tel. (421-7) 54 41 83 64
Fax (421-7) 54 41 83 64
E-mail: europ@tbb1.sltk.stuba.sk
URL: http://www.sltk.stuba.sk

SLOVENIJA

Gospodarski Vestnik
Dunajska cesta 5
SLO-1000 Ljubljana
Tel. (386) 613 09 16 40
Fax (386) 613 09 16 45
E-mail: europ@gvestnik.si
URL: http://www.gvestnik.si

TÜRKIYE

Dünya Infotel AS
100, Yil Mahallessi 34440
TR-80050 Bagcilar-Istanbul
Tel. (90-212) 629 46 89
Fax (90-212) 629 46 27
E-mail: infotel@dunya-gazete.com.tr

ARGENTINA

World Publications SA
Av. Cordoba 1877
C1120 AAA Buenos Aires
Tel. (54-11) 48 15 81 56
Fax (54-11) 48 15 81 56
E-mail: wpbooks@infovia.com.ar
URL: http://www.wpbooks.com.ar

AUSTRALIA

Hunter Publications
PO Box 404
Abbotsford, Victoria 3067
Tel. (61-3) 94 17 53 61
Fax (61-3) 94 19 71 54
E-mail: jpdavies@ozemail.com.au

BRESIL

Livraria Camões
Rua Bittencourt da Silva, 12 C
CEP
20043-900 Rio de Janeiro
Tel. (55-21) 262 47 76
Fax (55-21) 262 47 76
E-mail: livraria.camoes@incm.com.br
URL: http://www.incm.com.br

CANADA

Les éditions La Liberté Inc.
3020, chemin Sainte-Foy
Sainte-Foy, Québec G1X 3V6

Renouf Publishing Co. Ltd
5369 Chemin Canotek Road, Unit 1
Ottawa, Ontario K1J 9J3
Tel. (1-613) 745 26 65
Fax (1-613) 745 76 60
E-mail: order.dept@renoufbooks.com
URL: http://www.renoufbooks.com

EGYPT

The Middle East Observer
41 Sherif Street
Cairo
Tel. (20-2) 392 69 19
Fax (20-2) 393 97 32
E-mail: inquiry@meobserver.com
URL: http://www.meobserver.com.eg

INDIA

EBIC India
3rd Floor, Y. B. Chavan Centre
Gen. J. Bhosale Marg.
Mumbai 400 021
Tel. (91-22) 282 60 64
Fax (91-22) 285 45 64
E-mail: ebicindia@vsnl.com
URL: http://www.ebicindia.com

JAPAN

PSI-Japan
Asahi Sanbancho Plaza #206
7-1 Sanbancho, Chiyoda-ku
Tokyo 102
Tel. (81-3) 32 34 69 21
Fax (81-3) 32 34 69 15
E-mail: books@psi-japan.co.jp
URL: http://www.psi-japan.co.jp

MALAYSIA

EBIC Malaysia
Suite 45.02, Level 45
Plaza MBf (Letter Box 45)
8 Jalan Yap Kwan Seng
50450 Kuala Lumpur
Tel. (60-3) 21 62 92 98
Fax (60-3) 21 62 61 98
E-mail: ebic@tm.net.my

MÉXICO

Mundi Prensa México, SA de CV
Río Pánuco, 141
Colonia Cuauhtémoc
MX-06500 México, DF
Tel. (52-5) 533 56 58
Fax (52-5) 514 67 99
E-mail: 101545.2361@compuserve.com

PHILIPPINES

EBIC Philippines
19th Floor, PS Bank Tower
Sen. Gil J. Puyat Ave. cor. Tindalo St.
Makati City
Metro Manilla
Tel. (63-2) 759 66 80
Fax (63-2) 759 66 90
E-mail: eccpcom@globe.com.ph
URL: http://www.eccp.com

SOUTH AFRICA

Eurochamber of Commerce in South Africa
PO Box 781738
2146 Sandton
Tel. (27-11) 884 39 52
Fax (27-11) 883 55 73
E-mail: info@eurochamber.co.za

SOUTH KOREA

The European Union Chamber of Commerce in Korea
5th Fl, The Shilla Hotel
202, Jangchung-dong 2 Ga, Chung-ku
Seoul 100-392
Tel. (82-2) 22 53-5631/4
Fax (82-2) 22 53-5635/6
E-mail: eucck@eucck.org
URL: http://www.eucck.org

SRI LANKA

EBIC Sri Lanka
Trans Asia Hotel
115 Sir Chittampalam
A. Gardiner Mawatha
Colombo 2
Tel. (94-1) 074 71 50 78
Fax (94-1) 44 87 79
E-mail: ebicsl@slnet.ik

UNITED STATES OF AMERICA

Bernan Associates
4611-F Assembly Drive
Lanham MD 20706-4391
Tel. (1-800) 274 44 47 (toll free telephone)
Fax (1-800) 865 34 50 (toll free fax)
E-mail: query@bernan.com
URL: http://www.bernan.com

ANDERE LÄNDER/OTHER COUNTRIES/ AUTRES PAYS

Bitte wenden Sie sich an ein Büro Ihrer Wahl/Please contact the sales office of your choice/Veuillez vous adresser au bureau de vente de votre choix
Office for Official Publications of the European Communities
2, rue Mercier
L-2985 Luxembourg
Tel. (352) 29 29-42455

7 17 KS-37-01-558-EN-C

Price (excluding VAT) in Luxembourg: EUR 20

OFFICE FOR OFFICIAL PUBLICATIONS
OF THE EUROPEAN COMMUNITIES

L-2985 Luxembourg

ISBN 92-828-9974-8