



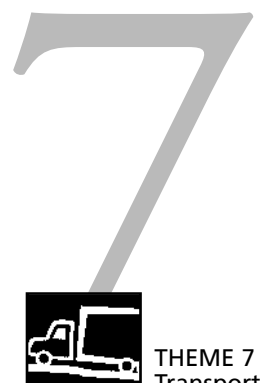
Panorama of transport

Statistical overview
of transport
in the European Union

Data 1970-2000



EUROPEAN
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THEME 7
Transport

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Luxembourg: Office for Official Publications of the European Communities, 2003

ISBN 92-894-4845-8
ISSN 1725-275X

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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 can 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 inland transport, with particular emphasis on freight transport for which Community statistics have been collected for many years. The second edition, published in 2001, also included air transport, for which international passenger transport has been increasing, since 1993 - the first year in which data were collected by Eurostat - at a rate close to a doubling every ten years.

This third edition covers for the first time all main modes of transport as it also includes maritime transport, a domain in which intra-EU trade has experienced a spectacular development, similar to that of road transport. When expressed as total tonnes transported, maritime transport is by far the most important mode of freight transport for the European Union, counting intra-EU and extra-EU transport together.

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 in the Eurostat dissemination database (New Cronos), not only on transport but also on the economy, on the environment and on energy, bringing these data together and explaining them. As most of the data used for this publication have been extracted from the Eurostat database at the beginning of 2002, and as there is a need of good data coverage among all the EU countries, the year 2000 is in most cases the most recent year for which data were available.

The user who wishes to go further can contact Eurostat or the network of Data Shops. More up to date, more specialized 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. In particular, this CD-ROM contains, at the date of its issue, relatively fresh data extracted from the Eurostat dissemination database, one or two month earlier.

The next edition of the Panorama will, in addition to covering all the main modes of transport, put a special emphasis on the latest road freight transport statistics collected under the recent EU regulation; it will also give a first overview of the data on the ten acceding countries.

Yves Franchet

A handwritten signature in blue ink, consisting of the letters 'YF' in a stylized, cursive script.

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Translations: European Commission Translation Service

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PANORAMA OF TRANSPORT

Statistical overview of the transport sector in the European Union

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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.

A sector in its own right

The transport services sector 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 approximately 6.3 million people. The latter figure represents

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

| | 1970-2000 | 1990-2000 | 1999-2000 |
|---|---------------|---------------|---------------|
| Total goods transport¹ | + 2.26 | + 2.83 | + 2.84 |
| Road goods transport | + 3.26 | + 3.44 | + 2.29 |
| Rail goods transport | -0.15 | + 0.59 | + 5.49 |
| Inland ww. goods transp. | +0.67 | + 1.59 | + 3.65 |
| | 1993-2000 | 1998-1999 | 1999-2000 |
| Air transport - passengers² | + 8.00 | + 7.93 | + 8.68 |
| Maritime transport - goods handled | : | -0.5 | + 1.25 |

(1) road, rail, inland waterways, pipelines.

(2) international traffic only.

Source: Eurostat, DG Energy and Transport.

around 4.1% of all persons employed in the EU. An additional 2 million persons are employed in the transport equipment industry, and over 6 million in transport related industries.

Each day, the transport industries and services of the European Union have to get more than 150 million people to and from work, enable at least 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.

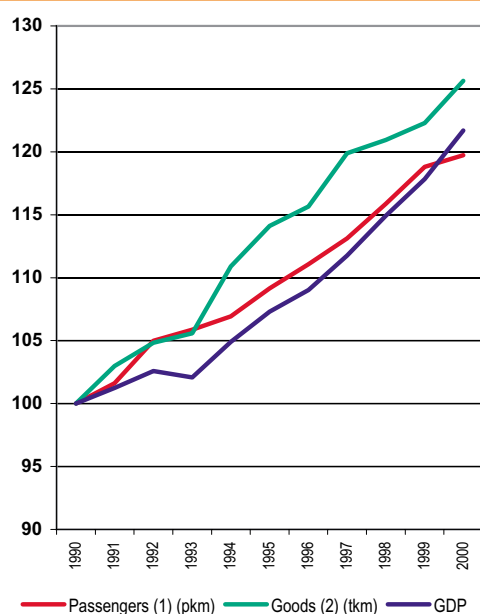
In 1999, average intra-EU passenger transport demand was close to 33 km per person/day (taking only into account transport by passenger car, buses and coaches and railways).

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 slightly decreased in the past 30 years. The transport performance of inland waterway vessels has been growing only slowly over the last 30 years, but it is at least surprising that this performance is obtained with a massively reduced vessel fleet.

It is however air transport that has experienced the fastest growth in recent years. Passenger data available at Eurostat show that the number of passengers in international intra- and extra-EU

Graph 1.1: EU-15 transport growth (1990 = 100)



(1) : Pass. cars, buses & coaches, tram & metro, rail, air.

(2) : Road, rail, inland waterways, pipelines, sea (intra-EU).

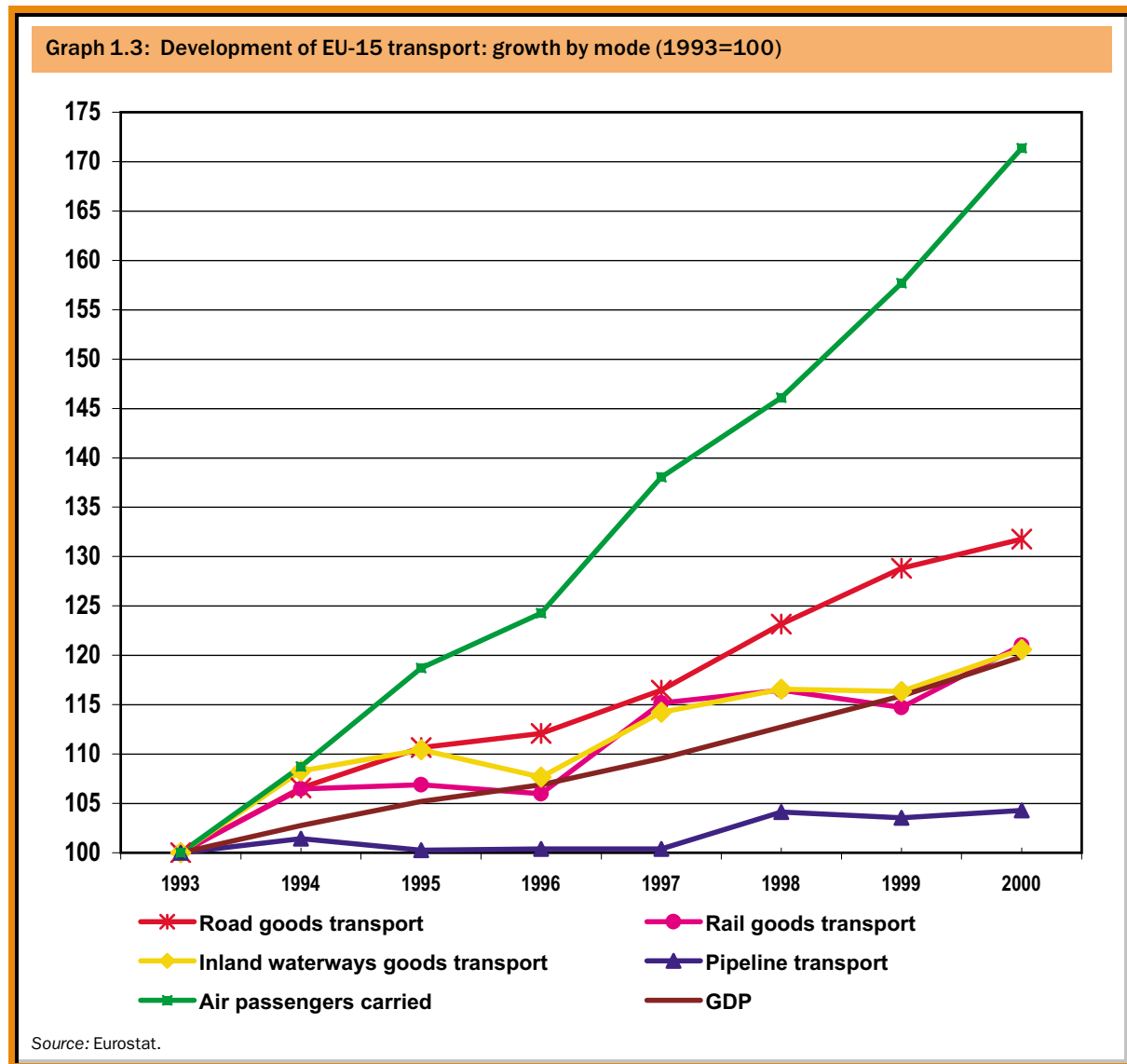
Source: Eurostat, DG Energy and Transport.

transport passed from 253 million in 1993 to 434 million in 2000. This corresponds to an average annual increase of 8%.

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 2.3).



(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.

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

| | 1970 | 1999 | Change 1970 - 99 |
|----------------------|------------------|------------------|------------------|
| Rail | 170 662 | 152 723 | -11% |
| Roads | 2 639 646 | 3 231 706 | +22% |
| of which motorways | 15 864 | 51 336 | +223% |
| Pipelines | 11 441 | 21 579 | +89% |
| Inland waterways | 31 748 | 28 168 | -11% |
| TOTAL NETWORK | 2 853 497 | 3 485 512 | +21% |

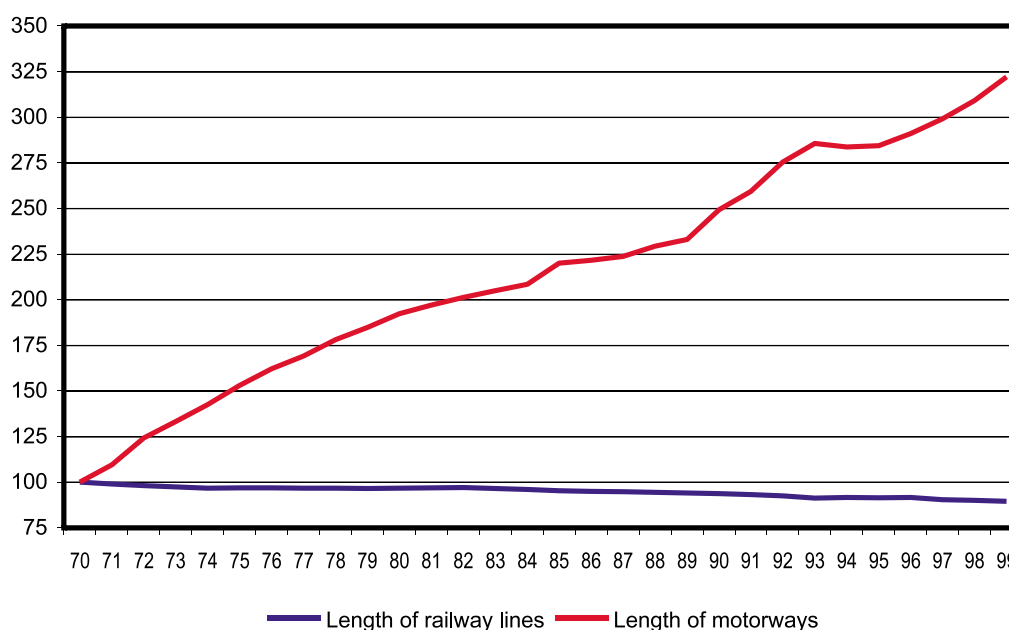
Source: Eurostat/ECMT/UN-ECE, national statistics.

Motorway network more than tripled since 1970

In 1999, the total length of railways in EU-15 amounted to 152 723 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 11% lower than in 1970. As far as network density is concerned, EU-15 offers 47.1 km of railways per 1 000 square kilometres (1999). This is nearly twice as much as in the United States (23.7 km/1 000 km² in 1998, including Alaska and Hawaii and inland waters) but less than in Japan (53.2 km/1 000 km² in 1998).

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.

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



Source: Eurostat/ECMT/UN-ECE.

The total length of the road network in EU-15 amounted to over 3.2 million km in 1999 of which 51 336 km consisted of motorways (1.6%). 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 nearly 6.5 million km with a share of 88 700 km (1.4%) of motorways (1998). Japan featured 1.16 million km of roads with a 0.6% share of motorways (6 400 km – in 1998).

When relating the length of the entire road network in 1999 to the total area, EU-15 offers 1 013 km per km² while the equivalent value is 656 (1998) for the United States (motorways: 15.8 km and 9.0 km respectively). With 3 076 km/1 000 km², Japan's total road network is extremely dense, whereas the density of the motorway network (16.9 km/1 000 km²) is slightly over the EU average.

Inland waterways decreased most since 1970

Only 9 of the 15 Member States are able to offer significant transport using inland waterways. In 1999, the total length of usable inland waterways (comprising rivers, canals and navigable lakes) amounted to 28 168 km of length which represents a density of 8.7 km per 1 000 km². This density is twice as much compared to the United States in 1998 (4.3 km per 1 000 km² - approximately 41 800 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 with regards to the Balkan countries – 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, the 21 579 km of pipelines should be mentioned, a network the length of which in 1999 constituted 14.1% of the rail and 77% of the inland waterway network. For statistical purposes, only oil pipelines are considered here.

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 20% increase over 28 years

The total length of the three 'classic' networks experienced a considerable growth: from 2.8 million km in 1970 to 3.4 million km in 1999. This represents an increase of 20%. The most important share of this growth can be attributed to the road network with a growth of 22%, while the rail and inland waterways network both decreased by 11%.

In terms of modal share, the railway network makes up only 4.5% (1970: 6.0%) of the total length of the transport network in 1999 while the road network amounts to 94.7% (1970: 92.9%) and inland waterways to 0.8% (1970: 1.1%).

Busy skies

The airspace over the European Union can be considered as one of the busiest in the world. Obviously, in aviation one cannot talk about 'network length' and a classification of airports on the basis of their technical or infrastructural features is not useful for statistical purposes: the network of airports is very different from networks of surface links. Airports are by their nature intermodal nodes on a route network requiring virtually no en-route surface infrastructure.

The 30 or so largest airports in the European Union handle three quarters of total passengers and about 90 percent of extra-Community international traffic. In the frame of the guidelines for the transport TENs (trans-European networks - see Chapter 2.3), those airports are regarded as *International Connecting Points*, although they also take most intra-Community traffic as well. A further 60 or so *Community Connecting Points*, generally handling between one and five million passengers per annum, account for almost all the remaining international and intra-Community traffic. The remaining 200 airports in the network tend to be quite small, but fulfil a vital *Regional and Accessibility Point* role, often in relatively remote areas, although they take only five per cent of Community passengers.

Infrastructure investments are planned and undertaken at many of the major EU airports, particularly with regards to connections to the rail, especially high-speed rail, network.

Most of the trade with third countries via seaports

The crucial role played by seaports in European Union trade is evident: more than 345 million persons passed through EU seaports in 2000 and the total tonnage of goods handled is estimated at 3 000 million tonnes, 70% of all trade with third countries is channelled through the ports. Short sea shipping along the EU's and its neighbouring countries' coasts has a share of

70% of the total EU seaborne transport of goods. Hence the need for efficient infrastructures and services.

For quite a while, seaports have not been at the center of common transport policy. Investment in infrastructures gradually declined between 1970 and the late 1980's. At the beginning of the 1990's however, investment in ports picked up significantly. Sustainability and intermodality are two key-words that pushes the Commission to take various actions aiming at better connections between ports and the rail and inland waterway networks together with improvements in the quality of seaport services.

At EU-level, there are approximately 345 maritime ports handling over 1 million tonnes of goods or 200 000 passengers per year. In 2000, the five most important ports (Rotterdam, Antwerp, Marseille, Hamburg and Le Havre) were responsible for 22% of the total tonnage handled in the European Union (see Chapter 5.1). The main passenger ports correspond to those offering the major European ferry connections. Data for the period 1997-2000 suggest that the construction of fixed links (tunnels, bridges) had a considerable impact on the passenger frequentation of ports (see Chapter 5.2).

2.2. Physical characteristics of transport networks

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.

Rail network reduced by 11% since 1970

At EU-15 level, the total length of the railway network decreased by 11% between 1970 and 1999 (see Table 2.5). The railway network decreased most in Portugal and Belgium (28 and 18% respectively), and remained the most stable in Italy, Luxembourg and Finland.

Table 2.3 outlines that in 1999, the railway network of Germany was the longest in EU-15: with 37 536 km this network constitutes 24.6% of the total EU-15 network. The French railway network comes second with 31 589 km or 20.7%. The UK and Italian network follow with 11.1% and 10.5% respectively. These four Member States alone stand for two thirds (67%) of the entire EU network.

Highest rail density in Belgium

In terms of network density things look different: despite a 18% decrease since 1970, Belgium still has the highest rail network density with 113.8 km/1 000 km², followed by Luxembourg (105.4 km/1 000 km²) and Germany (105.1 km/1 000 km²). The lowest density within the EU-15 can be found in Finland (17.3 km/1 000 km²) and Greece (17.4 km/1 000 km²).

Table 2.4: Railways: Dedicated high-speed rail network

| Lines capable of speeds of 250 km/h or more | | | | | | |
|---|---------|---------|-------|--------|-------|-------|
| | Belgium | Germany | Spain | France | Italy | EU-15 |
| 1995 | - | - | - | 1 124 | - | 1 124 |
| 1996 | 12 | 434 | 376 | 1 152 | 237 | 2 211 |
| 1997 | 71 | 434 | 376 | 1 152 | 259 | 2 292 |
| 1998 | 71 | 489 | 376 | 1 147 | 259 | 2 342 |
| 1999 | 74 | 491 | 377 | 1 147 | 259 | 2 348 |
| 2000 | 74 | 510 | 377 | 1 147 | 259 | 2 367 |

Source: UIC.

The case of Finland illustrates the typical situation of a country with 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 (24 km/1 000 km²) is almost the same as in Spain (24.3 km/1 000 km²).

Sweden and Finland have far more than 100 km of tracks per 100 000 inhabitants whilst Austria, in third position, follows with 70 km/100 000 inhabitants. It should be noted that the two Nordic countries feature a very uneven population distribution, a factor that is not considered in these ratios. The low rail network density for

Table 2.3: Length of transport networks 1999 - key indicators

| | Railways ¹ | | | | Motorways | | |
|-----------------------------|-----------------------|---------------|-------------------|----------------|-----------|-------------------|----------------|
| | km | % electrified | km/100 000 inhab. | km/1 000 km... | km | km/100 000 inhab. | km/1 000 km... |
| Belgium | 3 472 | 78 | 34.0 | 113.8 | 1 682 | 16.5 | 55.1 |
| Denmark | 2 324 | 26 | 43.8 | 53.9 | 880 | 16.6 | 20.4 |
| Germany | 37 536 | 48 | 45.7 | 105.1 | 11 515 | 14.0 | 32.3 |
| Greece | 2 299 | 0 | 21.9 | 17.4 | 470 | 4.5 | 3.6 |
| Spain | 12 319 | 56 | 31.3 | 24.3 | 8 800 | 22.3 | 17.4 |
| France | 31 589 | 45 | 53.5 | 58.1 | 11 000 | 18.6 | 20.2 |
| Ireland | 1 919 | 2 | 50.5 | 27.3 | 115 | 3.0 | 1.6 |
| Italy | 16 108 | 66 | 27.9 | 53.5 | 6 621 | 11.5 | 22.0 |
| Luxembourg | 274 | 95 | 68.5 | 105.4 | 115 | 28.8 | 44.2 |
| Netherlands | 2 808 | 73 | 17.8 | 67.7 | 2 235 | 14.1 | 53.9 |
| Austria | 5 643 | 61 | 69.7 | 67.3 | 1 634 | 20.2 | 19.5 |
| Portugal | 2 813 | 32 | 28.1 | 30.6 | 797 | 8.0 | 8.7 |
| Finland | 5 836 | 38 | 112.2 | 17.3 | 512 | 9.8 | 1.5 |
| Sweden | 10 799 | 75 | 121.3 | 24.0 | 1 484 | 16.7 | 3.3 |
| United Kingdom ² | 16 984 | 30 | 28.5 | 69.6 | 3 476 | 5.8 | 14.2 |
| EU-15 | 152 723 | 48 | 40.6 | 47.2 | 51 336 | 13.7 | 15.9 |

(1) Railways: Data for UIC member railways.

(2) United Kingdom data refer to Great Britain.

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

Estimates in italic.

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

- Railways¹
- Motorways
- Other roads²
- Pipelines³
- Inland waterways

| | B | DK | D | EL | E | F | IRL | I | L | NL | A | P | FIN | S | UK | EU-15 | EU-15 Index 1970 =100 |
|------|---------|--------|---------|--------|---------|---------|--------|---------|-------|---------|---------|--------|--------|----------------------|---------|-----------|--------------------------------|
| 1970 | 4232 | 2352 | 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 | 5 874 | 11 | 387 | 1 553 | 0 | 3 913 | 7 | 1 209 | 478 | 66 | 108 | 403 | 1 183 | 15 864 | 100 |
| | 93 539 | 62 592 | 555 000 | 34 692 | 139 221 | 710 384 | 86 695 | 281 405 | 4 949 | 81 890 | 102 053 | 41 763 | 73 444 | 110 846 ⁴ | 356 155 | 2 623 782 | 100 |
| | 52 | - | 2 260 | - | 1 099 | 3 609 | - | 1 860 | - | 323 | 604 | - | - | - | 1 634 | 11 441 | 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 | 194 |
| | 124 710 | 68 405 | 594 000 | 37 367 | 147 644 | 796 514 | 89 796 | 290 370 | 5 050 | 91 628 | 103 553 | 50 410 | 75 405 | 96 504 ⁴ | 337 077 | 2 811 929 | 107 |
| | 458 | 77 | 2 880 | - | 1 753 | 5 254 | - | 3 069 | - | 391 | 777 | - | - | - | 3 166 | 17 825 | 156 |
| | 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 | 10 854 | 190 | 4 693 | 6 824 | 26 | 6 193 | 78 | 2 092 | 1 445 | 316 | 225 | 939 | 3 180 | 39 287 | 248 |
| | 138 575 | 70 173 | 626 000 | 38 312 | 156 243 | 801 274 | 92 303 | 297 419 | 5 013 | 102 498 | 104 807 | 61 222 | 77 233 | 132 619 ⁴ | 378 934 | 2 950 006 | 112 |
| | 301 | 444 | 3 038 | - | 2 678 | 4 948 | - | 4 086 | - | 391 | 777 | - | - | - | 2 422 | 19 085 | 167 |
| | 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 | 286 |
| | 142 126 | 70 525 | 631 000 | 38 265 | 155 695 | 951 097 | 92 360 | 305 500 | 5 046 | 111 144 | 104 715 | 68 045 | 77 722 | 136 233 ⁴ | 387 799 | 3 140 999 | 120 |
| | 294 | 409 | 2 460 | - | 3 691 | 4 830 | - | 4 235 | - | 391 | 777 | - | - | - | 2 602 | 19 689 | 172 |
| | 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 | 292 |
| | 142 126 | 70 504 | 633 000 | 38 300 | 154 805 | 960 561 | 92 570 | 306 900 | 5 053 | 111 212 | 104 445 | 69 340 | 77 782 | 136 915 ⁴ | 389 585 | 3 156 183 | 120 |
| | 300 | 336 | 2 460 | - | 3 691 | 4 983 | - | 4 235 | - | 391 | 777 | - | - | - | 3 459 | 20 632 | 180 |
| | 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 | 300 |
| | 143 235 | 70 582 | 633 000 | 38 300 | 155 045 | 964 646 | 95 744 | 306 900 | 5 053 | 111 212 | 104 739 | 69 340 | 77 796 | 136 884 ⁴ | 390 918 | 3 166 510 | 121 |
| | 300 | 336 | 2 460 | - | 3 691 | 5 746 | - | 4 235 | - | 391 | 777 | - | - | - | 3 936 | 21 872 | 191 |
| | 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 | 311 |
| | 144 168 | 70 601 | 632 000 | 39 000 | 155 004 | 971 064 | 95 732 | 307 000 | 5 060 | 111 212 | 104 748 | 70 000 | 77 894 | 136 593 ⁴ | 392 545 | 3 176 028 | 121 |
| | 300 | 336 | 2 370 | - | 3 691 | 5 746 | - | 4 235 | - | 391 | 777 | - | - | - | 3 953 | 21 799 | 191 |
| | 1 529 | - | 6 740 | - | - | 5 732 | - | 1 477 | 37 | 5 046 | 351 | - | 6 245 | - | 1 153 | 28 310 | 89 |
| 1999 | 3 472 | 2 324 | 37 536 | 2 299 | 12 319 | 31 589 | 1 919 | 16 108 | 274 | 2 808 | 5 643 | 2 813 | 5 836 | 10 799 | 16 984 | 152 723 | 89 |
| | 1 682 | 880 | 11 515 | 470 | 8 800 | 11 000 | 115 | 6 621 | 115 | 2 235 | 1 634 | 797 | 512 | 1 484 | 3 476 | 51 336 | 324 |
| | 144 791 | 70 699 | 632 000 | 39 000 | 154 876 | 974 722 | 95 732 | 307 000 | 5 060 | 111 212 | 104 378 | 70 000 | 77 900 | 137 572 ⁴ | 393 000 | 3 180 370 | 121 |
| | 300 | 330 | 2 370 | - | 3 698 | 5 746 | - | 4 364 | - | 391 | 777 | - | - | - | 3 603 | 21 579 | 189 |
| | 1 529 | - | 6 754 | - | - | 5 576 | - | 1 477 | 37 | 5 046 | 351 | - | 6 245 | - | 1 153 | 28 168 | 89 |

(1) Railways: Length in use. Data refer to main railway companies (UIC-members).

Estimates in italic.

(2) Due to differences in definition, comparability is limited/low.

(3) Pipelines: only oil-pipelines longer than 40 km are considered.

(4) does not include private roads open to the public (approx. 74000 km).

Source: Eurostat, UIC, UN-ECE, national statistics.

Table 2.6: Main* airports handling at least 80% of the country's total passenger traffic in 2000

| | |
|-----------------------------------|--|
| BELGIUM (1 main airport**) | ITALY (26 main airports) |
| Bruxelles/National | Roma |
| DENMARK (4 main airports) | Milano/Malpensa |
| København | Milano/Linate |
| GERMANY (17 main airports) | Venezia |
| Frankfurt-Main | Napoli |
| München | Catania |
| Düsseldorf | Bologna |
| Berlin-Tegel | Torino |
| Hamburg | LUXEMBOURG (1 main airport) |
| Stuttgart | Luxembourg |
| GREECE (21 main airports) | NETHERLANDS (4 main airports) |
| Athinaí | Amsterdam |
| Iraklion | AUSTRIA (6 main airports) |
| Thessaloniki | Wien |
| Rodos | Salzburg |
| Kerkira | PORTUGAL (6 main airports) |
| Kos | Lisboa |
| SPAIN (34 main airports) | Faro |
| Madrid/Barajas | Porto |
| Barcelona | FINLAND (14 main airports) |
| Palma de Mallorca | Helsinki |
| Malaga | Oulu |
| Las Palmas/Gran Canaria | Turku |
| Tenerife | SWEDEN (19 main airports) |
| Alicante | Stockholm/Arlanda |
| Arrecife/Lanzarote | Göteborg |
| Ibiza | Malmö |
| FRANCE (27 main airports) | UNITED KINGDOM (32 main airports) |
| Airport System - Paris | London/Heathrow |
| Nice | London/Gatwick |
| Marseille | Manchester |
| Lyon/Satolas | London/Stansted |
| Toulouse | Birmingham |
| IRELAND (3 main airports) | Glasgow |
| Dublin | London/Luton |

* Airports with a total volume of 100 000 passengers per year or more.

** Only Brussels Airport reporting.

Source: Eurostat.

Greece is mainly due to the geographical characteristics of the country: numerous islands and extensive mountainous regions.

Gradual construction of the TEN boosts high-speed lines

In six Member States, dedicated 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 1 147 km or 48% of this track type, followed by Germany with 510 km (21%) and Spain with 377 km (16%). 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. The entire high-speed network is thus substantially higher.

Within the near future many more of high-speed sections of track 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.

Motorways more than tripled at Community level

Completely different tendencies can be observed for the development of road networks. Between 1970 and 1999 the total road network increased by 22%. This global increase should however be looked at with care: apart from 'motorways', the term 'road' is subject to various definitions. Keeping this in mind, the highest growth during the period 1970–99 has been achieved in Portugal (+ 69%), Belgium (+ 56%), France (+ 38%) and the Netherlands (+ 37%). 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 15 864 km in 1970 to 51 336 km in 1999). Extraordinary growth can be noticed for Greece and Spain: the Greek motorway network increased from 11 km in 1970 to about 470 km in 1999. A similar development is recorded in Spain where the network increased from 387 km to 8 800 km over the same period, although differences in definition might overstate this increase.

In 1999, the most extensive motorway network within EU-15 can be found in Germany with 11 515 km, followed by France (11 000 km) and Spain (8 800 km). The Benelux countries offer the densest motorway network with values between 44.2 km/1 000 km² and 55.1 km/1 000 km². The EU-15 average is 15.9 km per 1 000 km², a value close to those registered in Spain and the United Kingdom.

Inland waterways: easier from North Sea to Black Sea

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. Little passenger transport takes place using the inland waterway network. When it does it is mainly for leisure purposes.

Between 1970 and 1999, the total length of navigable inland waterways in the nine EU Member States able to perform transport activities using this mode decreased by 3 580 km

which represents 11%. Germany, with 6 754 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 and beyond (up to the Black Sea port of Constantza in Romania).

Netherlands: very long network compared to the country's size

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).

Difficulties to measure an airport or a seaport

As a densely populated part of the world, the EU as a whole features an impressive quantity of airports. It is not easy to « measure » a country's airport network or airport characteristics. The latter could for instance be measured on the basis of the number of runways and aircraft stands (be it with contact or remote), but such type of information is not yet available at Eurostat. Instead, Table 2.6 offers an overview of the number of main airports in the individual Member States (i.e. with a volume of more than 100 000 passengers per year) and furthermore shows those individual airports that, together, are responsible for at least 80% of a country's total traffic (both national and international traffic).

In geographically small countries, 80% of the total traffic is often handled by a single airport (like in Belgium, Denmark, Ireland, the Netherlands and Luxembourg). Larger countries and countries featuring islands (that eventually constitute popular holiday destinations too, like Spain and Greece) often list a certain number of important airports. Indications on the volume of air cargo handled at the various European airports can be obtained in chapter 5.1 (Transport of goods).

Table 2.7: Main* maritime ports handling at least 80% of the country's cargo traffic in 2000

| BELGIUM (4 main ports) | ITALY (41 main ports) |
|------------------------------|--------------------------------|
| Antwerpen | Genova |
| Zeebrugge | Trieste |
| DENMARK (17 main ports) | Taranto |
| Fredericia (og Shell-Havnen) | Augusta |
| Aarhus | Venezia |
| Statoil-Havnen | Porto Foxi |
| København (og Frihavnen) | Livorno |
| Helsingør | Ravenna |
| Rødby (Faergehavn) | Gioia Tauro |
| Esbjerg | Santa Panagia |
| Enstedvaerkets Havn | La Spezia |
| Aalborg Portland | Napoli |
| Frederikshavn | Milazzo |
| GERMANY (17 main ports) | Savona - Vado |
| Hamburg | Civitavecchia |
| Wilhelmshaven | Gela |
| Bremerhaven | PORTUGAL (7 main ports) |
| Rostock | Sines |
| Lübeck | Leixoes |
| Bremen | Lisboa |
| GREECE (59 main ports) | Setubal |
| Eleusis | FINLAND (18 main ports) |
| Piraeus | Skoeldvik |
| Thessaloniki | Helsinki |
| Agii Theodori | Kotka |
| Volos | Naantali |
| Megara | Rauma |
| Kavala | Rautaruukki |
| Chalkida | Hamina |
| Aliverio | Pori |
| Patras | Turku |
| Heraklion | Kokkola |
| Larymna | SWEDEN (28 main ports) |
| Milos Island | Göteborg |
| Igoumenitsa | Brofjorden Scanraff |
| Alexandroupolis | Trelleborg |
| Rio | Helsingborg |
| SPAIN (25 main ports) | Luleå |
| Bahía de Algeciras | Malmö |
| Tarragona | Stockholm |
| Bilbao | Oxelösund |
| Barcelona | Karishamn |
| Valencia | Norrköping |
| Huelva | Gävle |
| Cartagena | Stenungsund |
| Gijón | Silte Industrihamn |
| Santa Cruz de Tenerife | Nynäshamn oljehamn |
| Las Palmas, Gran Canaria | UNITED KINGDOM (48 main ports) |
| La Coruña | Grimsby & Immingham |
| Palma de Mallorca | Tees & Hartlepool |
| FRANCE (20 main ports) | London |
| Marseille | Forth |
| Le Havre | Sullom Voe |
| Dunkerque | Southampton |
| Nantes Saint-Nazaire | Milford Haven |
| Calais | Liverpool |
| Rouen | Felixstowe |
| IRELAND (3 main ports) | Kirkwall |
| Dublin | Dover |
| Cork | Medway |
| Limerick | Belfast |
| NETHERLANDS (10 main ports) | Port Talbot |
| Rotterdam | Hull |
| Amsterdam | |

*Main ports are ports that handle a cargo volume of at least 1 million tonnes.

Source: Eurostat

293 maritime ports handle over 1 million tonnes of cargo per year

The same principle has basically been applied for the seaports. Table 2.7 specifies the national distribution of the 293 main seaports in the EU

(i.e. seaports that handled at least 1 million tonnes of cargo in 2000). The same table further lists those ports of a country that, together, handled at least 80% of a country's total cargo volume.

2.3 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.

Environmentally responsible integration of national networks

A comprehensive, trans-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 periodically

The community guidelines for the development of the transport TEN (Council Decision No 1692/96/EC) mention the characteristics of the different networks. Periodically, 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 of the infrastructure and fixed installations. This includes the creation of high-speed and appropriate rail freight networks as well as the maintenance or upgrading of conventional lines;
- the achievement of technical interoperability of the European high-speed train network;
- consideration of safety, reliability, human health, environmental protection, technical compatibility and operational requirements.

For the road network, measures focus on :

- the creation of missing links and in particular those on cross-frontier intra-Community axes and those that are attractive to peripheral or enclosed areas;
- improvements on existing links, especially on cross-border axes and peripheral areas;
- connections with certain non-member countries;
- inter-modal connections aimed at combined-transport axes;

Table 2.8: Community financing of the transport-TEN 1993 - 2000 (million EUR)

| Type of assistance | Instrument | 1993-95 | 1996 | 1997 | 1998 | 1999 | 2000 |
|--|--|---------|-------|-------|-------|-------|-------|
| Loans | European Investment Bank | 7 666 | 3 504 | 4 943 | 4 415 | 5 977 | 4 989 |
| Loan guarantees | European Investment Fund | 161 | 303 | 55 | 71 | 266 | 55 |
| Grants | European Regional Development Fund | 999 | 2 639 | 527 | : | : | : |
| Grants | Cohesion Fund | 2 995 | 1 221 | 1 251 | 1 337 | 444 | 1 287 |
| Grants, interest rate subsidies, loan guarantees and co-financing of studies | European Commission's specific TEN Budget line | 625 | 280 | 352 | 474 | 497 | 581 |
| | <i>of which the 14 priority projects</i> | 355 | 200 | 202 | 282 | 267 | 288 |

Source: DG Energy and Transport.

- bypasses for the principal urban nodes located on the road TEN;
- the development and implementation of computerised traffic-management systems.

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: complementarily with other modes through improved port infrastructures.

Measures for the sea ports network comprise:

- new port infrastructures
- improved connections with the land networks
- Transshipment facilities and multimodal connections within the port area
- Improvement of sea access to ports (navigational facilities, clearing of ice)

Measures for the airport network focus on:

- Investments for airport infrastructure such as high speed rail connections at the airports designated as 'International Connecting points' (these include airports or airport systems with a volume of over 5 million passenger movements per year or greater than 150 000 tons of freight movements)
- Investment at airports designated as 'Regional Accessibility Points' (generally airports with an annual traffic volume of 500 000 to 900 000 passengers, airports on islands or landlocked areas)

Maps representing the TEN Outline Plans for the rail, road, inland waterways and airport network are included in this chapter.

'Selected projects' are now the priority

Originally fourteen transport projects of common interest were identified as priority projects during the European Council meeting in Essen in December 1994. Three of the original projects have been completed (the upgrading of the conventional rail link: Cork – Dublin – Belfast – Larne – Stranraer (Ireland), capacity enhancements at Malpensa airport (Northern Italy) and the Øresund fixed link between Denmark and Sweden) and have been removed from the list. In 2001, the Commission has proposed to add six new projects (numbered 15 to 20 in the box). Furthermore, two existing projects have been proposed to be modified (numbered 1 and 3 in the box). The modifications to project 1 concerns mainly of adding the Verona-Naples railway line and its Bologna-Milan branch to the Munich-Verona Brenner route. Those of project 3 concerns the adding of the mixed freight/high speed line between Montpellier and Nîmes to the Mediterranean branch of the TGV south (Madrid-Barcelona - Montpellier).

The TEN project list was re-aligned to reflect current policy guidelines, as laid down in the Commission's White Paper *'European transport policy for 2010: time to decide'*. These include:

- greater consideration of environmental issues
- the development of a better rail freight service network
- the encouragement of short sea and inland waterway shipping
- integration between rail and air modes
- measures concerning the implementation of intelligent transport systems.

Completing projects from the «Essen-list» most important

Despite the addition of new projects, the Commission considers completing outstanding agreed priority projects from the first phase (the «Essen-list») as very important. Financing is largely in place for these selected projects and work has begun on many.

Application of new technologies to the TEN

The TEN will also benefit from the development and application of new transport technologies. These are generically referred to as Intelligent transport systems (ITS). These include the development of a European Rail Traffic Management System (ERTMS), which is close to completion and will improve rail safety as well as ITS for road and air sectors. Similarly strategic benefits will accrue from the development of the European Global

Satellite Navigation System GALILEO which has been upgraded to a priority status project (number 15 on the list of specific projects).

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.

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 1.8 billion for the period 1995-1999 has considerably helped to launch major projects. For the period 2000-2006 this budget has been increased to € 4.2 billion. As can be seen in Table 2.9, the budget for 2000 was € 581 million. With regard to the categories of projects, the Commission has continued to concentrate the greater part of the available resources (50%) on the 14 priority projects (including rail traffic management projects). Some 40% were dedicated to other important projects of common interest and 10% to traffic management projects (all modes except rail).

Some 58% of TEN budget for direct grants in 2000

When looking at the 2000 budget by form of intervention, it appears that 33% of the volume has been attributed for feasibility studies, 58% for direct grants and 9% for interest rate rebates. The third way of looking at the 2000 budget is by modal split: 66% went to rail projects (including traffic management), 12% to road projects, 3% to projects linked to inland waterways. Traffic management (all modes except rail) was granted 10%, airports 2% and projects of multi-modal nature 7%.

Structural Funds by far the main EU source

However, the Structural Funds, European Regional Development Fund (ERDF) and Cohesion Fund are by far the main source of Union grants for TEN projects. Due to the multi annual 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 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. Details can be found in Table 2.9.

EIB for loans

One of the European Investment Bank's (EIB) priority objectives is to grant loans that help develop large infrastructure projects of common interest as can be seen from Table 2.9.

In September 2001, the Commission adopted the Indicative Multi-annual Programme for the funding of the transport TEN over the 2001-2006 period. The Commission allocates EUR 2780 million to various projects: 47% of the funds will be to the benefit of the infrastructure projects from the initial «Essen» list, 20% will be allocated to GALILEO, 23% to railway bottlenecks and cross-border projects and finally 10% to Intelligent Transport Systems (ITS) for the road and air sectors.

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 12 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 TINA Group agreed and approved an outline network in June 1999. The network consists of:

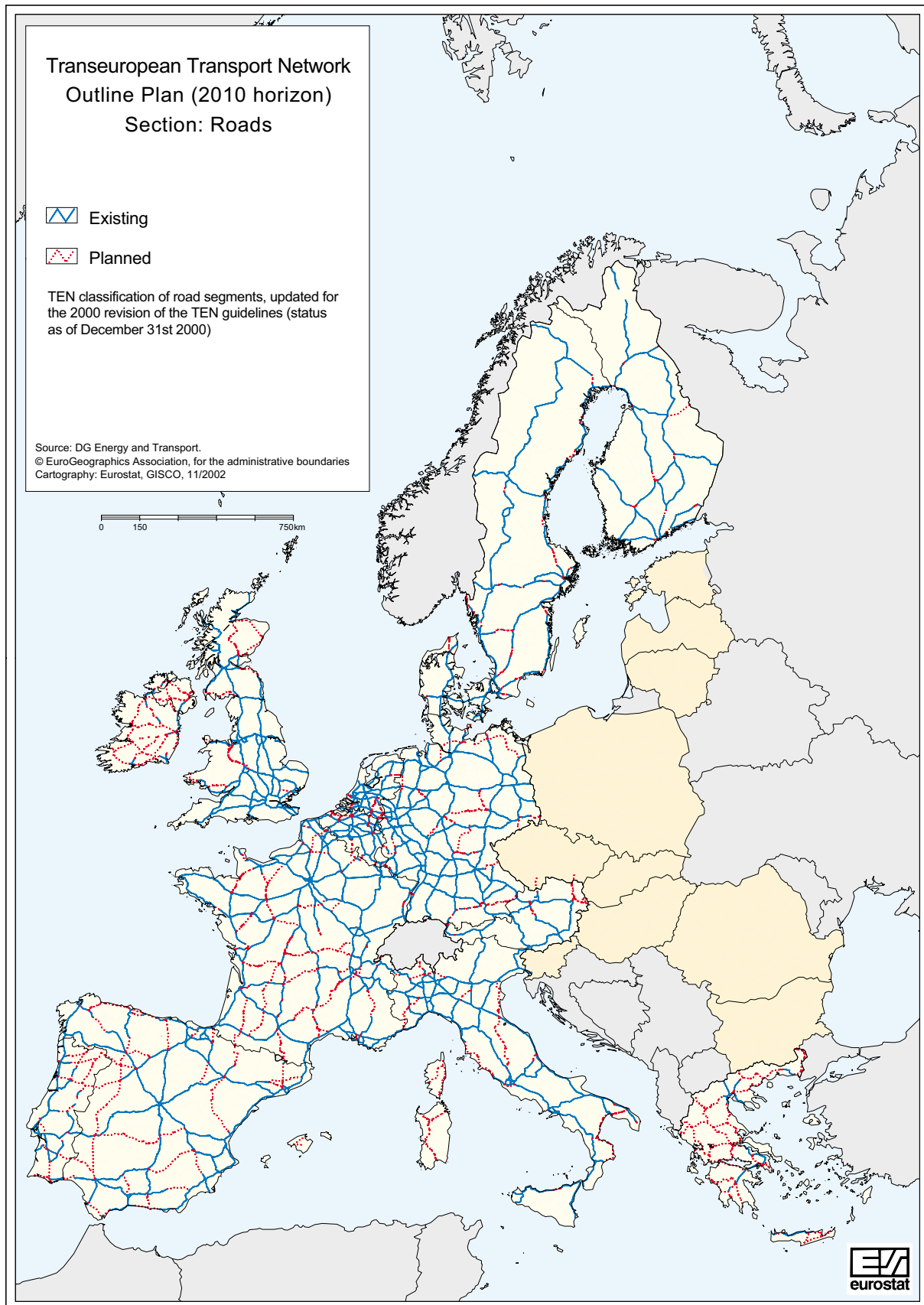
- 18 030 kilometres of roads
- 20 290 kilometres of railways
- 38 airports
- 13 sea ports
- 49 river ports

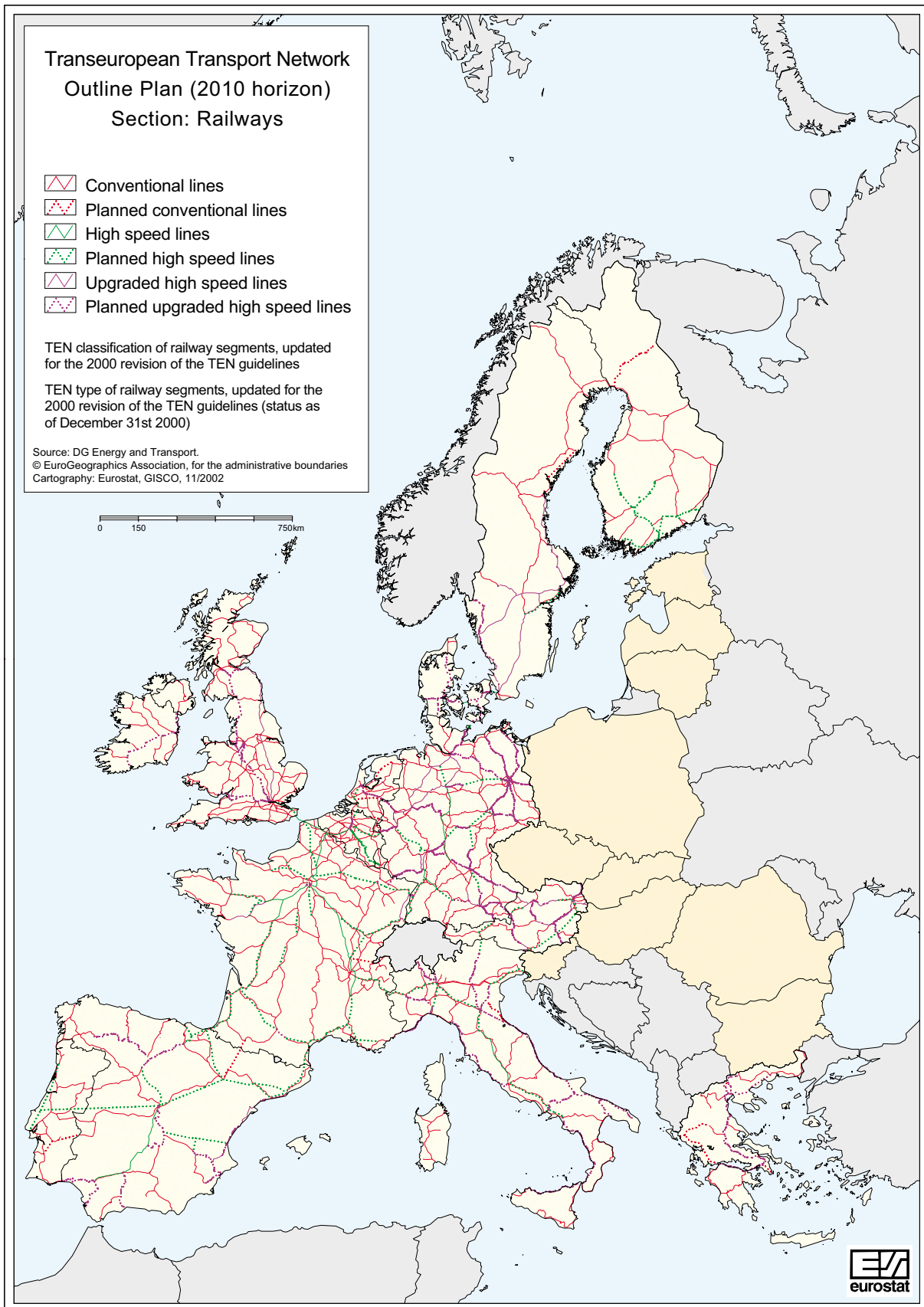
The estimated cost for the establishment of this network in the candidate countries is established at EUR 92 billion, between 1999 and 2015, of which 40% is attributed to measures in rail, 48% in road and 2% in inland waterway infrastructures. The remaining 10% have been calculated for network nodes such as airports, river and seaports and other terminals.

The Commission already gives assistance to the countries of Central and Eastern Europe under the PHARE programme, 1 billion to date for transport projects in those countries.

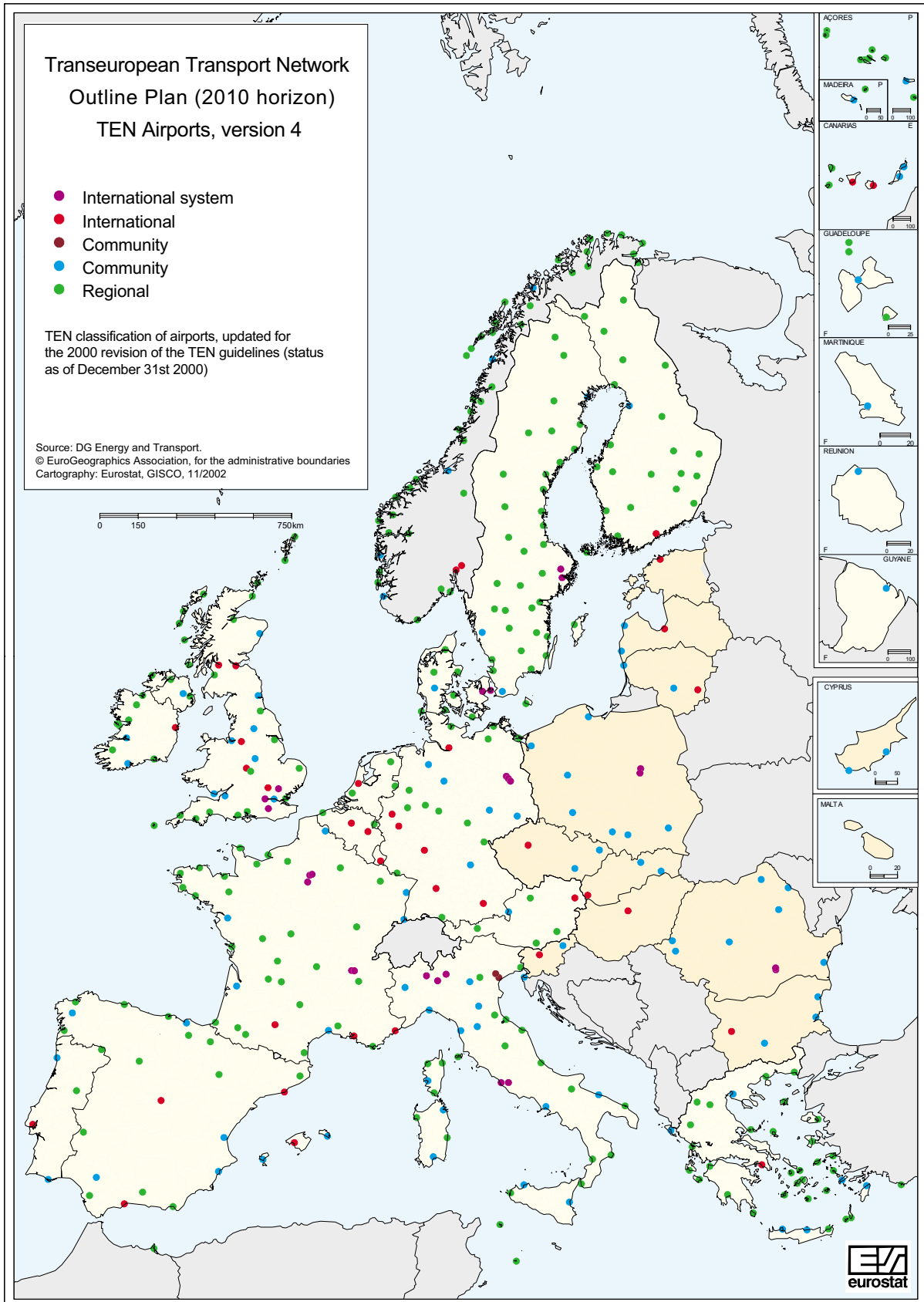
———— TENS for transport: 17 specific projects ————

1. **High-speed train/combined transport north-south**
München – Nürnberg – Erfurt-Halle/Leipzig-Berlin
Brenner axis: Napoli-Verona-München and Bologna-Milano
2. **High-speed train PBCAL (Paris-Brussels-Cologne-Amsterdam-London)**
Belgium: F/B border – Brussels – Liège – B/D border
Brussels – B/NL border
United Kingdom: London – Channel Tunnel Access
Netherlands: B/NL border – Rotterdam – Amsterdam
Germany: Aachen – Cologne – Rhine/Main
3. **High-speed train south**
Madrid-Barcelona-Perpignan-Montpellier-Nîmes-Madrid-Vitoria-Dax
4. **High-speed train east**
Paris – Metz – Strasbourg – Appenweier – (Karlsruhe) with junctions to
Metz – Saarbrücken - Mannheim and Metz - Luxembourg
5. **Conventional rail/combined transport : Betuwe line**
Rotterdam – NL/D border – (Rhine/Ruhr)
6. **High-speed train/combined transport, France-Italy**
Lyon – Turin
Turin – Milan – Venice - Trieste
7. **Greek motorways:**
Pathe: Rio Antirio, Patras – Athens – Thessaloniki – Promahon (Greek/
Bulgarian border)
Via Egnatia: Igoumenitsa – Thessaloniki – Alexandroupolis – Ormenio
(Greek/Bulgarian border) – Kipi (Greek/Turkish border)
8. **Multimodal Link Portugal – Spain – Central Europe**
12. **Nordic Triangle**
(Copenhagen-Oslo, Stockholm-Helsinki ; various rail/road projects)
13. **Ireland/United Kingdom/Benelux road link**
14. **United Kingdom West Coast main line (rail)**
15. **Global navigation and positioning satellite system (GALILEO)**
16. **High-capacity rail link across the Pyrenees**
17. **East European Combined Transport/High Speed Train**
Stuttgart-München-Salzburg/Linz-Vienna
18. **Danube river improvement between Vilshofen and Straubing (Germany)**
19. **High-speed rail interoperability on the Iberian Peninsula**
20. **Fehmarn Belt: fixed link between Germany and Denmark**









2.4 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 considerable lapse of time.

One of the few sources that offer a comprehensive breakdown of public expenditure by mode of transport is the European Conference of Ministers of Transport (ECMT), an intergovernmental organisation which administratively is a part of the OECD (Organisation for Economic Co-operation and Development). An extensive revision of public

expenditure data is currently being undertaken. Results for the period 1996 to 2000 are expected to become available during the first semester of 2003. The next edition of the Panorama of Transport is thus likely to offer a selection of these data. Awaiting the new results, 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 2.9 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 2.10 outlines the absolute sums invested in the transport infrastructures and compares the 1995 situation to the one in 1990.

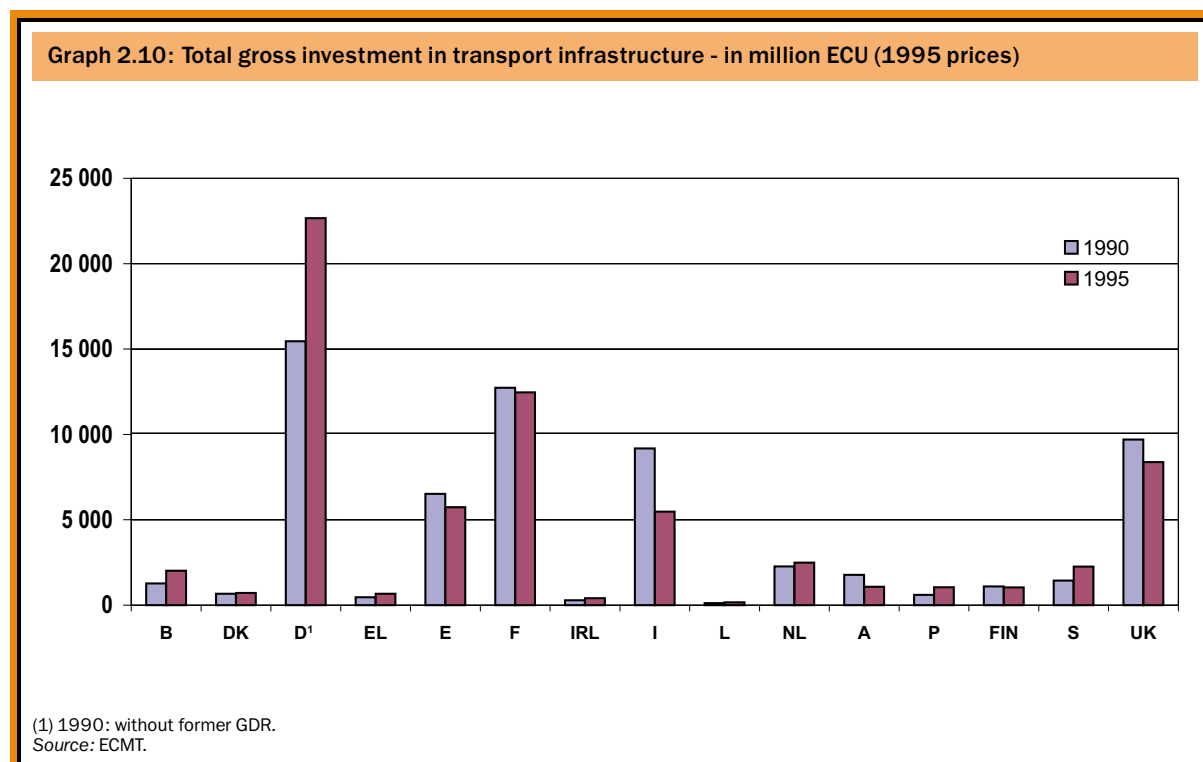


Table 2.9 : Total gross investment in transport infrastructure - in million ECU (1995 prices)

| | | 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.
Source: ECMT.

Estimates in italic.

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.

Expected high share for the road network

Graph 2.11 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.

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 2.9.

Combination with private capital

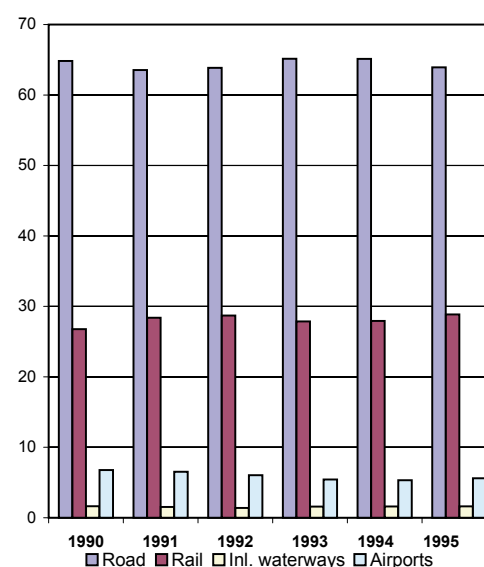
The concept of the trans-European transport networks (TENs) outlines the supra-national dimension of transport networks.

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 previous chapter gave details on the various instruments for the financing of the TENs.

Graph 2.11: Total gross investment in transport infrastructure in EU-15: modal split (%)



Source: ECMT.

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 out of 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 in export, too

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 2.3 — 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 experienced very serious cuts in their stock of rail goods vehicles. In the entire EU, 985 000 goods wagons were taken out of service between 1970 and 1999. Without doubt, this is due to the increasing phasing out of old material. A cautious interpretation of these figures is however requested: the decline of stock is probably 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 sometimes does not appear in the statistics anymore. The figures should thus be read with care.

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 1998 this figure stood at 52%. 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 inland transport - key indicators EU-15

| | | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 |
|------|---|--------|--------|--------|--------|--------|--------|--------|
| Road | Passenger cars (million) | 62.48 | 103.22 | 143.27 | 159.96 | 165.26 | 168.98 | 173.10 |
| | Buses and coaches (1 000) | 332 | 444 | 484 | 486 | 506 | 510 | 525 |
| | Goods vehicles ¹ (1 000) | 7 408 | 10 628 | 15 747 | 17 851 | 18 915 | 19 407 | 20 135 |
| | Trailers and semi-trailers (1 000) | 1 693 | 3 250 | 6 409 | 6 977 | : | : | : |
| Rail | Locomotives and railcars (units) | 49 059 | 45 773 | 45 852 | 37 528 | 38 116 | 36 616 | 34 454 |
| | Passenger vehicles ² (units) | 96 797 | 95 858 | 86 326 | 77 408 | 74 679 | 74 044 | 75 357 |
| | Goods transport wagons ³ (1 000) | 1 508 | 1 221 | 839 | 623 | 557 | 524 | 523 |
| IWW | Self-propelled goods vessels ⁴ (units) | 30 483 | 21 714 | 17 822 | 16 035 | 16 076 | 15 071 | 14 924 |

(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 and railcars (units) | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 |
| Belgium | 1 536 | 1 740 | 1 727 | 1 579 | 1 579 | 1 595 | 1 617 |
| Denmark | 675 | 660 | 765 | 783 | 666 | 453 | 433 |
| Germany | 18 071 | 18 949 | 17 741 | 11 784 | 12 802 | 11 715 | 9 976 |
| Greece | 514 | 313 | 400 | 430 | 523 | 638 | 214 |
| Spain | 1 928 | 1 791 | 1 922 | 1 856 | 1 764 | 1 730 | 1 670 |
| France | 6 261 | 6 204 | 7 279 | 7 009 | 6 952 | 6 952 | 7 002 |
| Ireland | 307 | 192 | 166 | 171 | 158 | 158 | 172 |
| Italy | 4 715 | 4 916 | 4 818 | 4 660 | 4 490 | 4 454 | 4 623 |
| Luxembourg | 95 | 85 | 97 | 110 | 97 | 104 | 113 |
| Netherlands | 1 113 | 1 132 | 1 235 | 1 171 | 1 213 | 1 079 | 1 027 |
| Austria | 1 423 | 1 428 | 1 543 | 1 542 | 1 557 | 1 526 | 1 512 |
| Portugal | 626 | 583 | 530 | 633 | 618 | 618 | 624 |
| Finland | 877 | 752 | 669 | 761 | 747 | 746 | 742 |
| Sweden | 1 408 | 1 576 | 1 350 | 1 039 | 950 | 948 | 929 |
| United Kingdom | 9 510 | 5 452 | 5 610 | 4 000 | 4 000 | 3 900 | 3 800 |
| EU-15 | 49 059 | 45 773 | 45 852 | 37 528 | 38 116 | 36 616 | 34 454 |
| Index 1970 = 100 | 100 | 102 | 94 | 88 | 57 | 55 | 70 |

| Goods transport rail wagons (1 000) | | | | | | | |
|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 |
| Belgium | 48.9 | 43.4 | 30.3 | 20.3 | 18.9 | 19.1 | 18.6 |
| Denmark | 10.3 | 8.3 | 4.6 | 4.1 | 3.4 | 3.2 | 2.5 |
| Germany | 459.0 | 476.4 | 366.7 | 245.9 | 213.1 | 197.7 | 192.8 |
| Greece | 9.0 | 10.9 | 11.0 | 11.1 | 8.6 | 2.7 | 3.5 |
| Spain | 41.0 | 41.0 | 37.2 | 29.7 | 28.3 | 26.5 | 26.5 |
| France | 302.4 | 253.1 | 162.0 | 131.9 | 123.6 | 117.2 | 96.3 |
| Ireland | 9.5 | 4.7 | 1.8 | 1.8 | 1.6 | 1.8 | 1.6 |
| Italy | 125.9 | 113.4 | 99.7 | 89.1 | 76.7 | 76.0 | 76.2 |
| Luxembourg | 4.2 | 3.7 | 2.7 | 2.4 | 2.3 | 2.3 | 2.3 |
| Netherlands | 19.2 | 12.3 | 6.7 | 6.0 | 4.7 | 4.6 | 4.6 |
| Austria | 34.9 | 38.7 | 34.3 | 28.7 | 25.5 | 24.0 | 23.7 |
| Portugal | 9.0 | 6.7 | 4.6 | 3.9 | 4.2 | 4.6 | 4.2 |
| Finland | 21.9 | 21.5 | 15.2 | 14.0 | 13.7 | 13.1 | 12 |
| Sweden | 48.2 | 45.9 | 27.5 | 20.2 | 17.9 | 17.2 | 17.6 |
| United Kingdom | 364.9 | 141.2 | 34.4 | 14.2 | 14.0 | 14.0 | 41.0 |
| EU-15 | 1 508 | 1 221 | 839 | 623 | 557 | 524 | 523 |
| Index 1970 = 100 | 100 | 81 | 56 | 41 | 37 | 34 | 35 |

| Passenger rail transport wagons (units) | | | | | | | |
|---|--------|--------|--------|--------|--------|--------|--------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 |
| Belgium | 3 415 | 3 641 | 3 286 | 3 110 | 3 430 | 3 389 | 3 468 |
| Denmark | 1 481 | 1 613 | 1 594 | 1 688 | 1 375 | 1 140 | 909 |
| Germany | 31 506 | 29 118 | 24 139 | 19 083 | 18 548 | 18 128 | 20 297 |
| Greece | 574 | 660 | 810 | 869 | 787 | 787 | 517 |
| Spain | 3 353 | 3 506 | 3 839 | 4 230 | 4 079 | 3 813 | 3 829 |
| France | 15 053 | 15 922 | 15 748 | 15 799 | 15 746 | 15 830 | 15 764 |
| Ireland | 481 | 343 | 314 | 318 | 347 | 347 | 373 |
| Italy | 11 357 | 13 611 | 14 025 | 13 527 | 12 273 | 12 213 | 11 890 |
| Luxembourg | 114 | 102 | 114 | 146 | 146 | 146 | 146 |
| Netherlands | 1 932 | 1 986 | 2 268 | 2 611 | 2 688 | 2 723 | 2 776 |
| Austria | 4 125 | 4 055 | 3 689 | 3 740 | 3 315 | 3 583 | 3 571 |
| Portugal | 980 | 1 143 | 1 232 | 1 341 | 1 367 | 1 406 | 1 431 |
| Finland | 1 043 | 1 095 | 957 | 977 | 959 | 968 | 994 |
| Sweden | 2 705 | 2 021 | 1 747 | 1 655 | 1 619 | 1 571 | 1 512 |
| United Kingdom | 18 678 | 17 042 | 12 564 | 8 314 | 8 000 | 8 000 | 7 880 |
| EU-15 | 96 797 | 95 858 | 86 326 | 77 408 | 74 679 | 74 044 | 75 357 |
| Index 1970 = 100 | 100 | 99 | 89 | 80 | 77 | 76 | 78 |

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

Estimates in italic.

The number of locomotives and railcars is estimated to have declined by over 25% at EU level between 1970 and 1999. The largest reduction in stock compared to 1970 was registered in the United Kingdom (- 60%, based on estimations), followed by Greece (- 58%) and Germany (- 45%). However, a part of the decrease in the last few years could be attributed to the aforementioned outsourcing of equipment (especially in the case of the United Kingdom where the entire rail transport has been privatised).

In the same period, the number of passenger rail wagons of the EU-15 area have declined more moderately (- 22%), but with substantial differences between Member States. The number of passenger rail wagons increased in seven Member States, with the strongest increase registered in Portugal (+ 46%) and the Netherlands (+ 43%). The total number of rail passenger transport vehicles taken off the tracks between 1970 and 1999 corresponds to the 1999 stock of these vehicles in the Benelux countries and France together.

It should however be noted that in 1999, the total number of passenger rail wagons at EU-15 level has increased again (+ 2% compared to 1998).

Over 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 1999, 173 million passenger cars were on the EU-15 roads, an impressive 177% growth in less than three decades (annual average growth rate: 3.6%).

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 460 units per 1 000 inhabitants in 1999.

Unsurprisingly, average annual growth rates of the number of cars registered between 1970 and 1999 were highest in Greece (+ 9.1%), Portugal (+ 7.4%) and Spain (+ 7.0%). The lowest rates were registered for Denmark (+ 1.8%) and Sweden (+ 1.9%). In 1998, three Member States seem to have a car-density higher than the US average: Germany, Italy and Luxembourg (with 508, 545 and 572 cars per 1 000 inhabitants respectively). However, the US figure (approximately 486 cars per 1000 inhabitants in 1998) only takes 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 58% increase at EU-15 level is registered for the period 1970-1999. Mainly the first decade of the period under observation saw impressive developments. Between 1970 and 1999, only Belgium (- 9%) registered a negative development. Quite to the contrary, spectacular increases can be noticed in Ireland (+ 223%), Portugal (+ 215%) and Denmark (+ 175%). It should be noted that these figures include buses used in urban common transport.

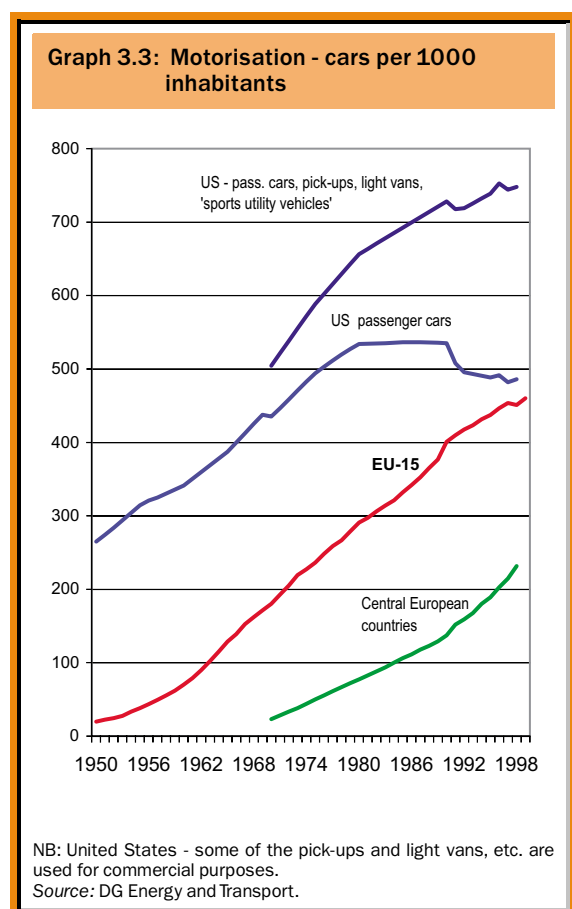


Table 3.4: Road transport equipment

| Passenger cars (million) | | | | | | | | | Cars per 1 000 inhab. 1999 |
|--------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|------------|----------------------------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 | | |
| Belgium | 2.06 | 3.16 | 3.86 | 4.27 | 4.42 | 4.49 | 4.60 | 450 | |
| Denmark | 1.08 | 1.39 | 1.59 | 1.67 | 1.78 | 1.82 | 1.80 | 341 | |
| Germany | 15.11 | 25.87 | 35.50 | 40.40 | 41.37 | 41.67 | 42.32 | 516 | |
| Greece | 0.23 | 0.86 | 1.74 | 2.20 | 2.50 | 2.68 | 2.90 | 275 | |
| Spain | 2.38 | 7.56 | 12.00 | 14.21 | 15.30 | 16.05 | 16.85 | 424 | |
| France | 11.90 | 18.40 | 23.60 | 25.10 | 26.09 | 26.81 | 27.50 | 465 | |
| Ireland | 0.39 | 0.74 | 0.80 | 0.96 | 1.13 | 1.15 | 1.30 | 346 | |
| Italy | 10.18 | 17.69 | 27.42 | 31.70 | 30.74 | 31.37 | 31.40 | 544 | |
| Luxembourg | 0.07 | 0.13 | 0.18 | 0.23 | 0.24 | 0.24 | 0.30 | 610 | |
| Netherlands | 2.56 | 4.55 | 5.51 | 5.63 | 5.81 | 5.90 | 6.30 | 398 | |
| Austria | 1.20 | 2.25 | 2.99 | 3.59 | 3.78 | 3.89 | 4.00 | 494 | |
| Portugal | 0.42 | 0.92 | 1.85 | 2.56 | 2.95 | 3.20 | 3.30 | 330 | |
| Finland | 0.71 | 1.23 | 1.94 | 1.90 | 1.95 | 2.02 | 2.10 | 407 | |
| Sweden | 2.29 | 2.88 | 3.60 | 3.63 | 3.70 | 3.79 | 3.90 | 440 | |
| United Kingdom | 11.90 | 15.60 | 20.70 | 21.90 | 23.50 | 23.90 | 24.60 | 414 | |
| EU-15 | 62.48 | 103.22 | 143.27 | 159.96 | 165.26 | 168.98 | 173.17 | 460 | |
| Index 1970 = 100 | 100 | 165 | 229 | 256 | 265 | 270 | 277 | | |

| Buses and coaches (1 000) | | | | | | | | | |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 | | |
| Belgium | 16.2 | 19.6 | 15.6 | 14.6 | 14.7 | 14.6 | 14.7 | 14.7 | 14.7 |
| Denmark | 5.0 | 7.4 | 8.1 | 13.5 | 13.8 | 13.9 | 13.9 | 13.9 | 13.9 |
| Germany | 63.9 | 95.8 | 100.4 | 86.3 | 84.0 | 83.3 | 84.7 | 84.7 | 84.7 |
| Greece | 10.5 | 18.0 | 21.4 | 24.6 | 25.6 | 26.3 | 26.8 | 26.8 | 26.8 |
| Spain | 30.7 | 42.6 | 45.8 | 47.4 | 50.0 | 51.8 | 53.5 | 53.5 | 53.5 |
| France | 41.0 | 65.0 | 75.0 | 80.0 | 82.0 | 82.0 | 85.6 | 85.6 | 85.6 |
| Ireland | 2.0 | 2.7 | 4.0 | 5.3 | 5.8 | 6.0 | 6.5 | 6.5 | 6.5 |
| Italy | 32.9 | 58.1 | 77.7 | 75.0 | 84.2 | 84.8 | 85.7 | 85.7 | 85.7 |
| Luxembourg | 0.6 | 0.6 | 0.8 | 0.8 | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 |
| Netherlands | 9.5 | 11.2 | 12.1 | 11.5 | 11.2 | 10.8 | 11.2 | 11.2 | 11.2 |
| Austria | 6.8 | 9.0 | 9.4 | 9.8 | 9.7 | 9.7 | 9.8 | 9.8 | 9.8 |
| Portugal | 5.9 | 8.5 | 12.1 | 15.0 | 16.4 | 17.0 | 18.5 | 18.5 | 18.5 |
| Finland | 8.1 | 9.0 | 9.3 | 8.1 | 8.5 | 9.0 | 9.5 | 9.5 | 9.5 |
| Sweden | 14.3 | 12.8 | 14.6 | 14.6 | 14.8 | 14.8 | 14.8 | 14.8 | 14.8 |
| United Kingdom ¹ | 84.2 | 83.3 | 78.0 | 80.0 | 84.0 | 85.1 | 89.0 | 89.0 | 89.0 |
| EU-15 | 332 | 444 | 484 | 486 | 506 | 510 | 525 | 525 | 525 |
| Index 1970 = 100 | 100 | 134 | 146 | 147 | 152 | 154 | 158 | 158 | 158 |

| Goods vehicles (lorries and road tractors) ² (1 000) | | | | | | | | |
|---|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 | |
| Belgium | 212 | 268 | 343 | 402 | 435 | 453 | 480 | 480 |
| Denmark | 245 | 249 | 287 | 333 | 336 | 347 | 362 | 362 |
| Germany | 1 188 | 1 511 | 1 653 | 2 215 | 2 315 | 2 371 | 2 466 | 2 466 |
| Greece | 105 | 401 | 743 | 884 | 952 | 987 | 1 020 | 1 020 |
| Spain | 716 | 1 362 | 2 401 | 3 024 | 3 310 | 3 510 | 3 736 | 3 736 |
| France | 1 504 | 2 515 | 3 568 | 3 597 | 3 453 | 3 400 | 3 370 | 3 370 |
| Ireland | 49 | 65 | 143 | 142 | 158 | 170 | 180 | 180 |
| Italy | 877 | 1 338 | 2 349 | 2 430 | 2 763 | 2 816 | 2 908 | 2 908 |
| Luxembourg | 9 | 9 | 11 | 15 | 16 | 17 | 18 | 18 |
| Netherlands | 286 | 314 | 507 | 578 | 635 | 680 | 760 | 760 |
| Austria | 121 | 184 | 253 | 290 | 301 | 310 | 320 | 320 |
| Portugal | 100 | 230 | 555 | 866 | 1 050 | 1 080 | 1 100 | 1 100 |
| Finland | 108 | 146 | 264 | 272 | 267 | 281 | 294 | 294 |
| Sweden | 145 | 182 | 310 | 308 | 321 | 338 | 350 | 350 |
| United Kingdom | 1 749 | 1 828 | 2 428 | 2 582 | 2 707 | 2 764 | 2 923 | 2 923 |
| EU-15 | 7 414 | 10 602 | 15 815 | 17 938 | 19 019 | 19 524 | 20 287 | 20 287 |
| Index 1970 = 100 | 100 | 143 | 213 | 242 | 257 | 263 | 274 | 274 |

| Number of trailers and semi-trailers ³ (1 000) | | | | | | | | |
|---|--------------|--------------|--------------|--------------|----------|------------------|----------|----------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 | |
| Belgium | 25 | 51 | 95 | 126 | - | - | - | - |
| Denmark | 35 | 128 | 318 | 436 | 465 | 496 | 562 | 562 |
| Germany | 1070 | 1905 | 3565 | 3139 | 3253 | 3371 | 3502 | 3502 |
| Greece | 2 | 5 | 9 | 12 | 13 | 13 | - | - |
| Spain | 18 | 48 | 106 | 157 | 182 | 201 | 221 | 221 |
| France | 81 | 156 | 165 | 182 | 181 | 311 ⁴ | 320.4 | 320.4 |
| Ireland | 9 | 12 | 19 | 17 | - | - | - | - |
| Italy | 104 | 264 | 600 | 840 | 812 | 815 | 800 | 800 |
| Luxembourg | 6 | 12 | 9 | 6 | - | - | - | - |
| Netherlands | 33 | 68 | 140 | 190 | - | - | - | - |
| Austria | 24 | 50 | 296 | 423 | 444 | 466 | 540 | 540 |
| Portugal | 31 | 72 | 160 | 290 | 303 | 317 | 332 | 332 |
| Finland | 10 | 23 | 345 | 434 | 453 | 477 | 500 | 500 |
| Sweden | 85 | 252 | 348 | 481 | 490 | 502 | 661 | 661 |
| United Kingdom ⁵ | 160 | 204 | 234 | 233 | 235 | 238 | 238 | 238 |
| EU-15 | 1 693 | 3 250 | 6 409 | 6 966 | - | - | - | - |
| Index 1970=100 | 100 | 192 | 379 | 411 | - | - | - | - |

(1) Data refer to Great Britain only.

Estimates in italic.

(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.

(4) Methodology change: Until 1997, includes vehicles < 10 years only; after 1998, includes vehicles < 20 years only.

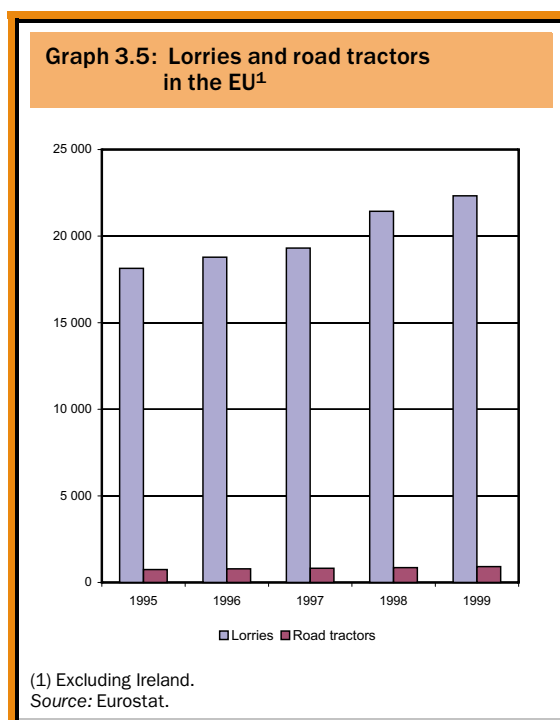
(5) Includes semi-trailers only.

Sources: DG Energy and Transport, Eurostat / ECMT / UN-ECE, IRF, national statistics.

Light vans not uniformly classified

The number of goods road vehicles has experienced a substantial increase over the years: their number rose by 174% between 1970 and 1999. 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 and pick-ups or classify them in the 'passenger cars' category makes comparison between Member States somewhat problematic.

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.



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 6 Member States (Spain, France,

Austria, Finland, Italy and Sweden) increased by more than 25% between 1995 and 1999 (1999: 1 418 490 units).

Table 3.4 also offers an overview of the number of trailers (coupled to lorries) and semi-trailers together. In 1999, their number nearly amounted to 8 millions at EU-level. Depending on the vehicle registers in the various countries, light trailers

Table 3.6: Inland waterway transport equipment

| | Self-propelled goods vessels, tugs and pushers (units) | | | | | | | Dumb and pushed barges (units) | | | | | | |
|----------------------|--|--------|--------|--------|--------|--------|--------|--------------------------------|-------|-------|-------|-------|-------|-------|
| | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 | 1970 | 1980 | 1990 | 1995 | 1997 | 1998 | 1999 |
| Belgium | 5 092 | 3 107 | 1 871 | 1 608 | 1 264 | 1 250 | 1 236 | 455 | 190 | 167 | 173 | 157 | 153 | 149 |
| Denmark | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Germany ¹ | 6 038 | 4 464 | 3 230 | 3 637 | 3 425 | 3 294 | 3 142 | 2 200 | 1 732 | 1 566 | 1 290 | 1 273 | 1 230 | 1 197 |
| Greece | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Spain | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| France | 5 790 | 4 254 | 2 514 | 1 687 | 1 479 | 1 443 | 1 408 | 1 591 | 1 211 | 768 | 749 | 694 | 695 | 679 |
| Ireland | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Italy | 3 124 | 2 347 | 2 755 | 3 069 | 3 184 | 3 184 | 3 197 | 393 | 217 | 372 | 431 | 459 | 474 | 437 |
| Luxembourg | 17 | 18 | 25 | 44 | 45 | 45 | 45 | - | - | - | - | - | - | - |
| Netherlands | 9 885 | 6 966 | 6 834 | 5 511 | 6 196 | 5 366 | 5 398 | - | - | 3 783 | 3 440 | 3 098 | 3 020 | 2 913 |
| Austria | 57 | 64 | 61 | 40 | 42 | 44 | 51 | 225 | 150 | 171 | 126 | 141 | 141 | 146 |
| Portugal | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Finland ² | 90 | 113 | 136 | 162 | 164 | 168 | 170 | 70 | 57 | 23 | 19 | 23 | 28 | 27 |
| Sweden | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| United Kingdom | 390 | 381 | 396 | 277 | 277 | 277 | 277 | 1 610 | 1 228 | 411 | 361 | 361 | 361 | 361 |
| EU-15 | 30 483 | 21 714 | 17 822 | 16 035 | 16 076 | 15 071 | 14 924 | 6 544 | 4 785 | 7 261 | 6 589 | 6 206 | 6 102 | 5 909 |
| Index 1970=100 | 100 | 71 | 58 | 53 | 53 | 49 | 69 | 100 | 73 | 111 | 101 | 95 | 93 | 123 |

(1) Including former GDR for 1970-90 data.

(2) Including passenger vessels.

Source: Eurostat/ECMT/UN-ECE.

Table 3.7: EU-15 Airfleet¹ by operator country - Number of aircraft types in service at mid-year

| Aircraft type/usage | Belgium | | Denmark | | Germany | | Greece | | Spain | | France | | Ireland | | Italy | | |
|--|------------|------------|-------------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|---------------|-------------|-------------|-------------|--------------|
| | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | |
| Business/Corporate/Executive | 14 | 14 | 33 | 39 | 180 | 214 | 9 | 9 | 42 | 43 | 94 | 99 | 6 | 10 | 81 | 93 | |
| Freight/Cargo less than 100 000 lbs MTOW | 10 | 11 | 2 | 2 | 31 | 32 | 3 | 2 | 42 | 41 | 7 | 9 | - | - | 14 | 13 | |
| Freight/Cargo more than 100 000 lbs MTOW | 40 | 34 | 14 | 11 | 23 | 22 | - | 1 | 10 | 12 | 18 | 16 | 10 | 14 | 4 | 3 | |
| Utility transport/Multi-Role/Convertible | 1 | - | 7 | 7 | 12 | 14 | - | - | 14 | 14 | 22 | 23 | - | - | - | - | |
| Hospital/Ambulance/other special purpose | 1 | 1 | 2 | 2 | 17 | 14 | - | - | 5 | 9 | 35 | 32 | 2 | 2 | 4 | 6 | |
| Passenger 50 seats or less | 12 | 10 | 44 | 45 | 127 | 141 | 18 | 16 | 40 | 44 | 169 | 142 | 8 | 4 | 70 | 54 | |
| Passenger 51 to 150 seats | 76 | 42 | 56 | 51 | 212 | 203 | 50 | 41 | 148 | 116 | 133 | 183 | 53 | 49 | 122 | 126 | |
| Passenger 151 to 250 seats | 25 | 15 | 17 | 25 | 176 | 185 | 9 | 11 | 138 | 143 | 128 | 65 | 24 | 33 | 111 | 123 | |
| Passenger 251 seats and more | 14 | 4 | 7 | 9 | 83 | 74 | 7 | 8 | 23 | 16 | 77 | 95 | 7 | 7 | 27 | 21 | |
| Total aircraft | 193 | 131 | 182 | 191 | 861 | 899 | 96 | 88 | 462 | 438 | 683 | 664 | 110 | 119 | 433 | 439 | |
| Aircraft type/usage | Luxembourg | | Netherlands | | Austria | | Portugal | | Finland | | Sweden | | United Kingd. | | EU-15 | | change |
| | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000 | 2002 | 2000-2002 |
| Business/Corporate/Executive | 12 | 25 | 20 | 19 | 43 | 51 | 29 | 37 | 11 | 11 | 34 | 29 | 159 | 158 | 767 | 851 | 11.0% |
| Freight/Cargo less than 100 000 lbs MTOW | - | - | 4 | 4 | 1 | 1 | 2 | 2 | - | - | 13 | 15 | 30 | 28 | 159 | 160 | 0.6% |
| Freight/Cargo more than 100 000 lbs MTOW | 17 | 11 | 10 | 6 | 3 | 2 | - | - | - | - | - | - | 37 | 32 | 186 | 164 | -11.8% |
| Utility transport/Multi-Role/Convertible | 2 | 2 | 6 | 6 | 2 | 3 | 1 | 1 | 1 | 1 | 12 | 12 | 26 | 27 | 106 | 110 | 4.8% |
| Hospital/Ambulance/other special purpose | - | - | 3 | 3 | 5 | 4 | 1 | 2 | 2 | 2 | 6 | 2 | 40 | 41 | 123 | 120 | -2.4% |
| Passenger 50 seats or less | 16 | 13 | 41 | 37 | 38 | 38 | 12 | 15 | 7 | 7 | 61 | 53 | 145 | 148 | 808 | 767 | -5.1% |
| Passenger 51 to 150 seats | 2 | 3 | 59 | 54 | 34 | 37 | 31 | 32 | 45 | 43 | 21 | 43 | 278 | 292 | 1320 | 1315 | -0.4% |
| Passenger 151 to 250 seats | 3 | 2 | 40 | 57 | 15 | 16 | 16 | 20 | 15 | 14 | 10 | 20 | 190 | 177 | 917 | 906 | -1.2% |
| Passenger 251 seats and more | - | - | 48 | 47 | 10 | 11 | 7 | 7 | 4 | 4 | 4 | 4 | 186 | 172 | 504 | 479 | -5.0% |
| Total aircraft | 52 | 56 | 231 | 233 | 151 | 163 | 99 | 116 | 85 | 82 | 161 | 178 | 1091 | 1075 | 4890 | 4872 | -0.4% |

(1) All military aircrafts excluded.

* Includes those SAS passenger aircraft registered in Denmark and Sweden respectively, for which the operator country is 'multinational'.

Source: Airclaims CASE2 database.

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.

Same performance with half the fleet

In 1998, EU-15 only offered less than half the amount of vessels than it did in 1970 (see Table 3.6). Various scrapping 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 Italy, Luxembourg and Finland, the fleet decreased sharply in the other Member States offering substantial goods transport on navigable inland waterways. At EU level, more than 15 000 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 (- 48%).

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

70% of the entire fleet consist of passenger aircraft

Table 3.7 offers an overview of the civil aircraft fleet in the various Member States for mid-2000 and mid 2002. 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. More than 70% of the entire fleet consist of passenger aircraft. Aircraft with a seating capacity of 51 to 150 clearly dominate the EU-15 fleet (nearly 38% of all passenger aircraft in 2002, 27% of the entire fleet).

More than 17% of all civil aircraft are so-called business aircraft (851 units at EU-15 level in 2002, 11% more than in 2000). This category includes privately or company-owned planes but also airtaxis. The vast majority of these planes

have a capacity of less than 20 seats. The 'special purpose/ambulance' category (120 units in 2002) 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 passenger flights.

Some 7% of aircraft fleet for cargo transport

Nearly 7% of the entire fleet (324 units in 2002) 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.

Reduction of fleet less than expected

Following the September 11th 2001 disaster, one could expect a noticeable reduction of the aircraft fleet. Compared to 2000, the global aircraft fleet at EU-15 level only recorded a 1.5% decrease. The business aircraft category saw its share in the fleet increase by 2% compared to 2000 (851 units versus 767 units in 2000). Freight/cargo aircraft of the larger category (over 100 000 lbs. of MTOW) experienced a significant drop in numbers (-12% compared to 2000) although this might also be due to the enforcement of new noise emissions standards, banning certain aircraft types from EU airports. In general, the average age of freight/cargo aircraft is significantly higher than those of passenger aircraft; thus older models, not meeting the recent 'Chapter 3' standards in force since the first of April 2002, have disappeared from the fleet (see also Chapter 7.3 Emissions).

The negative effects are more noticeable when looking exclusively at the passenger aircraft: the fleet experienced a 2.3% decrease at EU level, passing from 3 549 units in 2000 to 3 467 in 2002. This result is however biased by Belgium (-44%), which experienced the bankruptcy of a major air carrier. If Belgium is excluded from the EU, the general decrease in the number of passenger aircraft would be established at 0.8%.

Table 3.8: EU Merchant Fleet - ships of 1000 grt and over (at 1 Jan. 2000)

| | Total fleet controlled | | National flag | | Foreign flag | | Share of foreign flag in total fleet | |
|-------------------------------|------------------------|---------------|-----------------|--------------|-----------------|---------------|--------------------------------------|-----------------|
| | Number of ships | million dwt | Number of ships | million dwt | Number of ships | million dwt | Number of ships (%) | million dwt (%) |
| Belgium | 128 | 7.30 | 1 | 0.00 | 127 | 7.34 | 99% | 100% |
| Denmark ¹ | 613 | 15.30 | 357 | 6.66 | 256 | 8.67 | 42% | 57% |
| Germany | 1 900 | 29.20 | 468 | 7.51 | 1 432 | 21.73 | 75% | 74% |
| Greece | 3 167 | 131.70 | 745 | 40.78 | 2 422 | 90.94 | 76% | 69% |
| Spain | 232 | 3.60 | 123 | 1.58 | 109 | 2.03 | 47% | 56% |
| France | 210 | 5.50 | 122 | 2.53 | 88 | 2.95 | 42% | 54% |
| Ireland | 41 | 0.15 | 30 | 0.12 | 11 | 0.03 | 27% | 20% |
| Italy | 570 | 12.80 | 439 | 8.44 | 131 | 4.39 | 23% | 34% |
| Luxembourg | 2 | 0.01 | 2 | 0.01 | - | - | 0% | 0% |
| Netherlands | 597 | 5.00 | 444 | 2.79 | 153 | 2.16 | 26% | 44% |
| Austria | 50 | 0.80 | 22 | 0.10 | 28 | 0.70 | 56% | 88% |
| Portugal | 52 | 1.10 | 38 | 0.50 | 14 | 0.60 | 27% | 55% |
| Finland | 132 | 2.10 | 98 | 0.99 | 34 | 1.12 | 26% | 53% |
| Sweden | 377 | 14.60 | 165 | 1.54 | 212 | 13.02 | 56% | 89% |
| United Kingdom | 632 | 18.20 | 228 | 6.23 | 404 | 11.97 | 64% | 66% |
| EU-15 (as at 1.1.2000) | 8 703 | 247.36 | 3 282 | 79.79 | 5 421 | 167.65 | 62% | 68% |
| EU-15 (as at 1.1.1999) | 8 326 | 242.00 | 3 350 | 81.40 | 4 976 | 160.60 | 60% | 66% |
| EU-15 (as at 1.1.1998) | 7 970 | 227.00 | 3 286 | 80.70 | 4 684 | 146.30 | 59% | 64% |

(1) Including international registers like the Danish International Ship register; including vessels registered at territorial dependencies.
Source: ISL merchant fleet data bases; aggregates based on quarterly updates from the Lloyd's Maritime Information System.

The two categories most touched by the passenger aircraft decrease are those with 50 seats or less (from 808 to 767 units or -5%) and those offering 251 seats or more.

'Flags of convenience': an economic choice _____

Maritime transport plays a substantial role in the overall transport scene: in 2000, around 3 000 million tonnes were handled in EU ports (see chapter 5.1.4) and nearly 350 million passengers passed through ports' passenger terminals (see chapter 5.2.3.). However, while the Merchant fleet of the European Union handles much of this traffic, a substantial proportion is carried by vessels operated by or registered in non-EU countries.

Table 3.8 gives an overview of the EU Merchant fleet at the beginning of 2000, both for the EU as a whole and for individual Member States. The first pair of rows shows the total number of vessels and their respective dead weight tonnage (dwt) controlled by Member States. 'Controlled' means that the owner or operator of a vessel is

registered in an EU country and controls its day-to-day operations. The vessel itself need not also be registered in the country of the owner or operator's registration nor even in another Member State. To illustrate this, the second pair of rows in Table 3.8 shows the number of vessels (and their respective dwt) actually registered in the owner/operator's own country of registration. The majority of the vessels (62% for the EU as a whole) sail however under a foreign flag (see the third pair of rows). These are often so-called «flags of convenience». The regulations governing a ship's management depends on the legal, safety, technological, taxation and social provisions of the Register in which it is registered. Some countries have 'international' or 'open' registers, where the requirements are different from those in the 'national' register. An operator's choice of register will largely be governed by economic considerations and account for the substantial variation in the share of foreign flagged vessels (ranging from 23% in Italy to 99% in Belgium – see the last pair of rows).

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.

Transport: more than 7 million jobs at EU-15 level

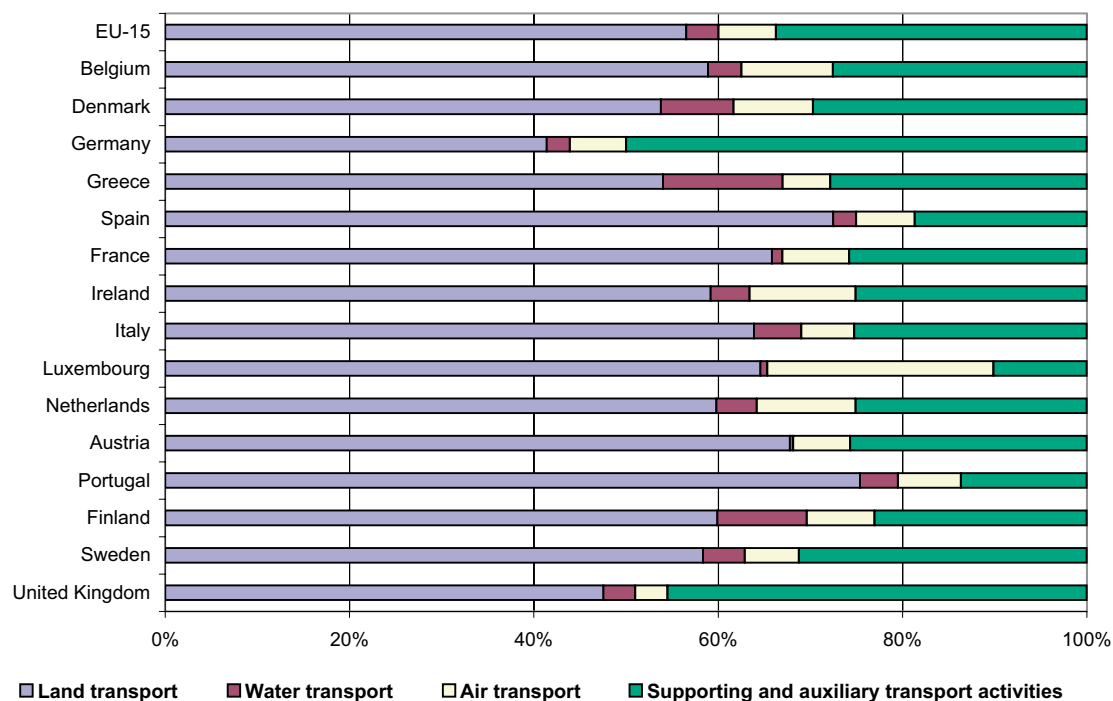
The importance of the transport branch in the EU economy is best illustrated by the number of jobs it is generating: according to the latest available labour force survey results (the second quarter of the year 2001), more than 7 million persons were employed in the transport sector at Community level. 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. Land transport is the most important transport activity in terms of employment in all Member States, except for Germany. The EU average for land transport can be established at about 57% of the total jobs in the transport sector. In Germany, the largest transport branch (50% of the total number of persons employed), is the sector of '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.

Within the land transport category, nearly all enterprises belong to road transport. In terms of employment, road transport takes a share of

Graph 4.1: Share of persons employed in various transport activities (NACE 60-63) - 2nd quarter 2001



Source: Eurostat.

Table 4.2: Number of enterprises by employment size class in 1999

| | 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 | 9 484 | 163 | 17 | 9 664 | : | 0 | : | 4 | : | 163 | : | 9 648 |
| Denmark | : | : | : | 12 162 | : | : | : | 22 | : | : | : | 12 136 |
| Germany | : | : | : | 85 001 | : | : | : | 132 | : | : | : | 84 731 |
| Greece | : | : | : | : | : | : | : | : | : | : | : | : |
| Spain | : | : | : | 198 749 | 0 | : | : | 6 | 198 335 | 367 | 42 | 198 744 |
| France | 78 192 | 1 124 | 140 | 79 456 | 20 | 5 | 2 | 27 | 78 139 | 1 118 | 137 | 79 394 |
| Ireland | : | : | : | 3 200 ^{1,2} | : | : | : | : | : | : | : | : |
| Italy ⁴ | 135 041 | 534 | 119 | 135 694 | 95 | 22 | 22 | 139 | 134 927 | 510 | 96 | 135 533 |
| Luxembourg | : | : | : | 631 ² | : | : | : | : | : | : | : | 630 2 |
| Netherlands | 12 660 | 435 | 60 | 13 155 | : | : | : | 5 | : | : | : | 13 150 |
| Austria | 8 757 | 185 | 15 | 8 957 | 12 | 2 | 3 | 17 | 8 744 | 182 | 12 | 8 938 |
| Portugal ⁴ | 17 010 | 135 | 30 | 17 175 | : | 0 | : | : | : | 135 | : | 17 172 |
| Finland ⁴ | 20 824 | 72 | 17 | 20 913 | 2 | 0 | 2 | 4 | 20 822 | 72 | 15 | 20 909 |
| Sweden | 25 126 | 151 | 19 | 25 296 | 25 | 4 | 1 | 30 | 25 090 | 147 | 18 | 25 255 |
| United Kingdom ⁴ | 45 569 | 713 | 182 | 46 464 | : | : | : | 111 | 45 463 | 705 | 157 | 46 325 |

| | 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 | : | : | 0 | 332 | : | : | : | 101 | 2 984 | : | : | 3 133 |
| Denmark | : | : | : | 498 | : | : | : | 148 | : | : | : | 2 152 |
| Germany | : | : | : | 2 586 | : | : | : | 505 | : | : | : | 32 909 |
| Greece | : | : | : | : | : | : | : | : | : | : | : | : |
| Spain | 195 | : | : | 221 | : | : | : | 47 | 17 282 | 314 | 71 | 17 667 |
| France | 1 885 | 29 | 10 | 1 924 | 508 | 17 | 12 | 537 | 9 808 | 559 | 158 | 10 525 |
| Ireland | : | : | : | 45 3 | : | : | : | 34 ³ | : | : | : | 844 ^{1,2} |
| Italy ⁴ | 1 329 | 52 | 17 | 1 398 | 167 | 19 | 10 | 196 | 23 745 | 714 | 115 | 24 574 |
| Luxembourg | : | : | : | : | : | : | : | 13 2 | : | : | : | 215 2 |
| Netherlands | 4 360 | 25 | 15 | 4 400 | 150 | 0 | 5 | 155 | 5 555 | 190 | 40 | 5 785 |
| Austria | 77 | 1 | 0 | 78 | 73 | 2 | 3 | 78 | 2 101 | 86 | 19 | 2 206 |
| Portugal ⁴ | : | : | : | 101 | : | : | : | 23 | 2 340 | 47 | 9 | 2 396 |
| Finland ⁴ | 294 | 12 | 7 | 313 | 59 | 0 | 2 | 61 | 1 810 | 68 | 12 | 1 890 |
| Sweden | 732 | 35 | 9 | 776 | 182 | 7 | 5 | 194 | 4 247 | 88 | 30 | 4 365 |
| United Kingdom ⁴ | 1 187 | 33 | 15 | 1 235 | 842 | 55 | 37 | 934 | 15 824 | 619 | 174 | 16 617 |

Note: For Netherlands and Portugal employment size classes are defined in terms of employees.

(1) 1998.

(2) Provisional data.

(3) 1997.

(4) 2000.

Source: Eurostat (SBS)

more than 90% in land transport for Spain, Portugal, Sweden and United Kingdom. In the railway sector, Luxembourg and Belgium had the highest share of employment: more than 30%.

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.

Greece, Finland and Denmark: highest employment in water 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. The highest shares of the employment in water transport are registered in Greece, Finland and Denmark. The geographical features of these countries, some with a considerable amount of islands, explain this relatively high employment.

France is a special case as, even with a large maritime coastal area and many kilometres of inland waterways, it has very few people employed in water transport (just slightly more than 1%).

Table 4.2 shows that a high proportion of the enterprises is of the smallest category (1–49 persons). Although not obvious from the table presented, an important rate of self-employment is typical for inland waterway transport.

Air transport: 6% employment share at EU level —

Among the four sectors observed, air transport shows the lowest number of enterprises. However, the distribution of the enterprises by size-classes displays the same pattern as for the other transport sectors: the enterprises with less than 50 persons employed have the highest share.

From Graph 4.1, it appears that at Community level, the average employment share of air transport was 6% (second quarter of 2001). Luxembourg shows by far the highest share: over

24%, 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. However, this should be seen in the light of lowest number of persons employed in absolute figures compared to the other Member States.

Highest share of 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 50%, more than the EU average (which is about 34%). This share is the highest not only among the other Member States, but also among the four transport sectors observed. Only the United Kingdom comes close (45%); all other

Table 4.3: Number of persons employed by size class in 1999

| | 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 | 53 049 | 14 136 | 60 273 | 127 458 | : | 0 | : | 41 425 | : | 14 136 | : | 86 016 |
| Denmark | : | : | : | 81 178 | : | : | : | 10 338 ¹ | : | : | : | 70 888 |
| Germany | : | : | : | 965 000 | : | : | : | : | : | : | : | : |
| Greece | : | : | : | : | : | : | : | : | : | : | : | : |
| Spain | : | : | : | 484 276 | 0 | : | : | 39 832 | 374 296 | 34 805 | 35 344 | 444 445 |
| France | 264 299 | 116 015 | 283 509 | 663 823 | : | : | : | : | : | : | : | : |
| Ireland | : | : | : | 24 009 ^{1,2} | : | : | : | : | : | : | : | : |
| Italy ⁴ | 309 997 | 52 141 | 218 087 | 580 225 | 871 | : | : | 129 543 | 309 064 | 49 112 | 91 986 | 450 162 |
| Luxembourg | : | : | : | 9 917 ² | : | : | : | 3 064 ² | : | : | : | 6 853 |
| Netherlands | 85 023 | 43 027 | 62 973 | 191 023 | : | : | : | : | : | : | : | : |
| Austria | 50 511 | 17 343 | 70 250 | 138 104 | : | : | : | : | : | : | : | 83 061 |
| Portugal ⁴ | 49 855 | 13 760 | 26 751 | 90 366 | : | 0 | : | : | : | 13 760 | : | 84 041 |
| Finland ⁴ | : | 7 542 | : | 71 869 | : | 0 | : | 9 799 | : | 7 542 | : | 62 070 |
| Sweden | 71 616 | 13 443 | 44 180 | 129 239 | : | : | : | 12 094 | 71 450 | 13 048 | 32 622 | 117 120 |
| United Kingdom ^{4,2} | 221 300 | 63 902 | 285 947 | 571 149 | : | : | : | 48 754 | : | : | : | 522 043 |

| | 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 | : | : | 0 | 1 316 | : | : | : | 13 022 | 17 138 | : | : | 51 400 |
| Denmark | : | : | : | 10 747 | : | : | : | 11 734 | : | : | : | 31 358 |
| Germany | : | : | : | 25 000 | : | : | : | 49 000 | : | : | : | 511 000 |
| Greece | : | : | : | : | : | : | : | : | : | : | : | : |
| Spain | 2 457 | : | : | 7 409 | : | : | : | 36 275 | 78 589 | 32 388 | 53 535 | 164 512 |
| France | 3 826 | 3 198 | 8 269 | 15 293 | 1 312 | 1 808 | 59 575 | 62 695 | 59 170 | 60 962 | 131 627 | 251 759 |
| Ireland | : | : | : | 1 666 ³ | : | : | : | 6 215 ³ | : | : | 13 463 ³ | : |
| Italy ⁴ | : | 5 085 | : | 20 245 | : | 2 013 | : | 25 331 | 112 937 | 72 466 | 72 976 | 258 379 |
| Luxembourg | : | : | : | : | : | : | : | 2 574 ² | : | : | : | 1 874 ² |
| Netherlands | 7 336 | : | : | 15 624 | : | : | : | : | : | 18 564 | : | 80 486 |
| Austria | : | : | 0 | 323 | : | : | : | 7 988 | 11 296 | 9 306 | 13 275 | 33 877 |
| Portugal ⁴ | : | : | : | 1 783 | : | : | : | 11 236 | 14 731 | 5 176 | 13 012 | 32 919 |
| Finland ⁴ | : | 1 477 | : | 8 430 | : | 0 | : | 9 717 | : | 7 452 | : | 22 753 |
| Sweden | 2 655 | 3 631 | 8 180 | 14 466 | 1 119 | : | : | 13 944 | 16 633 | 9 083 | 24 821 | 50 537 |
| United Kingdom ^{4,2} | : | 3 395 | : | 17 502 | : | 6 770 | : | 103 211 | 104 680 | 62 943 | 188 699 | 356 322 |

Note: For Netherlands and Portugal employment size classes are defined in terms of employees.

(1) 1998.

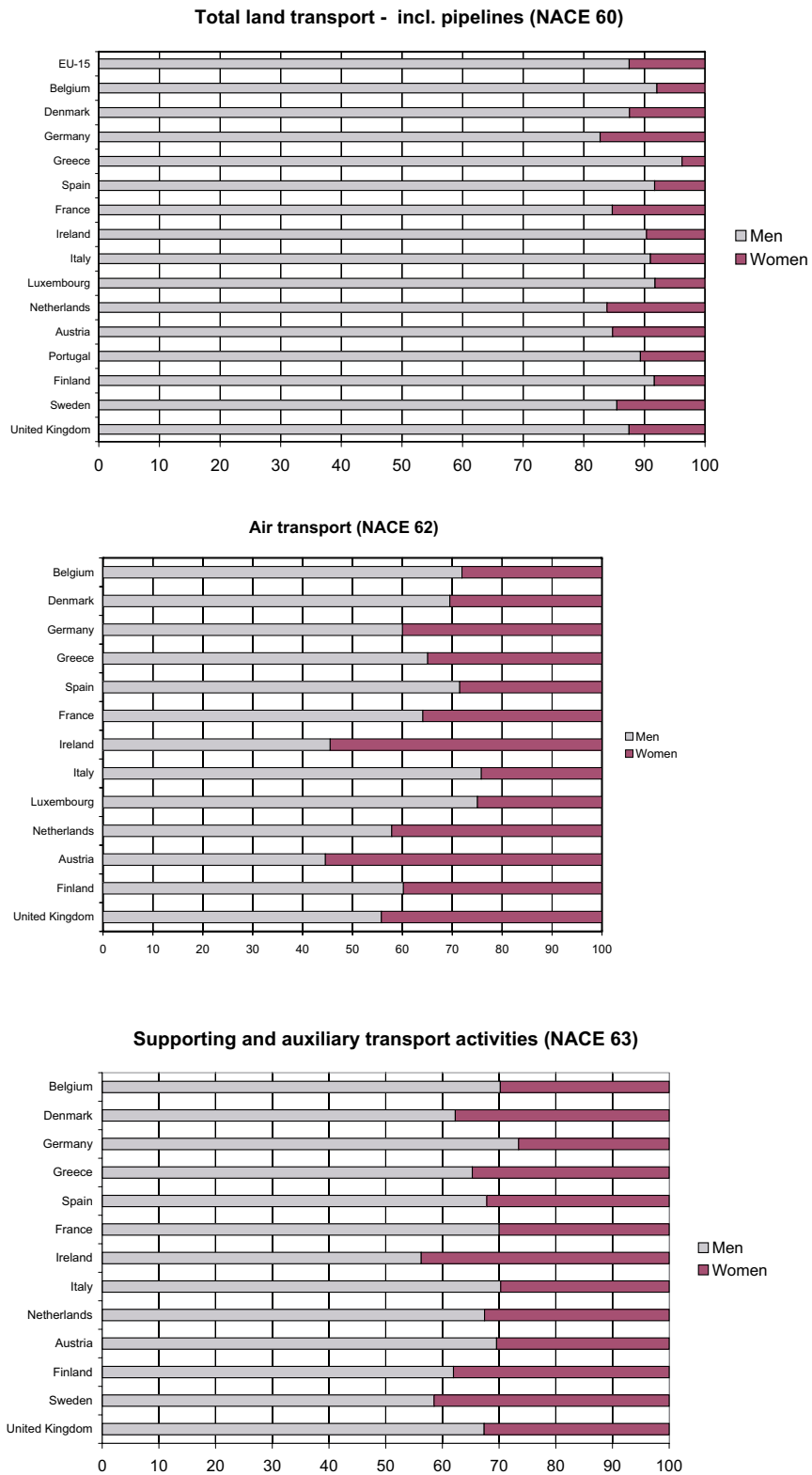
(2) Provisional data.

(3) 1997.

(4) 2000.

Source: Eurostat (SBS)

Graph 4.4 : Share of sexes in persons employed (in %), by NACE classification 2nd quarter 2001



Source: Eurostat (LFS).

Member States display far lower shares, most of them under 30%. Portugal and Luxembourg are lowest with a share under 15% (14 and 10% respectively).

Table 4.3 displays the number of persons employed by size class in 1999 (2000 data were available for Italy, Portugal, Finland and the United Kingdom).

Low female employment in land transport

Graph 4.4 gives an insight of the distribution of employment by sex in three of the transport categories considered. The source of these data is the Labour Force Survey (LFS). According to LFS, the data related to water transport for the majority of the countries were statistically unreliable and therefore, the graph for this mode of transport could not be presented.

From Graph 4.4 it appears that land transport, largely consisting of road transport, is dominated by male employment. At EU level, 13% of the employment is taken up by women, the two extremes consisting of Greece and Germany with 4% and 17% female employment respectively. However, with regards to the question of reliability mentioned earlier, the data on land transport by sex for Greece, Ireland, Luxembourg and Portugal should be carefully used.

Austria and Ireland: minority of men in air transport

The graph on air transport does not include Portugal and Sweden, as their data were statistically unreliable. As a consequence, EU-15 data also could not be presented.

In two Member States men constitute a minority in air transport employment: Austria (45%) and Ireland (46%). The highest share of men in the employment displays Italy: 76%.

LFS is warning readers on the reliability of data for Denmark, Greece, Ireland, Luxembourg and Finland.

Heterogeneity of auxiliary activities

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.

Again, it should be mentioned that the data for Luxembourg and Portugal were statistically unreliable and could not be used. These two countries are thus missing from the graph related to auxiliary activities, as well as EU-15.

Comparing the countries presented in Graph 4.4, it can be noticed that for the majority, the share of male employment is situated between 60-70% of the total employment. Germany displays the highest share of male employment with 73%.

4.2 Economic performance

Transport activities are important contributors to wealth creation. There are various ways to express the economic performance of an economic sector. In the case of the transport sector, composed of various sub-sectors, 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/EURO, total land transport (transport via rail, road and pipelines) and auxiliary transport activities roughly offer similar turnover figures.

High land transport turnover in 'strategic' countries

As far as data are available, it appears that turnover in land transport exceeded ECU/EURO 40 000 million in the United Kingdom, Germany, France and Italy (for the latter, the data refer to the year 2000). Small but geographically 'strategic' countries like the Netherlands and Belgium offer high turnover figures as well. Road transport is generating more than 80% of the land transport turnover in majority of countries, except for Denmark, Germany, Luxembourg and Austria. In Spain and Portugal the turnover of road transport represents more than 90% of the land transport turnover.

The figures for the water transport category reflect the relative importance of maritime transport in countries like Denmark, United Kingdom, Italy, France, Germany and the Netherlands. For all countries mentioned, the turnover of the water transport sector exceeds ECU/EURO 4 000 million, the highest value being registered by Denmark (about ECU/EURO 8 000 million).

With far less persons employed, the air transport category generates impressive turnover figures: the United Kingdom displays nearly ECU/EURO 29 400 million followed by France and Italy with ECU/EURO 13 350 million and 10 980 million respectively (the data for Italy and United Kingdom refer to the year 2000).

Turnover figures of auxiliary transport activities often come close to those of total land transport. They exceed them by a large margin in Belgium, Germany and Ireland. In the United Kingdom the turnover of auxiliary activities is almost twice as much as its total land transport sector, while in Luxembourg the situation is the opposite.

Table 4.6 gives an overview of the value added by activity. Here it appears that land transport generally offers the highest figures, followed by the auxiliary transport activities.

Both tables 4.5 and 4.6 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

Table 4.5: Turnover by activity in 1999 - in million ECU/EURO

| | Total land transport (incl. pipel.) | Rail transport | Road transport | Water transport. (marit. + iww.) | Air transport | Auxiliary transport activities |
|-----------------------------|-------------------------------------|--------------------|---------------------|----------------------------------|--------------------|--------------------------------|
| EU-15 | : | : | : | : | : | : |
| Belgium | 9 884 | 1 576 | 8 262 | 1 647 | 3 589 | 13 257 |
| Denmark | 7 893 | 1 857 ¹ | 5 755 | 7 923 | 2 177 | 7 046 |
| Germany | 52 896 | 10 980 | 41 245 | 4 430 | 9 167 | 67 626 |
| Greece | : | : | : | : | : | : |
| Spain | 25 475 | 1 233 | 24 242 | 1 204 | 5 634 | 28 169 |
| France | 48 610 | : | : | 4 511 | 13 348 | 46 994 |
| Ireland | 1 469 ^{1,2} | : | : | 305 ³ | 1 372 ³ | 2 689 |
| Italy ⁴ | 42 419 | 6 119 | 36 149 | 5 239 | 10 972 | 40 803 |
| Luxembourg | 951 ² | 230 ² | 721 ² | : | 894 ² | 445 |
| Netherlands | 12 837 | : | 10 517 ¹ | 4 378 ¹ | : | 8 884 |
| Austria | 7 834 | : | 6 107 | 93 | 2 041 | 9 831 |
| Portugal ⁴ | 3 824 | : | 3 607 | 362 | 1 429 | 4 819 |
| Finland ⁴ | 5 689 | 725 | 4 964 | 2 227 | 1 654 | 4 429 |
| Sweden | 11 691 | 1 334 | 10 353 | 3 327 | 2 745 | 13 074 |
| United Kingdom ⁴ | 55 560 | 8 682 | 46 587 | 6 954 | 29 385 | 92 882 |

(1) 1998.

(2) Provisional data.

(3) 1997.

(4) 2000.

Source: Eurostat (SBS).

Table 4.6 : Value added by activity in 1999 - in million ECU/EURO

| | Total land transport (incl. pipelines) | Rail transport | Road transport | Water transport (marit. + inl.wv.) | Air transport | Auxiliary transport activities |
|-----------------------|--|--------------------|--------------------|------------------------------------|------------------|--------------------------------|
| EU-15 | : | : | : | : | : | : |
| Belgium | 5 796 | 2 113 | 3 669 | 100 | 611 | 2 997 |
| Denmark | 4 656 | 1 100 ¹ | 3 267 | 1 536 | 784 | 2 271 |
| Germany | 24 072 | 3 699 | 19 869 | 2 790 | 7 797 | 20 861 |
| Greece | : | : | : | : | : | : |
| Spain | 13 412 | 2 042 | 11 370 | 444 | 2 107 | 7 786 |
| France | 24 899 | : | : | 749 | 4 028 | 14 349 |
| Ireland | 639 ^{1,2} | : | : | 82 ³ | 440 ³ | 522 ^{1,2} |
| Italy ⁴ | 18 538 | 4 812 | 13 687 | 1 582 | 1 266 | 11 984 |
| Luxembourg | 491 ² | 179 ² | 312 ² | : | 324 ² | 105 ² |
| Netherlands | 7 880 | : | 6 526 ¹ | 1 447 ¹ | : | 4 302 ¹ |
| Austria | 5 801 | : | 3 098 | 22 | 531 | 1 709 |
| Portugal ⁴ | 1 627 | : | 1 555 | 82 | 497 | 1 338 |
| Finland ⁴ | 2 958 | 476 | 2 482 | 588 | 624 | 1 039 |
| Sweden | 4 426 | 633 | 3 792 | 727 | 883 | 2 484 |
| United Kingdom | 25 059 | 3 350 | 21 601 | 2 724 | 11 535 | 22 428 |

(1) 1998.

(2) Provisional data.

(3) 1997.

(4) 2000.

Source: Eurostat (SBS).

activities branch is much lower than in the land transport category, although turnover figures are often similar.

Comparisons between countries rather than sub-sectors

The performance of the categories of transport under analysis is outlined in Table 4.7, which presents the ratios 'turnover per persons employed'. It should be noted that turnover per person comparisons should rather be made between countries and not between sub-sectors since they do not take into account infrastructure costs. And even so, infrastructure costs can vary substantially from country to country.

The average turnover per person employed in total land transport exceeds ECU/EURO 90 000 only in United Kingdom (data for 2000), Denmark and Sweden. Germany, Spain, Ireland, Austria and Portugal are below the EU average (72 200 ECU — calculated on the basis of available data).

The water and air transport sub-categories, as well as the auxiliary transport activities all display much higher figures compared to the land transport, although substantial differences between countries can be noticed.

Belgium's and Denmark's water transport activities showed a turnover per person employed of more than ECU/EURO 700 000, while the figures for Germany and Spain were much lower, with 177 000 and 163 000 ECU/EURO per person employed, respectively.

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 and the interpretation of these data requires caution.

In the air transport sector, Italy leads with ECU/EURO 433 200 per person employed, well ahead of Luxembourg, United Kingdom, Belgium and Austria, with a turnover per person employed higher than ECU/EURO 250 000. Portugal displays the lowest ratio and generates only 30% of the turnover per person employed of that of Italy.

The auxiliary transport activities had turnover levels above ECU/EURO 200 000 per person employed in Austria, United Kingdom, Sweden, Belgium, Luxembourg and Denmark. Amongst the available figures, the Netherlands and Germany display the lowest figures for this sector, with ECU/EURO 111 000 (in 1997) and 132 000 respectively.

Apparent labour productivity highest in water transport for majority of Member States

The comparison across sub-sectors 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.

Table 4.7 : Turnover per person employed in 1999 - in thousands of ECU/EURO

| | Total landtransport (incl. pipelines) | Rail transport | Road transport | Watertransport (marit. + incl. ww.) | Air transport | Auxiliary transport activities |
|-------------------------------|---------------------------------------|---------------------|---------------------|-------------------------------------|----------------------|--------------------------------|
| EU-15 | : | : | : | : | : | : |
| Belgium | 77.6 | 38.1 | 96.1 | 1251.2 | 275.6 | 257.9 |
| Denmark | 97.2 | 179.7 ¹ | 81.2 | 737.2 | 185.5 | 224.7 |
| Germany | 54.8 | : | : | 177.2 | 187.1 | 132.3 |
| Greece | : | : | : | : | : | : |
| Spain | 52.6 | 31.0 | 54.5 | 162.5 | 155.3 | 171.2 |
| France | 73.2 | : | : | 295.0 | 212.9 | 186.7 |
| Ireland | 61.2 ^{1,2} | : | : | 183.3 ³ | 220.7 ³ | 199.7 ^{1,2} |
| Italy ⁴ | 73.1 | 47.2 | 80.3 | 258.8 | 433.2 | 157.9 |
| Luxembourg | 83.2 ^{1,2} | 64.7 ^{1,2} | 91.8 ^{1,2} | : | 289.1 ^{1,2} | 257.0 ^{1,2} |
| Netherlands | : | : | : | 280.2 ¹ | : | 111.4 ^{2,3} |
| Austria | 56.7 | : | 73.5 | 288.1 | 255.5 | 290.2 |
| Portugal ⁴ | 42.3 | : | 42.9 | 202.9 | 127.2 | 146.4 |
| Finland ⁴ | 79.2 | 74.0 | 80.0 | 264.1 | 170.2 | 194.7 |
| Sweden | 90.5 | 110.3 | 88.4 | 230.0 | 196.9 | 258.7 |
| United Kingdom ^{4,2} | 97.3 | 178.1 | 89.2 | 397.3 | 284.7 | 260.7 |

(1) 1998.

(2) Provisional data.

(3) 1997.

(4) 2000.

Source: Eurostat (SBS).

The available data allow an insight on how the various sub-sectors perform.

For the majority of the Member States, apparent labour productivity was the highest in the water transport sector, while the land transport activity showed the lowest figures for all Member States (for the countries for which data were available).

The low figures could be partly explained by the high number of persons employed in this sector compared to the other activities. In Germany, France, Ireland, Luxembourg and Sweden air transport displays the highest apparent labour productivity compared to the other transport sub-sectors.

Table 4.8 : Apparent labour productivity (value added/employment) in 1999 - in thousands of ECU/EURO

| | Total land transport (incl. pipelines) | Rail transport | Road transport | Water transport (marit. + incl. ww.) | Air transport | Auxiliary transport activities |
|-------------------------------|--|---------------------|---------------------|--------------------------------------|----------------------|--------------------------------|
| EU-15 | : | : | : | : | : | : |
| Belgium | 45.5 | 51.0 | 42.7 | 75.7 | 46.9 | 58.3 |
| Denmark | 57.4 | 106.4 ¹ | 46.1 | 142.9 | 66.8 | 72.4 |
| Germany | 24.9 | : | : | 111.6 | 159.1 | 40.8 |
| Greece | : | : | : | : | : | : |
| Spain | 27.7 | 51.3 | 25.6 | 60.0 | 58.1 | 47.3 |
| France | 37.5 | : | : | 49.0 | 64.3 | 57.0 |
| Ireland | 26.6 ^{1,2} | : | : | 49.4 ³ | 70.7 ³ | 38.8 ^{1,2} |
| Italy ⁴ | 32.0 | 37.1 | 30.4 | 78.2 | 50.0 | 46.4 |
| Luxembourg | 45.6 ^{1,2} | 55.3 ^{1,2} | 41.1 ^{1,2} | : | 108.7 ^{1,2} | 57.0 ^{1,2} |
| Netherlands | : | : | : | 92.6 ¹ | : | 53.8 ^{2,3} |
| Austria | 42.0 | : | 37.3 | 69.3 | 66.5 | 50.5 |
| Portugal ⁴ | 18.0 | : | 18.5 | 46.0 | 44.3 | 40.6 |
| Finland ⁴ | 41.2 | 48.6 | 40.0 | 69.7 | 64.2 | 45.6 |
| Sweden | 34.3 | 52.4 | 32.4 | 50.3 | 63.3 | 49.2 |
| United Kingdom ^{4,2} | 43.9 | 68.7 | 41.4 | 155.6 | 111.8 | 62.9 |

(1) 1998.

(2) Provisional data.

(3) 1997.

(4) 2000.

Source: Eurostat (SBS).

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 sub-sector. Table 4.9 shows that the importance of the sectors is shared: for some countries the water transport sector displays the highest figures (Belgium, Denmark, Germany, Spain, Ireland, Italy and the Netherlands), for others it is air transport that leads (Austria, Finland, Sweden and United Kingdom). Compared to the other transport sub-sectors, auxiliary transport activities show the highest investment per person employed in France and Portugal.

Table 4.9 : Investment per person employed in 1999 - 1000 ECU/EURO

| | Total land transport (incl. pipelines) | Rail transport | Road transport | Water transport (marit. + incl. ww.) | Air transport | Auxiliary transport activities |
|-------------------------------|--|-------------------|------------------|--------------------------------------|--------------------|--------------------------------|
| EU-15 | : | : | : | : | : | : |
| Belgium | 17.2 | 29.9 | 11.0 | 41.6 | 24.0 | 17.4 |
| Denmark | 11.4 | 34.7 ¹ | 9.9 | 82.0 | 37.9 | 37.1 |
| Germany | 13.7 | : | : | 105.9 | 38.8 | 12.2 |
| Greece | : | : | : | : | : | : |
| Spain | 6.3 | 15.8 | 5.5 | 27.1 | 21.8 | 11.6 |
| France | 8.6 | : | : | 19.3 | 16.6 | 21.1 |
| Ireland | 6.9 ² | : | : | 54.7 ² | 28.3 ² | 12.8 ² |
| Italy ³ | 5.8 | 2.3 | 6.6 | 59.1 | 37.8 | 7.0 |
| Luxembourg | 21.3 ² | 47.8 ² | 7.9 ² | 0.1 | 113.3 ² | 6.7 ² |
| Netherlands | 5.9 ³ | : | : | 53.1 ¹ | : | 21.6 ² |
| Austria | 15.7 | : | 13.4 | 6.5 | 78.8 | 7.9 |
| Portugal ³ | 12.3 | : | 12.0 | 7.8 | 13.3 | 38.0 |
| Finland ³ | 10.4 | 11.2 | 10.3 | 7.6 | 18.4 | 9.6 |
| Sweden | 12.4 | 8.7 | 12.8 | 26.2 | 27.4 | 23.0 |
| United Kingdom ^{3,4} | 7.7 | 5.3 | 7.8 | 18.5 | 33.6 | 22.3 |

(1) 1998.

(2) 1997.

(3) 2000.

(4) Provisional data.

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 1999 total European goods transport in the present 15 Member States, including intra-EU maritime transport, grew from 1 338 000 to 2 960 000 million tkm (121%).

Constant increase of road haulage, decrease of rail transport

Considering only inland transport, it appears that the considerable growth 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 (by 31%), but in 1999 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. Goods transport by railways even decreased (– 16% since 1970). Inland waterway transport progressed by only 17% 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).

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

| | Road | Rail | Inland waterways | Pipelines | Sea (intra-EU) | Total |
|-----------|-------|------|------------------|-----------|----------------|-------|
| 1970 | 412 | 283 | 103 | 68 | 472 | 1 338 |
| 1980 | 626 | 287 | 107 | 92 | 780 | 1 892 |
| 1990 | 933 | 255 | 108 | 76 | 922 | 2 294 |
| 1995 | 1 136 | 221 | 114 | 85 | 1 071 | 2 627 |
| 1997 | 1 201 | 238 | 118 | 85 | 1 124 | 2 766 |
| 1998 | 1 254 | 240 | 121 | 88 | 1 167 | 2 870 |
| 1999 | 1 318 | 237 | 120 | 89 | 1 195 | 2 960 |
| 1970 - 80 | 52% | 2% | 4% | 35% | 65% | 41% |
| 1980 - 90 | 49% | -11% | 1% | -17% | 18% | 21% |
| 1990 - 99 | 41% | -7% | 11% | 17% | 30% | 29% |
| 1970 - 99 | 220% | -16% | 17% | 31% | 153% | 121% |

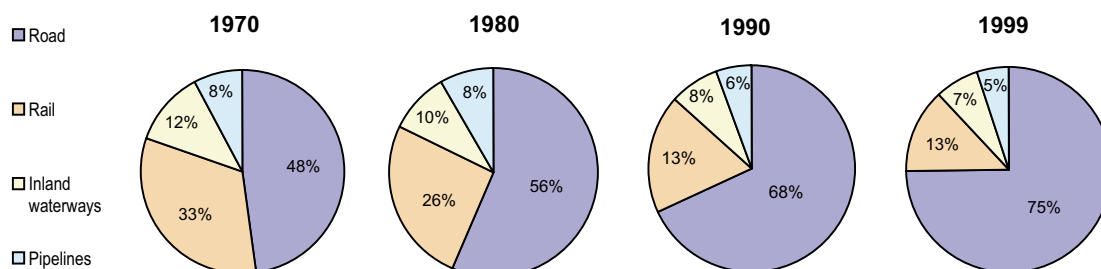
Estimates in italic.

Source: DG Energy and Transport, Eurostat (pipelines), ECMT, UIC, national statistics. Sea transport 1999: gross estimate subject to revision.

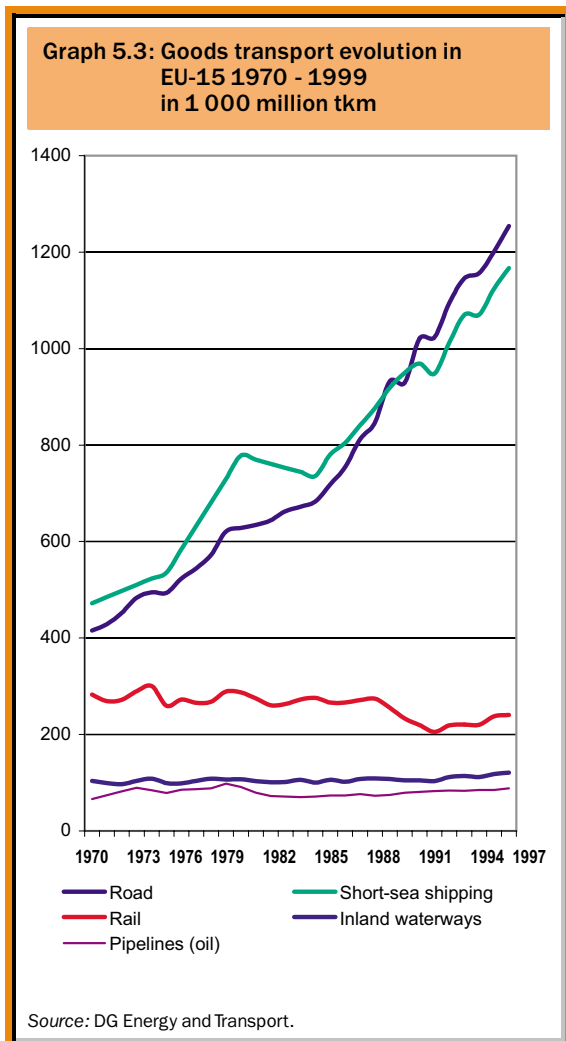
Short-sea shipping: fast growth in the 1970s

Maritime transport performance, restricted to intra-EU transport to allow a certain degree of comparison, has mainly progressed during the 1970s (+65% between 1970 and 1980). In 1999, the number of tonne kilometres declared stands 153% over those of 1970.

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



Source: DG Energy and Transport.



In 1999, for the European Union as a whole, 75% of all inland transport was performed by road, 13% 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 up to now since statistics on air freight 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, although the absolute volume remains low compared to the other transport modes.

Road haulage dominant, except in two countries — Table 5.4 outlines that for all 15 Member States — in the Netherlands and Austria by a relatively small margin — road transport is the main carrier of goods. In Greece, Spain, Ireland, Italy, and Portugal, it performed even more than 85% 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 with regards

Table 5.4: Goods transport: modal split by country 1999 - in % based on tkm performed

| | Road | Rail | Inland waterways | Pipelines |
|----------------|-------------|-------------|------------------|------------|
| Belgium | 71.2 | 14.0 | 11.8 | 3.0 |
| Denmark | 70.0 | 8.3 | - | 21.6 |
| Germany | 69.6 | 14.5 | 12.8 | 3.0 |
| Greece | 98.3 | 1.7 | - | - |
| Spain | 85.6 | 8.9 | - | 5.4 |
| France | 76.2 | 15.6 | 2.0 | 6.2 |
| Ireland | 92.4 | 7.6 | - | - |
| Italy | 86.7 | 8.0 | 0.1 | 5.3 |
| Luxembourg | 68.7 | 20.9 | 10.3 | - |
| Netherlands | 48.8 | 3.5 | 41.6 | 6.0 |
| Austria | 39.8 | 36.9 | 5.2 | 18.1 |
| Portugal | 86.5 | 13.5 | - | - |
| Finland | 73.2 | 26.0 | 0.8 | - |
| Sweden | 63.4 | 36.6 | - | - |
| United Kingdom | 83.5 | 10.0 | 0.1 | 6.3 |
| EU-15 | 74.7 | 13.4 | 6.8 | 5.1 |

Source: DG Energy and Transport.

to inland waterway transport is traditionally 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 1999. In Belgium, Germany and Luxembourg, inland shipping still accounts for a more than 10% of total transport.

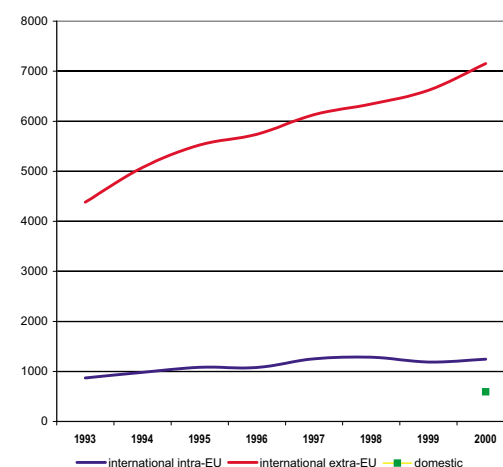
All figures and statistical information on the inland transport modes presented so far in this chapter, including the related tables and graphs are based on datasets that have been compiled by Directorate-General Transport and Energy according to the territoriality principle; i.e. transport performed on the territory of the country in question. Only this principle allows the establishment of the modal split indicators. Other datasets, based on detailed statistical declarations emanating from EU legal acts and compiled by Eurostat, have been used in the following chapters. This is particularly true for the international road transport

Table 5.5: Seaborne transport: gross weight of goods handled in all ports - in million t

| | 1997 | 1998 | 1999 | 2000 |
|----------------|----------------|----------------|----------------|----------------|
| EU-15 | 2 912.1 | 2 982.4 | 2 967.4 | 2 984.5 |
| Belgium | 161.6 | 171.0 | 165.6 | 179.4 |
| Denmark | 124.0 | 105.0 | 97.2 | 96.5 |
| Germany | 213.3 | 217.4 | 221.6 | 242.5 |
| Greece | 101.3 | 110.5 | 112.5 | 127.7 |
| Spain | 270.6 | 280.3 | 295.7 | 234.9 |
| France | 305.1 | 319.0 | 315.2 | 336.5 |
| Ireland | 36.3 | 40.0 | 42.9 | 45.3 |
| Italy | 459.2 | 475.7 | 462.9 | 446.6 |
| Netherlands | 402.2 | 405.4 | 395.7 | 405.8 |
| Finland | 75.3 | 76.6 | 77.5 | 80.7 |
| Portugal | 54.7 | 57.6 | 58.8 | 56.4 |
| Sweden | 149.9 | 155.6 | 156.3 | 159.3 |
| United Kingdom | 558.4 | 568.4 | 565.5 | 573.0 |

These figures do not exclude double counting (based on inwards+outwards)
Source: Eurostat (Maritime database).

Graph 5.6: Evolution of EU air freight and mail transport (in 1000 t)



Source: Eurostat.

datasets (presented in Chapter 5.1.3), based on the activities of hauliers registered in the declaring Member States and relating to transport performance both on the territory of the declarant country and abroad. This 'nationality'-principle does not allow the establishment of modal split indicators.

3000 million tonnes handled in EU-15 ports in 2000

Not comparable with the transport performance of the other modes due to the unavailability of tkm figures, Table 5.5 displays the total volume (in tonnes) of goods (thus not restricted to intra-EU short-sea shipping) handled in all maritime ports of the EU. Since Eurostat's data collection on maritime transport is relatively recent, data are only available for the period 1997-2000. The total volume of goods handled in 2000 can be established at nearly 3 000 million tonnes of goods, a

0.6% increase over the previous year and 2.5% more than the volume handled in 1997. Overall, 66% of the total was cargo unloaded and 34% loaded. Whereas Ireland registered a considerable growth in the volumes handled (close to 25%) a noticeable decline was experienced in Denmark (-22%), where ferry traffic on various routes has been substantially reduced following the opening of fixed links (tunnel/bridges).

Faster growth of extra-EU air transport

Compared to the 3 000 million tonnes handled in maritime transport, the volumes of freight and mail transport by air are obviously low. Graph 5.6 shows that international extra-EU air transport increases substantially faster than international intra-EU transport. Domestic freight and mail transport is currently only available for 2000 and is represented as a dot.

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 5.7 indicates that for the European Union as a whole, in 1995 road haulage accounted for about 10 340 million tonnes of national transport; this stands out in contrast to only 573 million tonnes for rail transport and about 185 million tonnes for inland navigation. Figures for 1999 show that the volume (in tonnes) of road transport progressed slightly at EU level (estimated at 10 850 million tonnes – an increase of just under 5%). Increases were highest in Ireland, Greece and Spain. Conversely, Belgium, Sweden, the Netherlands and Luxembourg registered a decline in volumes forwarded. For Belgium, the decrease is quite noticeable. It should however be noted that the 1999 figures are based on new sample surveys, which might slightly affect the comparability with previous years.

When comparing the 1999 rail transport volume figures with those of 1995, a slight decrease at EU-15 level can be observed (estimated at -3.7%). Greece and Sweden display a clear drop in

the number of tonnes forwarded whereas the decrease is less high in Belgium, Germany and Finland. 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 5.8), the modal split shows different proportions: in 1995, road transport was responsible for 856 000 million tkm and rail for nearly 121 000 million tkm of national transport. In other words, railways were responsible for 5.5% of the volume, but for 14.1% of the tkm performance of road haulage. For 1999, these figures can be estimated at 5.1% and 13.0% respectively, suggesting a stronger position for road transport. As for the data expressed in tonnes, the 1999 data are based on new sample surveys, which could affect comparability with previous years.

Expressed in tkm, it appears that in the period 1995-1999, the progress in road transport performance is quite substantial. At EU-level, the number of tkm increased by 11.7%. Except for Belgium and Luxembourg, national road transport increased in all Member States, especially in Greece, Portugal and Ireland.

Rail transport, displaying a decrease in the number of tonnes forwarded (-3.7%), increases when expressed in tkm (+ 2.6%). Figures suggest

Table 5.7: National transport of goods by country and mode - in 1 000 tonnes

| | 1985 | | | 1990 | | | 1995 | | | 1998 | | | 1999 | | |
|----------------|-----------|----------|-------------------|-----------|----------|-------------------|------------|----------|-----------------------|-----------|----------|-----------------------|-----------|----------|-----------------------|
| | Road (1) | Rail (2) | Inland water-ways | Road (3) | Rail (4) | Inland water-ways | Road (5) | Rail (6) | Inland water-ways (7) | Road (5) | Rail (6) | Inland water-ways (7) | Road (5) | Rail (6) | Inland water-ways (7) |
| Belgium | 265 383 | 34 426 | 21 437 | 276 871 | 30 228 | 21 134 | 351 431 | 27 198 | 18 019 | 282 574 | 24 490 | 18 976 | 214 889 | 23 696 | - |
| Denmark | 199 933 | 2 351 | - | 194 451 | 2 145 | - | 175 950 | 1 932 | - | 190 428 | 2 657 | - | 199 957 | - | - |
| Germany | 2 213 709 | 238 935 | 63 716 | 2 715 149 | 217 187 | 62 605 | 2 949 929 | 232 836 | 72 328 | 2 735 922 | 211 401 | 63 904 | 3 083 583 | 196 145 | 62 740 |
| Greece | 158 371 | 1 205 | - | 176 596 | 898 | - | 163 903 | 575 | - | 259 661 | 390 | - | - | 334 | - |
| Spain | 913 335 | 25 028 | - | 973 708 | 22 428 | - | 588 150 | 20 948 | - | 690 808 | 20 137 | - | 793 910 | 20 672 | - |
| 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 | 1 811 867 | 87 272 | 20 329 |
| Ireland | 89 736 | 3 379 | - | 78 955 | 3 277 | - | 78 531 | 3 179 | - | - | 2 680 | - | 137 719 | - | - |
| Italy | 327 555 | 17 221 | 1 599 | 889 066 | 21 084 | 740 | 1 220 919 | 27 425 | 607 | 1 130 936 | 30 164 | 1 054 | - | 29 398 | 1 355 |
| Luxembourg | 11 126 | 2 539 | 23 | 24 034 | 2 816 | 40 | 26 192 | 2 702 | 14 | - | - | - | 17 588 | - | - |
| Netherlands | 338 660 | 5 529 | 74 992 | 386 940 | 4 972 | 84 031 | 391 766 | 4 349 | 76 387 | 403 180 | 4 566 | 95 618 | 337 362 | 4 632 | 97 941 |
| Austria | - | - | - | - | - | - | 217 895 | 15 980 | 521 | 229 087 | 17 256 | 965 | 239 855 | 18 833 | 771 |
| Portugal | 190 558 | 4 690 | - | 237 946 | 5 389 | - | 263 229 | 7 631 | - | 262 752 | 7 723 | - | 273 052 | 8 288 | - |
| Finland | - | - | - | - | 14 465 | - | 349 118 | 21 903 | - | 316 882 | 23 613 | - | 410 848 | 19 466 | - |
| Sweden | 327 100 | - | - | 388 100 | - | - | 355 800 | 29 741 | - | 312 628 | 19 369 | - | 303 122 | 19 367 | - |
| United Kingdom | 1 406 199 | 139 322 | - | 1 686 999 | 137 622 | - | 1 658 409 | 95 379 | - | 1 560 521 | - | - | 1 617 134 | - | - |
| EU-15 | - | - | - | - | - | - | 10 339 222 | 572 594 | 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; - (9) B: 2000.
Source: Eurostat, Eurostat/ECMT/UN-ECE.

Table 5.8: National transport of goods by country and mode - in million tkm

| | 1985 | | | 1990 | | | 1995 | | | 1998 | | | 1999 | | |
|----------------|----------|----------|------------------|----------|----------|------------------|----------|----------|------------------|---------|--------|------------------|----------|--------|------------------|
| | Road (1) | Rail (2) | Inland waterways | Road (3) | Rail (4) | Inland waterways | Road (5) | Rail (6) | Inland waterways | Road | Rail | Inland waterways | Road (7) | 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 | 1 690 | 13 166 | 2 037 | 1 942 |
| Denmark | 8 342 | 608 | - | 9 354 | 568 | - | 9 327 | 448 | - | 10 108 | 476 | - | 10 421 | 421 | - |
| Germany | : | 37 802 | 12 964 | : | 33 092 | 14 108 | 201 299 | 35 700 | 17 152 | 210 402 | 35 763 | 14 483 | 226 892 | 34 629 | 13 970 |
| Greece | 10 352 | 291 | - | 12 485 | 222 | - | 12 357 | 152 | - | 19 322 | 121 | - | 20 000 | 98 | - |
| Spain | 74 144 | 8 795 | - | 69 924 | 8 750 | - | 78 744 | 7 992 | - | 91 329 | 9 174 | - | 98 147 | 9 543 | - |
| 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 | 159 026 | 31 060 | 3 066 |
| Ireland | 3 727 | 601 | - | 3 878 | 589 | - | 4 161 | 602 | - | : | 469 | - | 5 432 | : | - |
| Italy | 98 445 | 7 097 | 199 | 115 786 | 9 088 | 118 | 150 301 | 10 606 | 91 | : | 11 415 | 127 | 155 000 | 11 096 | 173 |
| Luxembourg | 206 | 87 | 1 | 454 | 113 | 1 | 531 | 104 | 1 | : | : | 1 | 400 | : | : |
| Netherlands | 18 189 | 1 062 | 6 718 | 22 581 | 1 020 | 6 897 | 26 683 | 721 | 5 746 | 28 240 | 763 | 8 759 | 31 970 | 622 | 10 260 |
| Austria | : | : | : | : | : | : | 11 069 | 2 999 | 83 | 11 715 | 3 093 | 127 | 12 282 | 3 522 | 98 |
| Portugal | 8 636 | 1 137 | - | 10 978 | 1 283 | - | 11 119 | 1 767 | - | 14 693 | 1 638 | - | 15 324 | 1 862 | - |
| Finland | : | : | - | : | : | - | 21 804 | 5 936 | - | 25 611 | 6 313 | - | 25 576 | 6 380 | - |
| Sweden | 21 177 | : | - | 26 519 | 10 275 | - | 28 357 | 10 438 | - | 30 369 | 9 216 | - | 30 424 | 9 265 | - |
| United Kingdom | 100 544 | 16 812 | - | 132 968 | 16 078 | - | 146 714 | 12 440 | - | 155 431 | : | - | 152 814 | : | - |
| EU-15 | : | : | : | : | : | : | 856 381 | 120 932 | 26 791 | : | : | : | 956 874 | : | : |

(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 (7) B: 2000.
 Source: Eurostat, Eurostat/ECMT/UN-ECE.

Estimates in italic.

a sensible decline in Greece, Ireland, the Netherlands and Sweden, whereas Spain and Austria show a progress of 19% and 17% respectively.

Rail: important in larger Member States

It is obvious that average distances for road and rail in national transport are very different: Graph 5.9 shows that only 10% 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 32%. 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 (1999): 30% in Sweden, 25% in Finland and 20% in France. Certainly influenced by the topographic features of the country, Austria's share is also high (29%).

Cabotage road transport

Apart from the 'traditional' national transport, cabotage transport (transport taking place on the territory of a country but performed by hauliers registered in another country) can also be considered as national transport from the point of view of the movements of goods. 'Traditional' national transport is based on the transport performance declared by the Member States for their own territory and hauliers registered in their country. Cabotage is declared by Member States for hauliers registered in their country that performed transport on the territory of another country. Thus, from the point of view of the reporting country, cabotage is considered as international transport. Further details on cabotage transport can be found in the following Chapter 5.1.3 *International goods transport*.

Dutch waterways 'compete' with rail

In the Netherlands national rail transport remains extremely low: only 2% of road haulage in 1999; but this is certainly connected with the strong competition of inland navigation, which has the biggest share of all Member States. This high share is certainly due to the important role of the port of Rotterdam, acting as location for redistribution to Europe.

A different situation occurs in Belgium; although one of the 'smaller' Member States, rail is, in 1999, responsible for 15% (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 (expressed in tkm), which in 1999 was about 16 times higher than the Dutch national rail transport. Figures in Tables 5.7 and 5.8 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. However, both the volume (in tonnes) and the transport performance (in tkm) registered a noticeable increase in 1999 compared to the previous year, with +11% and +19% respectively.

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.

Domestic air transport obviously close to zero in small Member States

Domestic air transport is quite limited or non-existing in smaller Member States. Larger Member States and those featuring important islands display however noticeable volumes in air freight and mail. Table 5.10 shows that on the

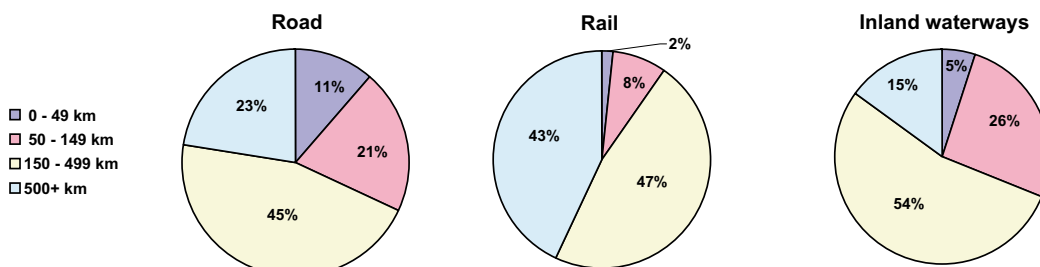
Table 5.10: Volume of freight and mail carried in domestic air traffic in 2000 - in tonnes

| | Main airport in domestic air transport | | |
|----------------|--|-----------------------|-----------|
| | Tonnes | Airport | Share (%) |
| Belgium | : | : | : |
| Denmark | : | : | : |
| Germany | 204 732 | Frankfurt/Main | 32% |
| Greece | 24 422 | Athinaï | 46% |
| Spain | 126 127 | Madrid-Barajas | 33% |
| France | 110 916 | Airport System Paris | 36% |
| Ireland | 5 032 | Shannon | 45% |
| Italy | 46 605 | Bergamo-Orio al Serio | 17% |
| Luxembourg | - | - | - |
| Netherlands | 41 | Rotterdam | 99% |
| Austria | 1 214 | Wien-Schwechat | 33% |
| Portugal | : | : | : |
| Finland | 9 484 | Helsinki | 37% |
| Sweden | : | : | : |
| United Kingdom | 63 999 | Belfast-Aldergrove | 23% |

Source: Eurostat.

basis of data available, it appears that Germany features the highest volume of domestic air freight (nearly 205 000 tonnes). This volume is however only a fraction of what is forwarded by other transport modes in Germany: rail carried nearly 1000 times, inland waterways more than 300 times the volume (in tonnes) of that forwarded by air. Spain (with the Baleares and the Canary Islands) and France (with Corsica but also the overseas territories like Martinique, Guadeloupe and French Guyana) follow on second and third position with 126 000 and 111 000 tonnes respectively. The table also displays the airport that takes the highest share in domestic air freight and mail transport.

Graph 5.9: National goods transport by distance class, on the basis of tkm forwarded



NB: Data according to the most recent year available - Rail: without L, UK; inland waterways: countries considered: B, D, F, L, NL, A.

Source: Eurostat.

Storebælt fixed-link make Danish figures drop —

In some ways, the situation of seaborne transport is similar. At the level of the EU (without however Finland), 259 million tonnes of goods have been handled during the year 2000 in the main ports in national transport. Table 5.11 shows that the United Kingdom, Italy, Spain and Greece are the countries that display the highest volumes. But it is the share of national transport in total seaborne transport that appears to be more interesting information: a little more than 30% of the tonnage handled in Greek ports had national origin and destination. Spain, Italy, and Denmark followed with a share of 21%, 16% and 15% respectively. The geographical features of the above mentioned countries (islands, either large in number or only a few but important ones, or a country with a very important coastline) largely explain this relatively high share.

For Denmark, the substantial drop of the national share during the observation period is notably influenced by the discontinuation of important ferry services after the opening (in 1998) of the Storebælt fixed link, enabling to reach Sjælland (with Copenhagen) via the island of Fyn without having to take a ferry.

Table 5.11: National seaborne transport in the main ports 1997 - 2000, in 1000 tonnes

| | 1997 | 1998 | 1999 | 2000 | 2000 - as share in total seaborne transport (%) |
|----------------|--------------|--------|--------|--------|---|
| Belgium | 4 197 | 4 000 | 4 521 | 5 073 | 2.9 |
| Denmark | 24 316 | 15 530 | 10 499 | 11 149 | 15.1 |
| Germany | 5 357 | 5 218 | 7 454 | 5 246 | 2.3 |
| Greece | : | : | : | 29 088 | 30.2 |
| Spain | : | : | : | 46 680 | 21.0 |
| France | : | 20 499 | 18 366 | 18 679 | 5.8 |
| Ireland | 774 | 1 007 | 809 | 1 384 | 4.0 |
| Italy | 74 557 | 67 404 | 64 713 | 58 761 | 15.6 |
| Netherlands | 576 | 545 | 869 | 778 | 0.2 |
| Portugal | 5 498 | 6 284 | 6 371 | 5 490 | 10.8 |
| Finland | not declared | : | : | : | : |
| Sweden | 13 286 | 13 903 | 12 597 | 12 068 | 9.1 |
| United Kingdom | : | : | : | 64 424 | 12.8 |

Source: Eurostat.

5.1.3. International goods transport

The globalisation of the economy and especially the increasing integration of the European economies have 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 1999, international goods movements of Member States amounted to approximately 272 000 million tonne kilometres (tkm) for road (without cross-trade and cabotage transport), 85 000 million tkm for rail and 68 000 million tkm for inland waterways. Compared to 1990, international road transport increased by 54.1%, rail transport by 15.2% and transport over navigable inland waterways by 9.4%.

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. How-

ever, 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 most important for the Netherlands and Germany

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 5.12).

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 transhipped in the big seaports, like Rotterdam, Antwerp or Hamburg.

Noticeable is also Austria's navigable waterways, with the Danube offering a major transport corridor to some central European countries.

Rail: strong position in Scandinavia

Although at EU-level railways are taking care of only a minor part in total international transport, the importance of this mode is substantial for some Member States; railways carry substantial volumes in international transport in Sweden and Finland. The modal comparison in international goods transport throughout the Member States is impossible due to the fact that road transport declarations include transport performed outside the country where hauliers are registered whereas the territorial principle applied to transport performance declarations of rail and inland waterways. Furthermore, 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.

Table 5.12: International transport by inland waterways - loaded and unloaded (million tkm)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 ¹ | Change 1990-99 (%) |
|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------------------|--------------------|
| Belgium | 3 264 | 3 242 | 3 186 | : | : | : | 3 897 | 3 915 | 4 006 | 4 025 | 23 |
| Germany | 31 952 | 32 126 | 32 691 | 32 979 | : | 34 998 | 34 466 | 35 693 | 36 660 | 35 281 | 10 |
| France | 2 895 | 2 521 | 2 651 | 2 464 | 2 432 | 2 575 | 2 352 | 2 530 | 2 743 | 3 112 | 7 |
| Luxembourg | 7 | 5 | 8 | 8 | 6 | : | 6 | 28 | 35 | 7 | 0 |
| Netherlands | 22 739 | 22 448 | 21 659 | 20 006 | 22 995 | 22 551 | 22 607 | 25 973 | 24 939 | 23 988 | 5 |
| Austria | : | : | : | : | 974 | 943 | 1 077 | 1 030 | 1 079 | 1 152 | : |

(1) France: data refer to 2000.
Source: Eurostat (New Cronos).

Table 5.14: International rail transport - loaded and unloaded (million tkm)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | change 1990-99 (%) |
|----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------------------|
| Belgium | 4 954 | 4 929 | 4 878 | 4 691 | 4 942 | 4 644 | 4 321 | 4 771 | 4 903 | 4 966 | 0 |
| Denmark | 569 | 630 | 631 | 543 | 607 | 602 | 570 | 706 | 674 | 608 | 7 |
| Germany | 22 127 | 22 984 | 20 936 | 21 101 | 24 532 | 25 373 | 25 101 | 28 563 | 30 084 | 29 376 | 33 |
| Greece | 358 | 306 | 329 | 320 | 155 | 140 | 185 | 108 | 191 | 241 | -33 |
| Spain | 1 381 | 1 365 | 1 253 | 1 049 | 1 490 | 1 762 | 1 990 | 2 269 | 2 148 | 1 943 | 41 |
| France | 12 983 | 12 802 | 13 003 | 11 506 | 13 551 | 13 803 | 15 227 | 16 683 | 16 241 | : | 25 ¹ |
| Ireland | - | - | - | - | - | - | - | - | - | - | - |
| Italy | 10 141 | 10 840 | 9 979 | 9 357 | : | 11 065 | 10 607 | 11 357 | 10 992 | 10 415 | 3 |
| Luxembourg | 419 | 408 | 376 | : | : | : | : | : | : | : | : |
| Netherlands | 2 016 | 2 017 | 1 770 | 1 673 | 1 934 | 2 280 | 2 375 | 2 605 | 3 015 | 3 096 | 54 |
| Austria | : | : | : | : | : | 8 098 | 8 523 | 9 660 | 7 990 | 8 048 | : |
| Portugal | 156 | 171 | 211 | 155 | 236 | 251 | 250 | 394 | 409 | 318 | 104 |
| Finland | : | : | : | : | : | 3 357 | 3 107 | 3 597 | 3 572 | 3 373 | : |
| Sweden | 8 039 | 7 208 | 8 492 | 8 156 | 7 920 | 7 833 | 6 843 | 4 854 | 4 803 | 4 880 | -39 |
| United Kingdom | 193 | 192 | 353 | 336 | 529 | : | : | : | : | : | : |

(1) 1990-1998

Source: Eurostat, Eurostat/ECMT/UN-ECE.

Germany by far first in rail transport performance

In absolute terms, Germany performed in 1999 close to 30 000 million tkm in rail goods transport, considerably ahead of France and Italy with 16 200 million and 10 400 million tkm respectively (see Table 5.14). In relative terms, Portugal's international rail transport more than doubled between 1990 and 1999, whereas Sweden's transport recorded a decline of 39%. 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 1994-1997. Rail figures display a considerable increase again for 1998 and 1999, without however reaching the transport performance level of the early 1990s.

Transshipment often needed in Spain

Although there is no competition from inland shipping, rail transport from and to Spain appears remarkably low (1 943 million tkm in 1999). 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 are available, road haulage is still responsible for a large part of Spanish international goods transport.

Road: plus 54% in a single decade

In 1999, the international goods transport by road at EU-level amounted to approximately 271 500 million tkm. This represents an increase in volume of over 54% in a decade (1990-99). Its volume is three times as big as international rail transport and nearly four times that of inland shipping.

Table 5.15 shows that the Member States with the most voluminous international road haulage in 1999 were Germany (45 652 million tkm), France (41 975), the Netherlands (41 005) and Spain (35 066). The port of Rotterdam, where goods are unloaded from ships and often continue their journey by lorry, can partly explain the surprisingly high transport performance of hauliers registered in the Netherlands.

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 or 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

Table 5.15: International road transport - loaded and unloaded (million tkm)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 ¹ | Change 1990-99 (%) |
|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------------------|--------------------|
| Belgium | 19 433 | 20 604 | 18 210 | 20 178 | 23 073 | 22 833 | 21 084 | 21 920 | 19 900 | 17 118 | -12 |
| Denmark | 5 145 | 5 872 | 6 384 | 10 423 | 11 433 | 12 421 | 11 344 | 11 226 | 10 796 | 12 276 | 139 |
| Germany ² | 21 432 | 23 137 | 24 203 | 25 681 | 2 772 | 29 507 | 31 679 | 36 736 | 41 884 | 45 652 | 113 |
| Greece | 2 119 | 1 983 | 2 732 | 1 415 | 636 | 867 | 841 | 1 734 | 1 272 | 1 400 | -34 |
| Spain | 12 271 | 13 086 | 14 187 | 15 385 | 19 334 | 22 513 | 25 251 | 28 351 | 32 814 | 35 046 | 186 |
| France | 30 689 | 30 972 | 33 398 | 31 446 | 34 560 | 36 072 | 40 333 | 37 831 | 40 293 | 41 975 | 37 |
| Ireland | 1 008 | 780 | 411 | 887 | | | | | | 1 106 | 10 |
| Italy | 20 498 | 18 423 | 19 661 | 18 179 | 19 309 | 12 497 | 23 940 | 19 754 | | 24 465 | 19 |
| Luxembourg | | | 1 661 | 1 615 | 1 395 | | | 1 213 | | 1 461 | |
| Netherlands | 30 896 | 29 033 | 30 468 | 31 232 | 32 719 | 33 901 | 35 147 | 35 999 | 36 809 | 41 005 | 33 |
| Austria | | | | | | 12 474 | 13 103 | 13 613 | 14 610 | 15 654 | |
| Portugal | 5 152 | 6 901 | 6 140 | 5 764 | 6 739 | | 8 846 | 10 046 | 9 954 | 10 990 | 113 |
| Finland | | | | | | | 2 570 | 2 122 | 2 413 | 3 716 | |
| Sweden | | | | | | 3 097 | 2 768 | 2 566 | 2 829 | 2 721 | |
| United Kingdom | 10 650 | 11 228 | 11 753 | 12 480 | 14 373 | 14 441 | 15 491 | 16 252 | 16 085 | 16 908 | 59 |

(1) All countries: 1999 data based on sample-surveys (Council Regulation (EC 1172/98).

(2) Break in series (1994-1995) due to method. changes.

Source: Eurostat (New Cronos), Eurostat estimates (italic).

Cross-trade road transport (international road transport, carried out by vehicles neither registered in the country of loading, nor in the country 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: share of 10%

Table 5.16 displays the number of tkm performed in cross-trade transport. The figures express the performance by nationality of the operators and are not related to the territory where this transport took place. In fact, if cross-trade transport

Table 5.16: Cross-trade road goods transport performed by hauliers registered in the reporting Member States (million tkm)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | Share (1999) in total international transport (%) |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|---|
| Belgium | 2 292 | 1 973 | 3 126 | 3 170 | 3 822 | 3 800 | 3 745 | 2 924 | 3 848 | 3 330 | 15.2 |
| Denmark | | | | 653 | 602 | 496 | 427 | 482 | 390 | 436 | 3.4 |
| Germany | | | | | | 2 762 | 2 656 | 3 293 | 3 855 | 4 354 | 8.7 |
| Greece | | | | | | | | | | 0 | 0.0 |
| Spain | | | | 219 | 220 | 376 | 456 | 493 | 707 | 791 | 2.2 |
| France | 2 499 | 2 851 | 3 157 | 3 254 | 3 254 | 2 831 | 2 719 | 2 226 | 2 811 | 2 957 | 6.6 |
| Ireland | 184 | 109 | | | | | | | | 229 | 17.2 |
| Italy | | | 150 | 142 | 152 | 182 | 237 | | | 509 | 1.6 |
| Luxembourg | | 1 248 | 1 847 | 2 055 | 1 979 | | 1 763 | 2 599 | | 3 436 | 70.0 |
| Netherlands | 4 385 | 4 908 | 5 050 | 4 954 | 5 352 | 5 958 | 6 259 | 6 480 | 6 998 | 8 246 | 16.6 |
| Austria | | | | | | 2 981 | 3 347 | 4 059 | 4 753 | 5 827 | 27.0 |
| Portugal | 134 | 247 | 219 | 325 | 442 | 466 | 361 | 328 | 352 | 688 | 6.0 |
| Finland | | | | | | | 153 | 21 | 64 | 102 | 2.7 |
| Sweden | | | | | | 64 | 41 | 14 | 44 | 54 | 2.0 |
| United Kingdom | 360 | 539 | 260 | 213 | 275 | 290 | 400 | 392 | 397 | 292 | 1.8 |
| EU-15 | | | | | | | | | | 31 251 | |

Source: Eurostat, national statistics (italic).

and 'regular' international transport for 1999 are taken together, it appears that cross-trade transport is far from negligible: 31 251 out of 302 764 million tonne kilometres, or 10.3% (1998: 8.8%).

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 as important as 'regular' international transport. For all other Member States, and especially the peripheral ones, this type of transport is of lesser importance.

Data presented in Table 5.16 suggest that throughout the period observed, fluctuations occurred at Member State level. However, a general upward trend can be noticed for most countries. There can however be no doubt about the favourable effects (economical efficiency, reduction of environmental pressure due to less empty journeys) of cross-trade transport, which offers an important step for the realisation of a European common transport market.

Cabotage: international or national?

From the point of view of the movements of goods, cabotage transport (transport inside a country by a haulier based in another country) should constitute a category of national road transport. In the economical sense however, as well as from the point of view of the declaring country, this type of road haulage is considered as international transport, since it is performed outside the territory of the reporting country. This is also the concept that applies to the road transport data collected under Council Regulation (EC) 1172/98. In the frame of this publication, Eurostat will consider cabotage transport as part of international transport.

Cabotage transport was gradually introduced in 1990 through the introduction of authorisation quotas. In the Benelux countries, quotas were already abolished at the end of 1992. The cabotage regime was extended to the EFTA states (except Switzerland) on 1 July 1994 following the

Table 5.18: Cabotage transport performed by hauliers from each reporting country, 1999 – in million tkm

| Country | 1999 (million tkm) |
|----------------|--------------------|
| EU-15 | 7 284 |
| Belgium | 936 |
| Denmark | 102 |
| Germany | 1 533 |
| Greece | 0 |
| Spain | 271 |
| France | 756 |
| Ireland | 249 |
| Italy | 350 |
| Luxembourg | 1 039 |
| Netherlands | 1 632 |
| Austria | 222 |
| Portugal | 99 |
| Finland | 33 |
| Sweden | 19 |
| United Kingdom | 44 |

Source: Eurostat.

Estimates in italic.

creation of the EEA. The quotas were steadily increased and entirely abolished on the 1 July 1998.

Although Table 5.17 suggests a considerable increase of cabotage transport over the years, the overall influence remains small: with 956 874 million tkm in 1999, national transport by resident hauliers was still 130 times more important than cabotage (7284 million tkm).

Hauliers from small countries have more incentive to undertake cabotage due to their limited national markets and the fact that other national markets are geographically close. Table 5.18 and Graph 5.19 outline that road transport enterprises from the Benelux countries have been particularly active in the market: in 1999, they were responsible for half of the entire cabotage transport performed in the EU.

The long time fears for 'unfair competition' from low labour cost countries remain unfounded: only 5% of the entire cabotage transport performance was carried out by hauliers registered in Greece, Spain and Portugal.

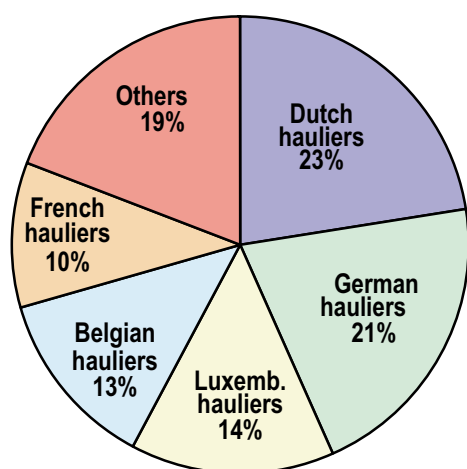
Table 5.17: Total cabotage by hauliers from EU countries¹ - in million tkm

| Year | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------|------|------|------|-------|-------|-------|-------|-------|-------|
| Total | 646 | 745 | 881 | 1 144 | 1 672 | 2 204 | 3 538 | 4 816 | 7 284 |

(1) The figure for 1994 includes cabotage performed by hauliers from Sweden and Finland, which joined the EU only on 1.1.1995. Austria joined the cabotage regime in 1997.

Source: DG Energy and Transport (figures up to and including 1998); Eurostat (1999). Estimates in italic.

Graph 5.19: The most active 'caboteurs' in 1999 (based on tkm)



Source: Eurostat.

High increases in air transport

The development of international freight transport by air (worldwide) is displayed in Table 5.20. 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 indi-

vidual 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 international extra-EU air cargo handling

These elements have not to be considered when looking at Table 5.21 which displays the 'top-20' airports in the EU with regards to cargo loaded and unloaded in 2000, separately for international intra-EU and international extra-EU freight traffic.

With regards to international intra-EU cargo traffic, the German airports of Cologne-Bonn and Frankfurt (Main) lead the ranking, both handling over 200 000 tonnes of freight and mail. Within the top-20 ranking, the airports of Milano-Malpensa (Italy) and East Midlands (United Kingdom) not only display the highest increase compared to the previous year (with 72% and 29% respectively) but also feature the highest average annual growth since 1993 (with 48% and 26% respectively). It should be mentioned that the airport of Milano-Malpensa has been subject to considerable investments in the frame of the trans-European transport network (one of the 14 priority projects), notably with regards to runway capacity and cargo facilities.

Volumes of freight and mail handled in international extra-EU transport are sensibly higher: the three most important airports in this respect (Frankfurt, London-Heathrow and Amsterdam) all handled well over one million tonnes. Within the

Table 5.20: Development of the volume of cargo and mail handled in worldwide international air traffic (1000 tonnes)

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Average annual increase 1993-2000 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------------------|
| Belgium | 306 | 375 | 426 | 449 | 518 | 585 | : | : | 6.7 ¹ |
| Denmark | : | : | : | : | : | : | : | : | : |
| Germany | 1 520 | 1 721 | 1 807 | 1 876 | 2 019 | 1 948 | 2 054 | 2 244 | 5.7 |
| Greece | 81 | 82 | : | 73 | 106 | 101 | 105 | 110 | 4.6 |
| Spain | 179 | 174 | 244 | 281 | 309 | 309 | 340 | 353 | 10.2 |
| France | 853 | 1 006 | 1 034 | 1 058 | 1 025 | 1 030 | 1 038 | 1 060 | 3.2 |
| Ireland | 50 | 43 | 58 | 39 | 70 | 59 | 66 | 72 | 5.4 |
| Italy | 403 | 438 | 459 | 475 | 454 | 446 | 420 | 459 | 1.9 |
| Luxembourg | : | : | 287 | 281 | 340 | 383 | 448 | 501 | 11.8 ² |
| Netherlands | 773 | 842 | 982 | 1 084 | 1 163 | 1 174 | 1 182 | 1 268 | 7.3 |
| Austria | 73 | 85 | 96 | 98 | 109 | 111 | 122 | 127 | 8.2 |
| Portugal | 86 | 94 | 101 | 102 | : | : | : | : | : |
| Finland | : | : | : | : | 92 | 94 | 91 | 92 | : |
| Sweden | 103 | 128 | 145 | 171 | 195 | 198 | 185 | : | 10.3 |
| United Kingdom | 1 215 | 1 486 | 1 584 | 1 657 | 1 847 | 1 990 | 2 095 | 2 210 | 8.9 |

(1) 1993-1998.

(2) 1995-2000.

Source: Eurostat; Sweden: SIKa-Institute/Swedish Civil Aviation Agency.

Table 5.21: Top 20 airports in EU-15 based on cargo loaded/unloaded worldwide

| Rank 2000 | Airport | Intra-EU freight traffic | | | Airport | Extra-EU freight traffic | | |
|-----------|------------------------|--------------------------------|----------------------|-------------------------------|------------------------|---------------------------------|----------------------|-------------------------------|
| | | Volume handled in 2000 (1000t) | Change 1999-2000 (%) | Aver. evolution 1993-2000 (%) | | Volume handled in 2000 (1000 t) | Change 1999-2000 (%) | Aver. evolution 1993-2000 (%) |
| 1 | Köln/Bonn /D | 236.6 | 14.3 | 15.4 | Frankfurt (Main)/D | 1 401.3 | 11.7 | 5.3 |
| 2 | Frankfurt (Main)/D | 216.5 | 5.0 | 0.8 | London-Heathrow/UK | 1 123.8 | 3.9 | 8.3 |
| 3 | London-Heathrow/UK | 174.6 | -0.4 | 0.9 | Amsterdam-Schiphol/NL | 1 118.0 | 5.5 | 7.5 |
| 4 | East Midlands/UK | 123.8 | 28.6 | 26.3 | Airport-system Paris/F | 877.5 | 9.3 | : |
| 5 | Airport-system Paris/F | 109.5 | -1.8 | : | Luxembourg/L | 450.5 | 14.6 | : |
| 6 | Amsterdam-Schiphol/NL | 104.5 | -13.1 | 1.5 | London-Gatwick/UK | 306.1 | 9.2 | 8.4 |
| 7 | Madrid-Barajas/E | 75.2 | 11.8 | 9.2 | Milano-Malpensa/I | 243.6 | 15.9 | 15.3 |
| 8 | Athina/EL | 55.6 | 3.4 | 4.3 | Köln/Bonn/D | 150.0 | -0.1 | 6.9 |
| 9 | Luxembourg/L | 50.3 | -8.9 | : | Madrid-Barajas/E | 146.3 | 3.7 | 7.7 |
| 10 | Helsinki/FIN | 48.8 | 10.5 | : | London-Stansted/UK | 113.5 | -4.5 | 15.5 |
| 11 | London-Stansted/UK | 47.3 | -1.2 | 17.6 | Roma-Fiumicino/I | 109.7 | 10.1 | -6.6 |
| 12 | Barcelona/E | 42.7 | 10.2 | 10.9 | Manchester-Intl./UK | 101.3 | 12.9 | 16.3 |
| 13 | Wien-Schwechat/A | 42.3 | -8.5 | 2.8 | Wien-Schwechat/A | 81.4 | 13.9 | 12.8 |
| 14 | Milano-Malpensa/I | 40.0 | 71.8 | 48.2 | München/D | 80.7 | 11.6 | 11.4 |
| 15 | Roma-Fiumicino/I | 28.5 | 4.2 | -8.9 | Athina/EL | 46.6 | 9.0 | 5.6 |
| 16 | München/D | 27.4 | -14.8 | 3.3 | Helsinki/FIN | 40.3 | -1.7 | : |
| 17 | Dublin/IRL | 26.2 | -15.0 | : | Maastricht/NL | 38.5 | : | : |
| 18 | London-Luton/UK | 24.7 | 0.3 | 4.0 | Düsseldorf/D | 34.6 | 1.3 | 6.8 |
| 19 | Vitoria/E | 24.2 | 31.2 | : | East Midlands/UK | 32.3 | 104.2 | 38.2 |
| 20 | Düsseldorf/D | 20.1 | -10.1 | 0.2 | Manston (Civil)/UK | 31.1 | 41.3 | 47.9 |

NB: Belgium, Denmark, Portugal and Sweden did not report for 2000.
Source: Eurostat.

top-20, it appears that in 2000, the East Midlands airport (United Kingdom) doubled its volume compared to the previous year. In the higher ranks, Milano-Malpensa and Luxembourg also display considerable growth rates. The fact that the airport of Brussels – also a major cargo-handling airport – is missing in the 2000 ranking is due to the fact that Belgian authorities did not report for 2000.

EU's main sea ports: 2 442 million tonnes handled

For seaborne transport as for aviation, it is hard to proceed to a correct comparison of the transport performance of the various transport modes as long as no tonne kilometres indications are available. The information on seaborne transport presented in this chapter refers to the cargo tonnage handled (i.e. loaded and unloaded) in the main ports of the various EU Member States. «Main ports» refer to those ports that at least handle 1 million tonnes of cargo per year. Over time, certain ports may however reach this threshold and start reporting, making year-to-year comparisons somewhat risky. This should be taken into account when looking at Table 5.22, which offers thus an insight of the development of the tonnage handled in ports that were over the threshold in the reference year considered. An indication of the total tonnage handled in all ports

(including the volume in national traffic) can be found in Chapter 5.1.1 *Transport of goods – General development*.

All main ports of the EU taken together handled 2 442 million tonnes of cargo in international traffic in 2000. The most important volumes were handled in the main ports of the United Kingdom

Table 5.22: International seaborne transport in the main ports: goods loaded and unloaded

| | 1997 | 1998 | 1999 | 2000 | |
|----------------|---------|---------|---------|---------|---------------------|
| | 1000 t | 1000 t | 1000 t | 1000 t | % of which intra-EU |
| Belgium | 154 387 | 163 904 | 157 814 | 170 822 | 31.6 |
| Denmark | 64 921 | 62 267 | 61 249 | 62 856 | 50.8 |
| Germany | 200 907 | 205 521 | 206 986 | 227 635 | 41.8 |
| Greece | 56 927 | 65 650 | 66 763 | 67 103 | 24.9 |
| Spain | 207 194 | 227 265 | 241 178 | 175 243 | 19.6 |
| France | : | 285 579 | 281 870 | 303 332 | 31.6 |
| Ireland | 27 744 | 29 832 | 31 485 | 33 107 | 60.3 |
| Italy | 303 959 | 332 092 | 324 413 | 318 503 | 12.4 |
| Netherlands | 399 149 | 401 956 | 394 747 | 402 454 | 28.0 |
| Portugal | 42 138 | 43 374 | 44 773 | 45 219 | 33.0 |
| Finland | 70 248 | 71 694 | 71 123 | 75 394 | 67.7 |
| Sweden | 108 509 | 112 499 | 117 244 | 120 015 | 59.9 |
| United Kingdom | : | : | : | 440 305 | 40.7 |

Source: Eurostat.

(440.3 million t – or 18% of the EU total) followed by those of the Netherlands (402.5 million t – or 16%) and Italy (318.5 million t – or 13%).

Port of Dunkerque: from rank 16 to rank 9

Table 5.23 further specifies that individual ports sometimes can take a very important position, mainly in the smaller Member States: the port of Rotterdam alone – by far the most important EU port with regards to tonnage handled – accounts for a volume of 302.5 million tonnes. In the period observed, the top-5 ranking remains strictly unchanged although the ports of Antwerp, Hamburg and Le Havre increased their volume by around 10%. Rotterdam and Marseille did not progress compared to 1997. It should however be

noted that the various rankings in Table 5.23 refer to the total tonnage handled in the individual ports – including (often minor) volumes loaded and unloaded in national transport.

In the lower ranks, the port of Dunkerque (France) gradually moved up from position 16 in 1997 to position 9 in 2000. The volume handled in this port increased by nearly 22% over the period 1997-2000. The statistically combined ports of Bremen and Bremerhaven miss the top-15 in 2000 by a small margin. These ports displayed the highest increase compared to 1997 (28.2%). The only port in the top-15 ranking with a noticeable decrease (-14% compared to 1997) was the port of London, due to the closure of a major oil terminal.

Table 5.23: TOP 15 ports - on the basis of gross weight of goods handled (in 1000 t)

| | 1997 | | 1998 | | 1999 | | 2000 | | change 1997-2000 (%) |
|----|---------------------|-----------|---------------------|---------|---------------------|---------|---------------------|---------|-------------------------|
| 1 | Rotterdam | 303 427 | Rotterdam | 306 991 | Rotterdam | 299 506 | Rotterdam | 302 485 | -0.3 |
| 2 | Antwerpen | 104 592 | Antwerpen | 111 592 | Antwerpen | 103 591 | Antwerpen | 115 988 | 10.9 |
| 3 | Marseille | 92 936 | Marseille | 90 929 | Marseille | 87 643 | Marseille | 91 279 | -1.8 |
| 4 | Hamburg | 69 583 | Hamburg | 68 912 | Hamburg | 73 358 | Hamburg | 76 950 | 10.6 |
| 5 | Le Havre | 58 207 | Le Havre | 62 783 | Le Havre | 60 303 | Le Havre | 63 883 | 9.8 |
| 6 | London | 55 692 | London | 57 311 | London | 52 206 | Grimsby & Immingham | 52 501 | 9.4 |
| 7 | Tees & Hartlepool | 51 249 | Tees & Hartlepool | 51 454 | Grimsby & Immingham | 49 757 | Tees & Hartlepool | 51 472 | 0.4 |
| 8 | Grimsby & Immingham | 47 991 | Grimsby & Immingham | 48 387 | Tees & Hartlepool | 49 316 | London | 47 892 | -14.0 |
| 9 | Trieste | 46 664 | Trieste | 47 557 | Genova | 46 775 | Dunkerque | 44 318 | 21.7 |
| 10 | Genova | 43 633 | Genova | 45 213 | Forth | 45 396 | Bahía de Algeciras | 44 016 | 18.0 |
| 11 | Forth | 43 102 | Forth | 44 400 | Trieste | 44 515 | Trieste | 44 015 | -5.7 |
| 12 | Bahía de Algeciras | 37 299 | Wilhelmshaven | 43 950 | Bahía de Algeciras | 42 047 | Genova | 43 797 | 0.38 |
| 13 | Amsterdam | 36 942 | Bahía de Algeciras | 42 126 | Wilhelmshaven | 39 731 | Wilhelmshaven | 43 402 | 19.1 |
| 14 | Taranto | 36 720 | Dunkerque | 39 036 | Dunkerque | 38 025 | Amsterdam | 42 044 | 19.3 |
| 15 | Wilhelmshaven | 36 443.05 | Taranto | 36 593 | Sullom Voe | 37 680 | Forth | 41 143 | -4.5 |

Source: Eurostat.

5.1.4. 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. The NST 2000, aiming at a further harmonisation with mainly nomenclatures used in foreign trade statistics, is expected to become the new standard in the near future.

Soon from NST/R to NST 2000

The NST/R is widely used in EU-15. Nearly all Member States apply 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 availability, statistical information of various Member States was 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 offers a concise description of this grouping.

Not all Member States feature inland waterway transport

Table 5.24 (national transport) and Table 5.25 (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.

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 absolute importance of national transport with regard to the volumes forwarded, Table 5.24 shows the 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 types of goods forwarded (45%). Chapter 9 (machinery, transport equipment, manufactured and miscellaneous articles) and Chapter 1 (foodstuffs and animal fodder) follow with 19% and 11% respectively.

Share of road: 93% in national, 'only' 39% in international transport

The situation is quite different in international transport (see Table 5.25). Surprisingly, it appears that in 1999, 'only' 39% of the total amount of

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

Table 5.24: National transport in 1999 - by group of goods (NST/R chapter) - in 1000 tonnes

| | NST/R chapters | | | | | | | | | | Total | Modal split |
|----------------|----------------|------------------|----------------|----------------|----------------|----------------|------------------|----------------|----------------|------------------|------------------|-------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Road transport | 627 936 | 1 018 758 | 69 001 | 365 074 | 113 676 | 207 254 | 3 943 053 | 102 252 | 402 455 | 1 633 316 | 8 482 775 | 92.9% |
| Rail transport | 17 515 | 12 805 | 101 771 | 37 330 | 47 438 | 63 790 | 75 682 | 9 568 | 23 367 | 48 792 | 438 058 | 4.8% |
| IWW transport | 7 965 | 13 055 | 19 006 | 34 122 | 6 046 | 3 050 | 102 377 | 4 349 | 10 767 | 8 837 | 209 574 | 2.3% |
| Total | 653 416 | 1 044 618 | 189 778 | 436 526 | 167 160 | 274 094 | 4 121 112 | 116 169 | 436 589 | 1 690 945 | 9 130 407 | 100% |
| Share | 7% | 11% | 2% | 5% | 2% | 3% | 45% | 1% | 5% | 19% | 100% | |

Note: Road and rail: countries considered: B (Rail: 1998), D, EL (Rail and Road: 1998), E, F (Rail: 1998), NL, P, UK (Rail: 1994).
Inland waterways: B, D, F, NL, AT.
Source: Eurostat.

Table 5.25: International transport in 1999 - by group of goods (NST/R chapter) - in 1000 tonnes

| | NST/R chapters | | | | | | | | | | Total | Modal split |
|----------------|----------------|---------------|---------------|---------------|----------------|---------------|----------------|---------------|----------------|----------------|------------------|-------------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| Road transport | 59 966 | 56 540 | 2 881 | 9 288 | 5 941 | 34 383 | 61 217 | 5 298 | 53 351 | 162 728 | 451 593 | 38.7% |
| Rail transport | 26 450 | 6 925 | 16 715 | 16 250 | 22 175 | 39 784 | 18 681 | 4 407 | 19 723 | 97 512 | 268 622 | 23.0% |
| IWW transport | 19 795 | 25 048 | 41 573 | 72 084 | 74 640 | 18 693 | 102 227 | 14 846 | 34 998 | 43 644 | 447 548 | 38.3% |
| Total | 106 211 | 88 513 | 61 169 | 97 622 | 102 756 | 92 860 | 182 125 | 24 551 | 108 072 | 303 884 | 1 167 763 | 100% |
| Share | 10% | 9% | 3% | 7% | 7% | 8% | 15% | 2% | 10% | 29% | 100% | |

Note: Road and rail: countries considered: B, D, EL (road 1998), E, F (rail: 2000), I, NL (rail: 2000), A, P, FIN (road: 1998), UK (rail: 1994). Inland waterways: B, D, F (2000), L, NL, A. 'Regular' international road transport only, i.e. without cross-trade and cabotage transport.
Source: Eurostat.

tonnes forwarded use the road as mode of transport, just ahead of inland waterways with 38%. The remaining 23% is carried by rail.

International transport of all inland modes considered, Chapter 9 has the most important share with 29%, followed by minerals and building materials (Chapter 6) with 15% and chemicals (Chapter 8) as well as agricultural products (Chapter 0) with both a share of 10%.

Inland waterway vessels forward the highest volume in four 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 5.26 to 5.31: they offer both an insight by mode of transport, show the modal particularities and demonstrate

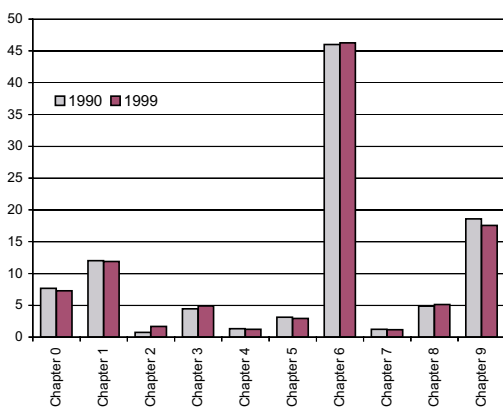
the relative importance of rail and inland waterway transport for heavy and bulky goods like building materials, ores and petroleum products.

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

Minerals and building materials very dominant only in national road transport

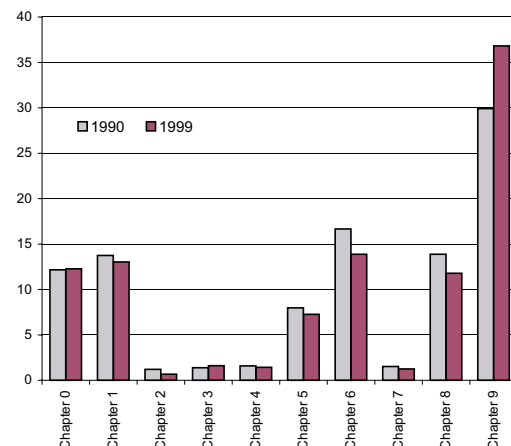
Looking at the two graphs of road transport individually (Graph 5.26 and 5.27), it appears that there have been no major changes in the percentage shares of the various goods groups between 1990 and 1999, especially with regards to national transport. More interesting is the comparison of the various NST/R chapters between national and international transport. It then appears that the transport of crude and manufac-

Graph 5.26: Share of NST/R goods chapters in national road transport in 1990 compared to 1999 (%)



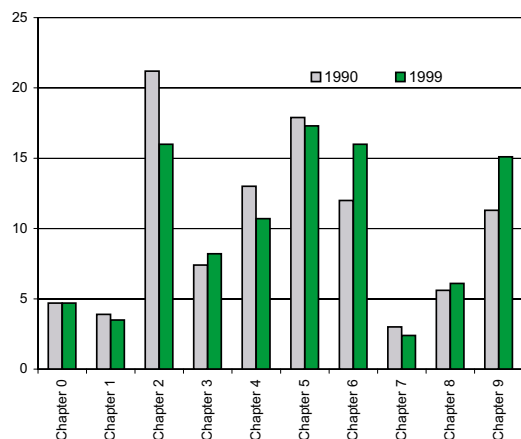
NB: Data are based on tonnes forwarded by the following Member States: B, DK, D, EL, E, F, IE, I, NL, P, UK. Greece: 1998 data instead of 1999.
Source: Eurostat.

Graph 5.27: Share of NST/R goods chapters in international road transport in 1990 compared to 1999 (%)



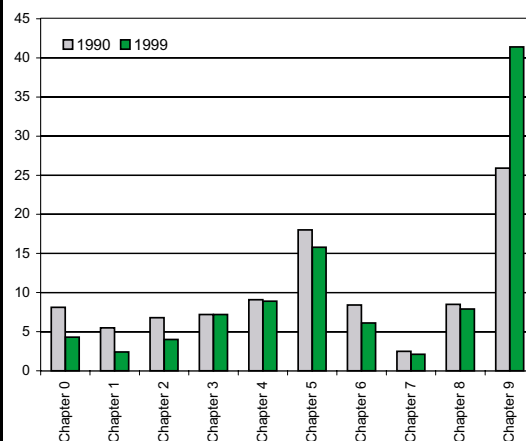
NB: Data are based on tonnes forwarded by the following Member States: B, DK, D, E, F, NL, P, UK.
Source: Eurostat.

Graph 5.28: Share of NST/R goods chapters in national rail transport in 1990 compared to 1999 (%)



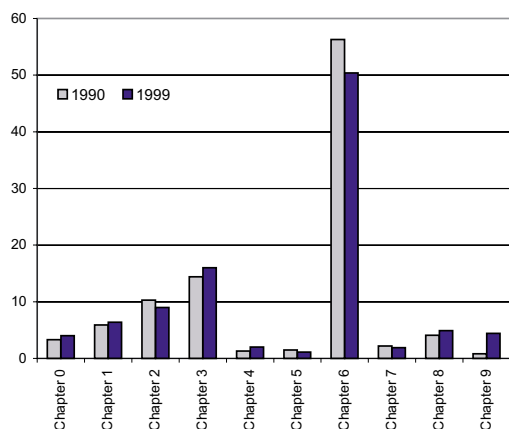
NB: Data are based on tonnes forwarded by the following Member States: B, D, EL, E, F, IRL, I, NL and P. - F, IRL: 1998 data instead of 1999.
Source: Eurostat.

Graph 5.29: Share of NST/R goods chapters in international rail transport in 1990 compared to 1999 (%)



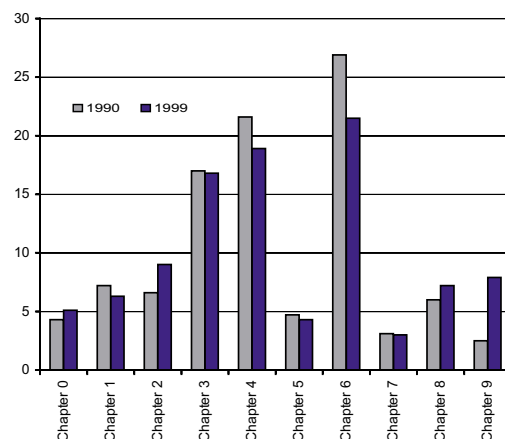
NB: Data are based on tonnes forwarded by the following Member States: B, D, EL, E, F, I, NL, P and FIN. - F: 1998 data instead of 1999; NL: 2000 data instead of 1999.
Source: Eurostat.

Graph 5.30: Share of NST/R goods chapters in national int. waterway transport in 1990 compared to 1999 (%)



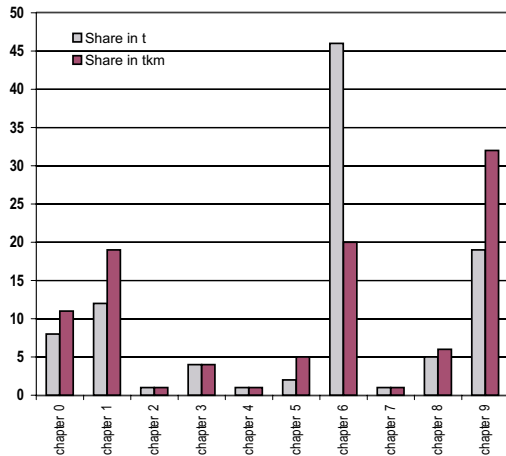
NB: Data are based on tonnes forwarded by the following Member States: D, F, NL.
Source: Eurostat.

Graph 5.31: Share of NST/R goods chapters in international int. waterway transport in 1990 compared to 1999 (%)



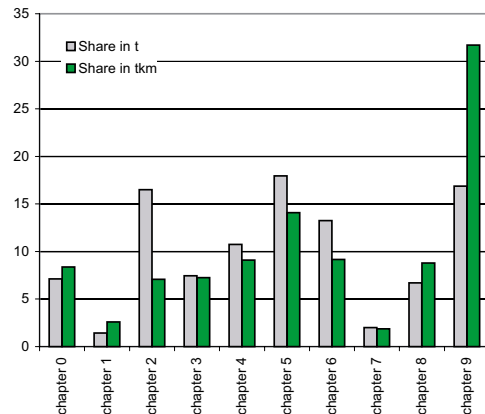
NB: Data are based on tonnes forwarded by the following Member States: D, F, L, NL.
For L: 1998 data instead of 1999 - for NL: 2000 data instead of 1999.
Source: Eurostat.

Graph 5.32: Share of NST/R goods chapters in national road transport 1999 - tonnes and tonne-kilometres (%)



NB: National goods transport in all Member States except B, EL and I have been taken into account.
Source: Eurostat.

Graph 5.33: Share of NST/R goods chapters in international rail transport 1999 tonnes and tonne-kilometres (%)



Note: data of the following countries were compiled: B, D, EL, E, I, NL, A, P, FIN, S.
Source: Eurostat.

ured minerals and building materials (Chapter 6) alone accounts for nearly half (46%) of the total volume of national road transport whereas the same goods category represents only around 14% in international traffic (all percentages refer to 1999).

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 18%, whereas in international transport, this same group accounts for 37%.

Graph 5.27 further outlines that apart from NST/R Chapter 9, there is a more equal distribution in the kind of goods in international than in national transport.

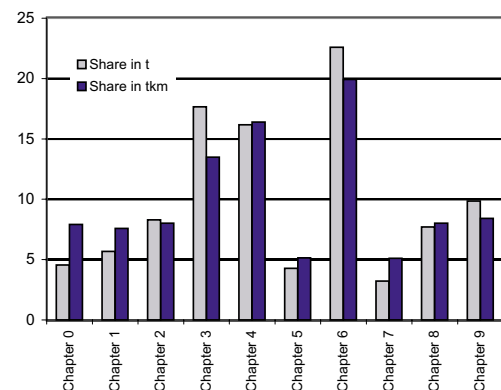
Goods in containers increasingly allocated to 'miscellaneous goods'

Although not visible in Graph 5.27, 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 1999 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 1999. 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.

National rail transport: most balanced shares

Rail transport shows quite different characteristics when comparing national and international transport. In national transport (see Graph 5.28), the share of solid mineral fuels (NST/R Chapter

Graph 5.34: Share of NST/R goods chapters in international inland waterway transport 1999 - tonnes and tonne-kilometres (%)



Note: data of the following countries were compiled: B (1998), D, F (2000), L (1998), NL, A.
Source: Eurostat.

2), still dominant in 1990, decreased mainly 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 1999. Considering the three inland transport modes, national rail transport features the most balanced shares of the various goods groups.

In international transport (see Graph 5.29), metal products (Chapter 5) 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 (from 26% to 41%).

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

With a share of 50% in 1999, crude and manufactured minerals and building materials (Chapter 6) dominate national inland waterway transport (see Graph 5.30). The second most important group of goods consists of petroleum products (Chapter 3). Between 1990 and 1999, their share increased from 14 to 16%. Solid minerals fuels (Chapter 2) follow with 9% (1999).

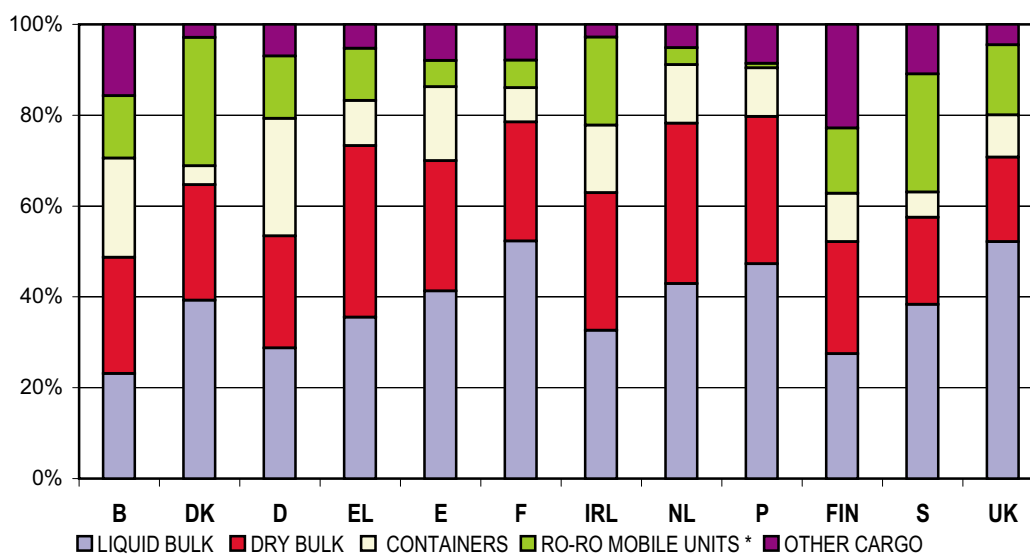
These three NST/R chapters together account for 75% of the entire national transport on inland waterways in 1999.

Chapter 6 takes the highest share in international inland waterways transport as well (see Graph 5.31), but only by a small margin (share: 22% in 1999). 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 19%. The share of petroleum products is, with 17%, the third most important type of goods (almost 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 1999 compared to 1990 is noticeable, both in national and international transport. The remark on the problems in reporting procedures made earlier (road transport) also seems to apply to a certain extent to inland waterway transport.

Machinery, transport material and manufactured articles: relatively light but travelling far

All elements outlined so far were based on volumes carried in tonnes, and did not take into account over what distance these were forwarded. Information given in Graph 5.32, 5.33 and 5.34 compiles datasets for a selection of

Graph 5.35: Maritime transport: share of types of cargo handled (inward and outward) in main ports in 2000 (in % of total cargo handled)



* Ro-Ro mobile units : roll on / roll off; either self-propelled or not.

NB: EL: based on data for first 2 quarters of 2000 - FIN: did not report national traffic - I: did not report any data at the time of establishment of this publication.

Source: Eurostat.

countries, which reported international transport data for 1999 both expressed in tonnes and tonne kilometres.

In road transport for instance (Graph 5.32), the share of Chapter 6 reaches 46% when expressed in tonnes, yet only 20% when expressed in tonne kilometres. Hence minerals and building materials remain – weightwise – the dominant type of goods, those goods were however carried over a relatively short distance. The opposite, albeit at a lesser degree, can be said for Chapter 9 and Chapter 1: here, quantities are carried over much longer distances.

The situation for Chapter 9 is similar in rail transport (Graph 5.33): expressed in tonnes, its share is only 17%, whereas it registers nearly the double (32%) when expressed in tonne kilometres. The opposite is true for solid mineral fuels (Chapter 2), where distances covered are obviously lower (weightwise a share of 17% but a weight-over-distance share of only 7%).

In international transport over navigable inland waterways, the general situation is far more balanced. Only goods belonging to Chapter 0 (Agricultural products and live animals) have a noticeable higher share in tkm whereas petroleum products (Chapter 3) and minerals and building materials (Chapter 6) dominate in tonnes and score lower when expressed in tkm.

Ro-Ro: substantial in Denmark and Sweden

In maritime transport, consistent data are available by type of cargo, a more general classification of goods compared to the NST/R goods chapters. The information displayed in Graph 5.35 refers to the share (in%) of the various types based on the total weight of the cargo handled in the main ports of the individual Member States in 2000. 'Main ports' refer to ports handling over 1 million tonnes of cargo annually.

It appears that bulk cargo continues to play a dominant role in all Member States: the share of liquid and dry bulk together ranges from around 50% in Belgium, Germany and Finland to around 80% in Portugal, France and the Netherlands. The handling of containers is important in Germany and Belgium (share of 26% and 22% respectively), but of minor importance in Denmark (4%) or Sweden (6%). For countries featuring major car ferry services, the share of ro-ro (roll on – roll off) mobile units is substantial: 28% in Denmark, 26% in Sweden and 19% in Ireland. For Finland, 'other cargo', which notably includes forestry products, accounted for nearly a quarter of the total, the highest for any country.

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.

Increased mobility demand mainly satisfied by cars

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 activities 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;
- an increasing number of households where at least two family members work on different locations which is not the place of residence;
- 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.

More than double as 'mobile' as in 1970

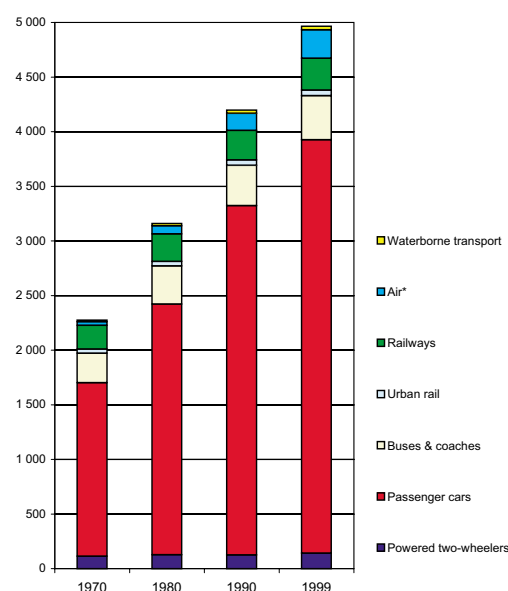
In 1999, transport demand in EU-15 (considering transport in passenger cars, on powered two-wheelers, buses and coaches, subways, trams, trolleys, railways and aeroplanes) could be established at 4 965 billion passenger kilometres (pkm) per year. When considering the equivalent figure of 1970 (2276 billion pkm), the transport demand increased by nearly 120% compared to 1970.

The shares of transport by car, buses and coaches and rail taken together appear to be virtually the same in 1970 (91.2 %) as in 1999 (90.2%).

Air travel progresses most

Disregarding the transport performance of powered two-wheelers and waterborne transport (see Table 5.38 and Graph 5.39), overall passenger transport performance in EU-15 rose by 123% between 1970 and 1999. As could be

Graph 5.36: EU-15 passenger trips by mode of transport - in million pkm



* intra-EU and domestic passengers only.

Source: Eurostat, ECMT, UIC, national statistics, DG TREN studies.

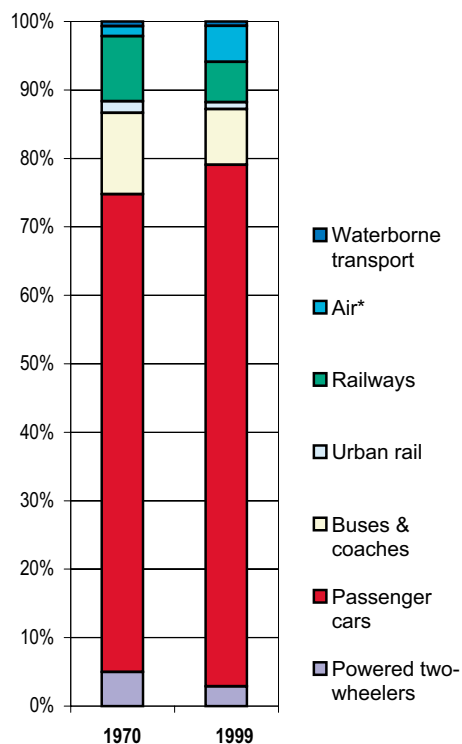
expected, passenger car transport progressed more than the average (+138%) but it is air transport that saw the biggest increase passing from 33 billion pkm in 1970 to 260 billion pkm in 1998 (+688%). Air transport data mentioned here refer to international intra-EU and domestic travel only. All transport modes have experienced the most important increase in the 1970 to 1980 period, except for urban rail (trams and metro).

Maritime passenger transport mainly to the account of main ferry connections

The fact that for maritime transport there are currently no passenger kilometre data available (pkm data will be available in the future though) handicaps the comparison with the other transport modes. The data available at Eurostat outline the number of passengers embarked and disembarked in the various ports of the EU.

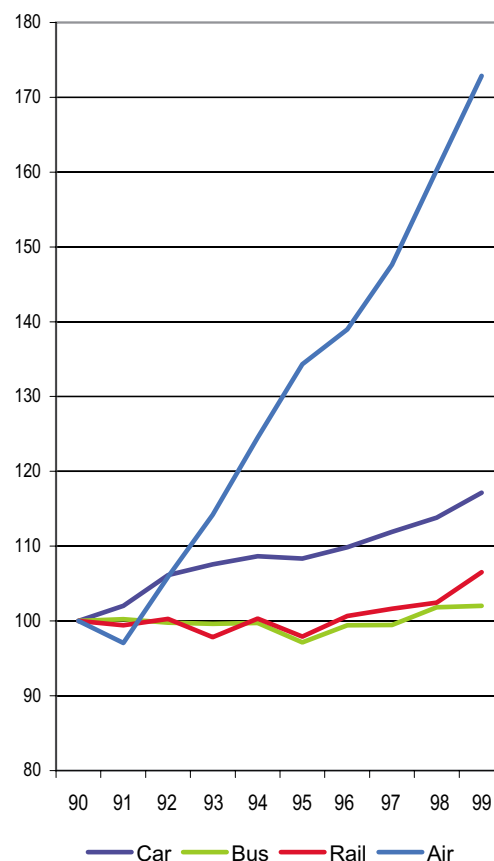
Table 5.40 shows these passenger volumes for the individual Member States. Luxembourg and Austria, with no direct access to the sea are obviously missing in this table. An estimated 345 million passengers passed through EU ports in 2000. This figure should be treated with care: it takes into account passengers that have made national, international intra-EU and international extra-EU journeys. Thus, passengers in national

Graph 5.37: EU-15 passenger trips modal split (%)



* intra-EU and domestic passengers only.
Source: Eurostat, ECMT, UIC, national statistics, DG TREN studies.

Graph 5.39: Evolution of passenger transport in EU-15 (1990=100) - on the basis of tkm performed



Source: DG TREN.

Table 5.38: Passenger transport performance by mode in EU-15

| | 1 000 million pkm | | | | | |
|-------------|-------------------|-------------------|--------------|---------|--------|--------|
| | Passenger cars | Buses and coaches | Tram & metro | Railway | Air* | Total |
| 1970 | 1 588 | 271 | 39 | 217 | 33 | 2 147 |
| 1980 | 2 294 | 350 | 41 | 253 | 74 | 3 012 |
| 1990 | 3 196 | 370 | 49 | 270 | 157 | 4 043 |
| 1995 | 3 500 | 384 | 48 | 268 | 202 | 4 402 |
| 1999 | 3 784 | 403 | 51 | 292 | 260 | 4 791 |
| 1970-80 (%) | +44.5 | +29.2 | +4.6 | +16.7 | +124.2 | +40.3 |
| 1980-90 (%) | +39.3 | +5.7 | +19.4 | +6.8 | +112.6 | +34.2 |
| 1990-99 (%) | +18.4 | +8.9 | +4.9 | +8.1 | +65.3 | +18.5 |
| 1970-99 (%) | +138.3 | +48.7 | +31.1 | +34.8 | +687.9 | +123.1 |

* Intra-EU and domestic passengers only.
Sources: ECMT, UIC, UITP, DG TREN studies, national statistics, estimates.

and intra-EU traffic are double counted, once at embarkation and once at disembarkation. Thus the figures in Table 5.40 should be considered from the point of view of the various ports in the Member States: they express the port passenger frequentation or passenger 'throughput' at national level.

Graph 5.41 gives the breakdown of the passenger transport by national, international intra-EU and international extra-EU transport. The large majority of the maritime transport of passengers goes to the account of ferry-services.

Substantial domestic air transport in large Member States

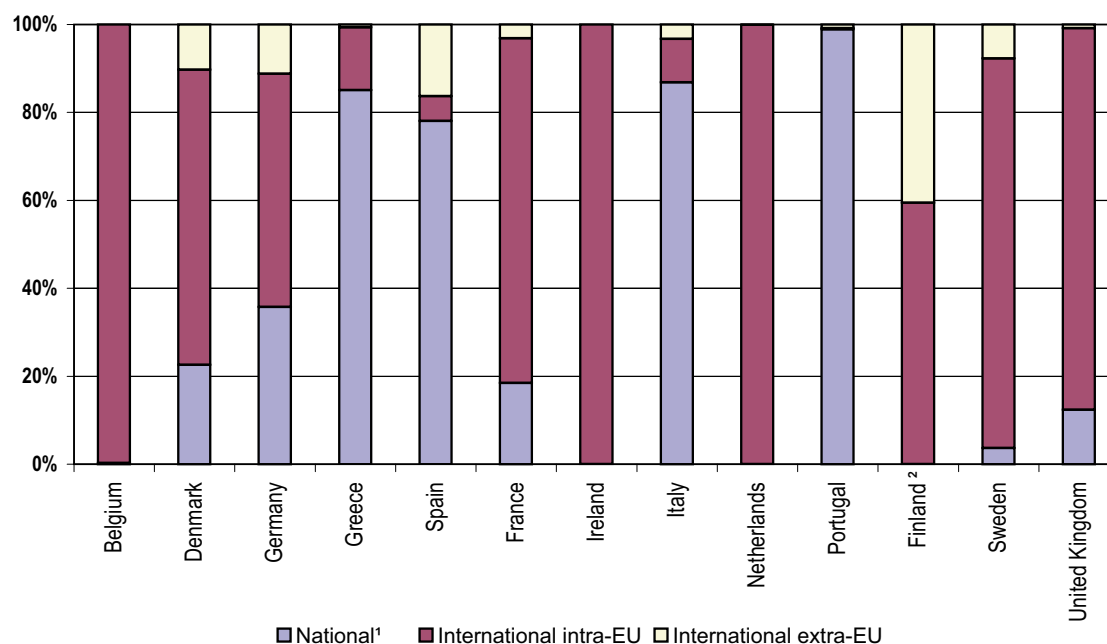
Graph 5.42 offers an insight on the development of total passenger air transport at EU-level between 1993 and 2000 based on the number of passengers carried. It appears that the number of passengers carried on international intra-EU and international extra-EU flights follow the same

Table 5.40: Maritime passenger transport in Member States: number of passengers embarked and disembarked in all ports (in 1000)

| | 1997 | 1998 | 1999 | 2000 |
|----------------------|--------|--------|--------|--------|
| Belgium | 1 946 | 1 696 | 1 553 | 1 520 |
| Denmark | 75 928 | 63 448 | 57 345 | 51 830 |
| Germany | : | : | : | 31 378 |
| Greece | : | : | : | 27 867 |
| Spain | 13 939 | 15 349 | 16 225 | 17 258 |
| France | 33 124 | 30 825 | 30 436 | 27 842 |
| Ireland | 4 380 | 4 682 | 4 358 | 4 218 |
| Italy | 80 184 | 80 621 | 85 439 | 86 376 |
| Netherlands | 1 964 | 1 840 | 1 949 | 2 004 |
| Finland ¹ | 15 191 | 15 986 | 16 146 | 15 964 |
| Portugal | : | 473 | 472 | 534 |
| Sweden | 40 949 | 41 749 | 41 574 | 36 573 |
| United Kingdom | 36 287 | 36 884 | 35 813 | 33 851 |

(1) National transport not declared.
Source: Eurostat (Maritime database).

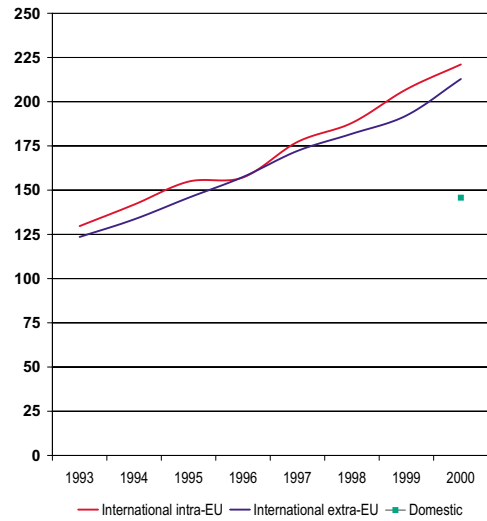
Graph 5.41: Maritime transport: share of national, international intra-EU and international extra-EU passenger transport, 2000



(1) National passengers counted twice (at port of embarkation and disembarkation) - (2) National transport not declared.
Source: Eurostat.

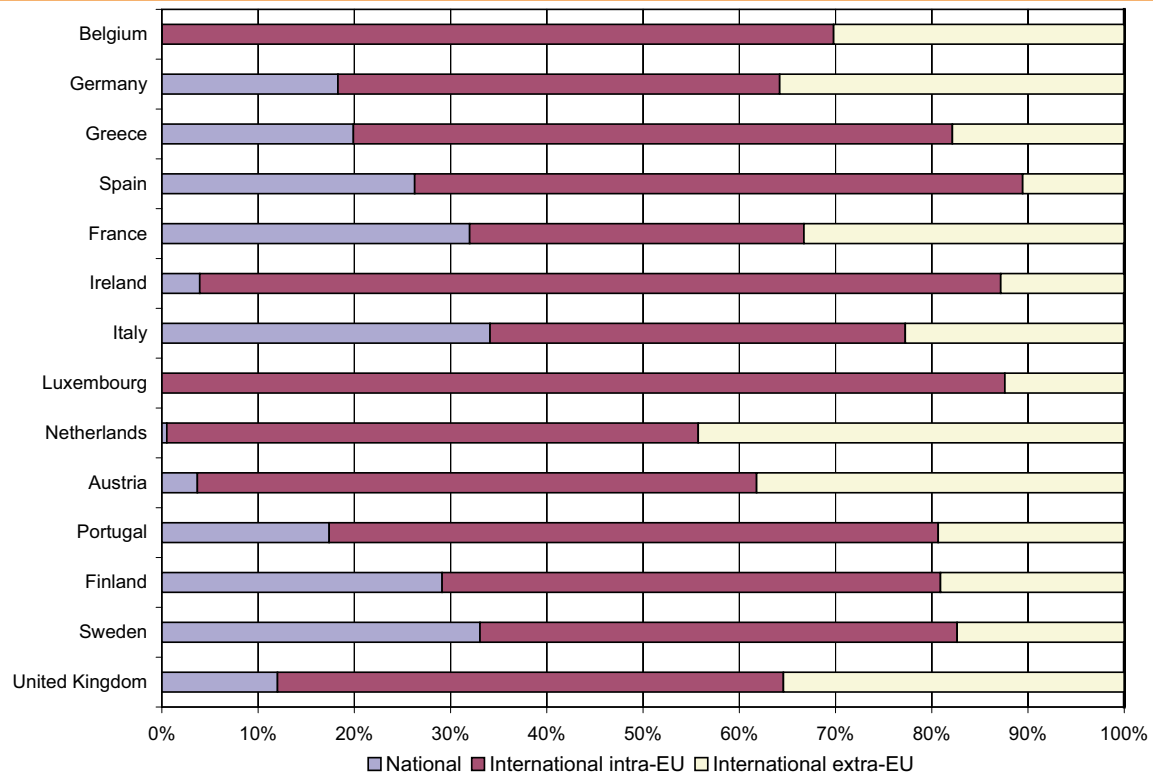
trend and are quite similar in number (2000: 221 million passengers on intra-EU flights, 213 million passengers on extra-EU flights). Please note that data for domestic air transport are only available for 2000 (146 million passengers on domestic flights in the various EU countries). Graph 5.43 details the above-mentioned breakdown by individual Member State for the year 2000. Passengers on domestic flights obviously play a considerable role in geographically large Member States. Conversely, domestic figures are either very low or non-existent for smaller countries like Belgium, the Netherlands or Luxembourg.

Graph 5.42: Evolution of passenger air transport in EU-15, in million passengers



Source: Eurostat.

Graph 5.43: Passenger air transport: distribution between national, international intra-EU and international extra-EU transport, 2000



Note: no data available for Denmark.
Source: Eurostat.

5.2.2. National passenger transport

The statistics on national passenger transport performances 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 motorised inland transport modes (passenger cars, buses and coaches and railways).

Furthermore, it should be noted that the tables indicating the passenger kilometres performed (Tables 5.44 to 5.46) apply to those on the national territory. This thus includes the national lags of international trips.

The second part of this chapter is dedicated to passenger transport by sea and air. Compared to the other transport modes, Eurostat's data collection on maritime and air transport is relatively recent. Passenger kilometre indications for these two modes are not yet available; and the data presented for those modes refer to the number of passengers at arrival and departure.

EU average: 10 000 km per year in a car

At EU-15 level, transport performance by car increased by 138% between 1970 and 1999 (see Table 5.44 – outlining the transport performance on the national territory). 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 1999: In Denmark, France, Italy and Luxembourg passenger car use appears to be the highest with an average performance between 11 500 and 12 500 km per person per year whereas the Greek, with an average of 6 930 km, obviously use their cars for shorter distances. In addition, it should be noted that Greece only offers 275 cars per 1 000 inhabitants (EU-average: 460 — see Chapter 3 — Means of transport).

Danish, Greek and Luxembourg citizens use buses double as much as the average EU

Between 1970 and 1999, the average transport by buses and coaches in EU-15 has been increasing by nearly 50%, arriving at a total of 403 billion pkm (see Table 5.45). 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 Italy (+ 182% between 1970 and 1999) and Portugal (+ 164%).

With 90.2 billion pkm in 1999, Italy offers the highest figure in the EU in absolute terms — this corresponds to 4.3 km per person per day. It is however the Danish, Luxembourg and Greek population that travels more on bus and coach

Table 5.44: Transport performed by passenger cars (1 000 million pkm)

| | 1970 | 1980 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 1999 pkm per person per year |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------------|
| Belgium | 49.3 | 65.4 | 80.7 | 91.2 | 92.4 | 94.0 | 95.7 | 98.4 | 9 620 |
| Denmark | 33.3 | 38.1 | 47.8 | 54.3 | 55.8 | 57.1 | 58.5 | 66.5 | 12 496 |
| Germany | 394.6 | 513.7 | 683.1 | 730.5 | 730.8 | 735.3 | 740.3 | 749.5 | 9 129 |
| Greece | 8.6 | 27.6 | 48.8 | 58.8 | 61.7 | 64.4 | 68.0 | 73.0 | 6 930 |
| Spain | 77.2 | 172.2 | 225.0 | 262.0 | 272.0 | 283.0 | 296.0 | 325.2 | 8 250 |
| France | 304.7 | 452.5 | 585.6 | 640.1 | 649.1 | 659.5 | 678.6 | 699.6 | 11 838 |
| Ireland | 11.0 | 17.6 | 18.1 | 23.2 | 25.1 | 27.1 | 28.5 | 31.0 | 8 254 |
| Italy | 211.9 | 324.0 | 522.6 | 614.7 | 627.4 | 638.8 | 643.6 | 661.4 | 11 467 |
| Luxembourg | 2.1 | 2.7 | 4.0 | 4.7 | 4.8 | 4.9 | 5.0 | 5.0 | 11 562 |
| Netherlands | 66.3 | 107.1 | 62.4 | 68.1 | 65.7 | 67.0 | 68.5 | 69.0 | 8 526 |
| Portugal | 13.8 | 29.0 | 40.5 | 62.0 | 66.3 | 70.8 | 75.6 | 81.6 | 8 169 |
| Finland | 23.7 | 33.9 | 51.2 | 50.1 | 50.4 | 51.9 | 53.3 | 54.9 | 10 628 |
| Sweden | 55.4 | 66.7 | 90.0 | 85.0 | 83.0 | 83.0 | 84.0 | 84.2 | 9 506 |
| United Kingdom | 303.5 | 396.0 | 600.2 | 609.0 | 619.1 | 627.5 | 630.0 | 633.0 | 10 647 |
| EU-15 | 1 588 | 2 294 | 3 196 | 3 500 | 3 550 | 3 616 | 3 676 | 3 784 | 10 066 |
| index 1970 = 100 | 100 | 144 | 201 | 220 | 223 | 228 | 231 | 238 | |
| Modal share % (1) | 74.0 | 76.2 | 79.1 | 79.5 | 79.3 | 79.3 | 79.1 | 79.0 | |

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

with 5.8, 5.7 and 5.6 km per day respectively. The high figure for Greece can partly be explained by a restricted rail network. The Danish figure constitutes the double of the EU average (2.9 km).

Slow growth of rail transport

Compared to the other modes, transport performances of rail (on national territory) experienced only a modest increase: + 35% at EU level between 1970 and 1999 (see Table 5.46). Since the early 1990s, growth has been slow in most countries and a certain decrease can be observed in 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 (around + 85% for both countries). All the Scandinavian countries as well as France display an increase between 50 and 60%.

It is on average the French who travel most by rail (3.1 km per person per day) in 1999, followed by the Danish (2.8 km) and Austrians (2.7 km). The EU-15 average in 1999 can be established at 2.1 km per person per day, the same average distance as the previous year.

Longest daily distance for Danish and Luxembourg citizens

Graph 5.47 presents the average daily distances travelled in 1999 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 intends to give an impression on the availability and acceptance of the different modal networks.

With an average of 42.8 km per person per day in 1999, the Danes are by far the most mobile in the EU (considering distances travelled in passenger cars, trains and buses/coaches only, excluding cycling and walking). Luxembourg follows with 39.3 km. The population in Greece and Portugal travels least with an average of 25.0 and 26.7 km respectively. The share of rail in Greece is low and can partly be explained by a relatively poor rail network density (Greece: 17.4 km/1 000 km², EU-15 average: 47.2 km/1 000 km² — see Chapter 2.2 — Physical characteristics of transport networks).

Remote islands boost the number of passengers on domestic flights

As mentioned at the first paragraph of this chapter, Eurostat's aviation data collection is relatively recent (since 1993) and does not yet include passenger kilometre (pkm) data. Furthermore, the reference year 2000 is the first year where a near complete set of detailed data on domestic traffic is available.

The total number of passengers carried in domestic air traffic in the various EU countries in 2000 can be estimated at close to 150 million. Table 5.48 indicates that large Member States

Table 5.45: Transport performed by buses and coaches (1000 million pkm)

| | 1970 | 1980 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 1999 pkm per person per year |
|-------------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|------------------------------|
| Belgium | 9.3 | 9.1 | 10.9 | <i>12.5</i> | <i>11.4</i> | <i>11.9</i> | <i>12.0</i> | <i>12.2</i> | 1 193 |
| Denmark | 4.6 | 7.3 | 9.3 | 10.6 | 11.4 | 11.2 | 11.1 | 11.2 | 2 105 |
| Germany | 67.7 | 90.0 | 73.1 | 68.5 | 68.3 | 68.0 | 68.2 | 68.0 | 828 |
| Greece | 9.4 | 15.6 | 17.7 | 20.2 | 20.4 | 20.7 | 21.2 | 21.5 | 2 041 |
| Spain | 20.9 | 28.1 | 33.4 | 39.6 | 44.0 | 44.0 | 49.4 | 50.0 | 1 268 |
| France | 25.2 | 38.0 | 41.3 | 41.6 | 42.4 | 42.0 | 42.7 | 40.7 | 689 |
| Ireland | 3.3 | 4.5 | 3.9 | 5.2 | 5.3 | 5.5 | 5.7 | 5.9 | 1 571 |
| Italy | 32.0 | 57.8 | 84.0 | 87.1 | 88.7 | 88.5 | 90.9 | 90.2 | 1 563 |
| Luxembourg | <i>0.8</i> | <i>0.8</i> | <i>0.9</i> | <i>0.9</i> | <i>0.9</i> | <i>0.9</i> | <i>0.9</i> | <i>0.9</i> | 2 081 |
| Netherlands | 11.1 | 13.2 | 13.0 | 14.8 | 15.0 | 14.7 | 15.0 | 15.1 | 955 |
| Austria | 9.1 | 9.8 | 8.7 | 10.5 | 12.5 | <i>12.5</i> | <i>12.7</i> | <i>12.9</i> | 1 594 |
| Portugal | 4.4 | 7.6 | 10.3 | 11.3 | 11.1 | 11.6 | 11.6 | 11.5 | 1 149 |
| Finland | 7.0 | 8.5 | 8.5 | 8.0 | 8.0 | 8.0 | 7.8 | 7.6 | 1 471 |
| Sweden | 5.5 | 7.3 | 9.0 | 8.8 | 9.3 | 9.4 | 10.3 | 10.6 | 1 197 |
| United Kingdom | 60.2 | 52.2 | 46.2 | 44.3 | 44.2 | 44.2 | 43.0 | 45.0 | 757 |
| EU-15 | 270.5 | 349.8 | 370.0 | 383.9 | 392.9 | 393.1 | 402.5 | 403.3 | 1 073 |
| index 1970 = 100 | 100 | 129 | 137 | 142 | 145 | 145 | 149 | 149 | |
| Modal share % (1) | 12.6 | 11.6 | 9.2 | 8.7 | 8.8 | 8.6 | 8.7 | 8.4 | |

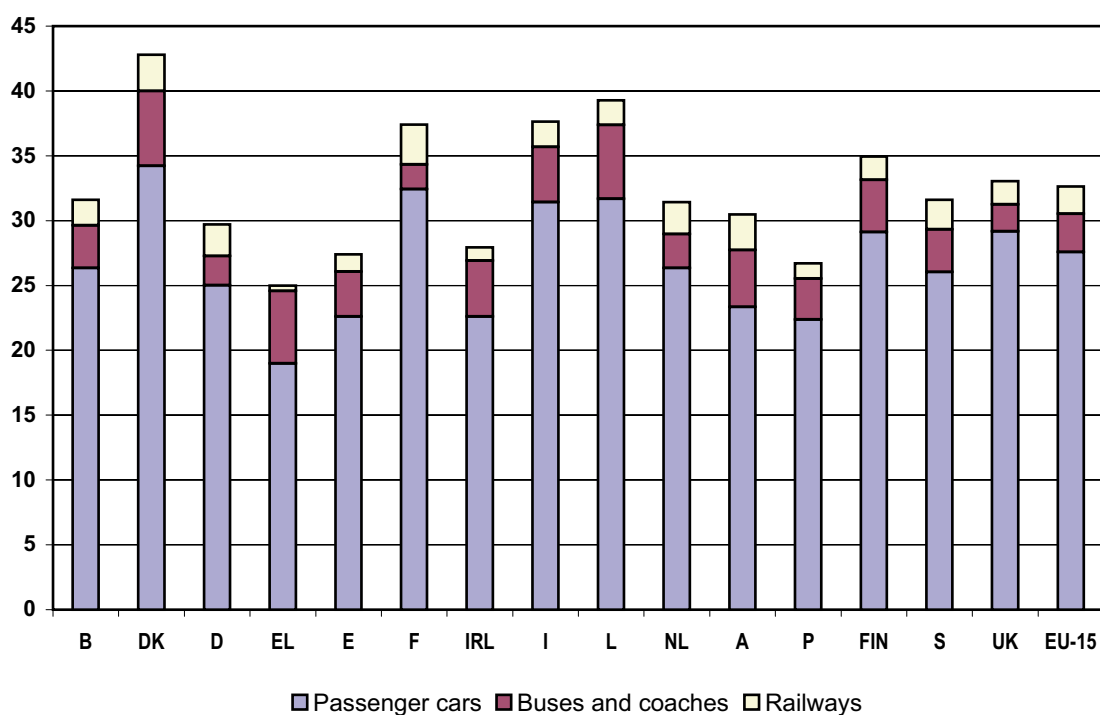
(1) Considered: passenger cars; buses and coaches; tram, metro and rail; air.
Sources: ECMT, Eurostat, national statistics, estimates (italic).

Table 5.46: Transport performed by railways (1 000 million pkm)

| | 1970 | 1980 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 1999 pkm per person per year |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------------|
| Belgium | 7.6 | 7.0 | 6.5 | 6.8 | 6.8 | 7.0 | 7.1 | 7.4 | 724 |
| Denmark | 3.6 | 4.5 | 5.1 | 5.0 | 4.9 | 5.2 | 5.6 | 5.4 | 1 015 |
| Germany | 56.9 | 63.0 | 62.1 | 69.0 | 69.2 | 67.9 | 66.5 | 72.8 | 887 |
| Greece | 1.5 | 1.5 | 2.0 | 1.6 | 1.8 | 1.9 | 1.8 | 1.6 | 152 |
| Spain | 15.0 | 14.8 | 16.7 | 16.6 | 16.6 | 17.9 | 18.9 | 19.2 | 487 |
| France | 41.0 | 54.7 | 63.8 | 55.6 | 59.8 | 61.8 | 64.3 | 66.5 | 1 125 |
| Ireland | 0.8 | 1.0 | 1.2 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 373 |
| Italy | 34.9 | 42.9 | 44.7 | 43.9 | 44.8 | 43.6 | 41.5 | 41.0 | 711 |
| Luxembourg | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 694 |
| Netherlands | 8.0 | 8.9 | 11.1 | 14.0 | 14.1 | 14.4 | 14.8 | 14.3 | 904 |
| Austria | 6.4 | 7.6 | 8.7 | 9.8 | 9.9 | 8.3 | 8.2 | 8.1 | 1 001 |
| Portugal | 3.5 | 6.1 | 5.7 | 4.8 | 4.5 | 4.6 | 4.6 | 4.3 | 430 |
| Finland | 2.2 | 3.2 | 3.3 | 3.2 | 3.3 | 3.4 | 3.4 | 3.4 | 658 |
| Sweden | 4.6 | 7.0 | 6.0 | 6.4 | 6.4 | 6.4 | 7.1 | 7.4 | 835 |
| United Kingdom | 30.6 | 30.4 | 33.4 | 30.2 | 32.3 | 34.5 | 35.4 | 38.8 | 653 |
| EU-15 | 216.7 | 252.8 | 270.5 | 268.3 | 275.9 | 278.6 | 280.9 | 291.9 | 776 |
| index 1970 = 100 | 100 | 117 | 125 | 124 | 127 | 129 | 130 | 135 | |
| Modal share % (1) | 10.1 | 8.4 | 6.7 | 6.1 | 6.2 | 6.1 | 6.0 | 6.1 | |

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

Graph 5.47: Average daily distance travelled per person in 1999 (km)



Source: DG Energy and Transport.

(France, Spain, Italy, Germany and the United Kingdom) obviously account for the highest passenger volumes. Smaller Member States like the Netherlands and Belgium display very low passenger figures or none at all (Luxembourg). It should be noted that certain countries feature islands or island groups that are at considerable distance from the mainland, such as the Canary Islands (Spain) or Madeira and the Açores (Portugal). Also, domestic air passenger transport declared by France includes the traffic with the overseas territories (Réunion, French Guyana, Guadeloupe and Martinique). The relatively high passenger figure for Greece can be explained by the impressive amount of islands offering air connections with the mainland.

Keeping in mind the very different passenger volumes forwarded in domestic air transport, Table 5.49 shows the five most important individual airports handling air passengers on domestic flights. One exception applies to France where authorities have declared for the Paris airport system (composed of Charles-de-Gaulle, Orly and Le Bourget airports). The airports of the respective capitals always take the highest individual share in domestic air transport (except Germany, where Frankfurt-Main comes first) although substantial differences are registered: 59% of all domestic air passengers in Ireland have passed through Dublin airport, but only 19% of United Kingdom domestic passengers used London/Heathrow.

Italian mainland – Sicily is by far the most important national ferry-route

The characteristics of national maritime transport of passengers in the individual Member States appear to be quite heterogeneous. Based on relatively recent EU reporting requirements, a near full set of data on national passenger transport (only Finland did not report national transport) is available for 2000. As outlined in the previous chapter (Graph 5.41) and presented in the second column of Table 5.50, the share of national transport can be substantial: this is notably the case for Greece, Spain, Italy and especially Portugal. As for air transport, the geographical characteristics (islands) often explain the high volumes. The numerous islands of Greece and Denmark, the Balears and Canary Islands for Spain and the Madeira and Açores archipelago for Portugal explain the relatively high passenger figures. One figure however excels: Italy registered close to 40 million passengers in its ports. A couple of important ferry services are responsible for this impressive number, notably the link Reggio Calabria – Messina (linking the Italian mainland and Sicily) and the ports of Napoli and Capri, also offering frequent connections, mainly during the holiday season. The majority of the 7 million persons registered in German ports were counted in the small port of Norddeich (German North-Sea coast), mainly heading for the island of Norderney, a popular holiday resort.

Table 5.48: Development of domestic air passenger transport 1995-2000 (in 1000 passengers)

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|----------------|----------|----------|----------|----------|----------|----------|
| Belgium | 1.1 | 1.1 | 0.6 | 2.9 | 4.0 | 7.9 |
| Denmark | 2 641.1 | 2 806.4 | 2 703.8 | : | : | : |
| Germany | 17 832.2 | 17 598.4 | 18 737.5 | 19 875.5 | 20 288.7 | 22 075.8 |
| Greece | : | : | : | 4 390.4 | 5 165.8 | 6 111.0 |
| Spain | : | : | : | : | 25 148.2 | 28 884.2 |
| France | : | : | 26 592.0 | 28 517.0 | 30 413.2 | 30 813.5 |
| Ireland | 439.5 | 469.3 | 447.4 | : | 552.6 | 656.4 |
| Italy | 15 428.4 | 17 095.2 | 19 770.7 | : | 20 601.0 | 22 935.0 |
| Luxembourg | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | 157.5 | 185.9 | 198.7 | 204.6 | 180.0 | 210.9 |
| Austria | 384.8 | 411.7 | 428.6 | 475.4 | 501.4 | 545.3 |
| Portugal | 1 708.9 | 1 761.8 | 1 873.8 | 2 108.4 | 2 565.3 | 2 821.4 |
| Finland | : | : | : | 2 993.0 | 2 855.0 | 3 121.9 |
| Sweden | 6 875.7 | 6 604.4 | 6 819.6 | 7 260.6 | 7 695.8 | 8 043.0 |
| United Kingdom | 14 100.0 | 15 300.0 | 16 000.0 | 16 800.0 | 17 500.0 | 19 500.9 |

Source: Eurostat, national statistics (UK 1995-1999).

Table 5.49: Top 5 airports in domestic air transport, 2000

| Country | Airport | Number of passengers (in 1 000) | Share in domestic transport |
|------------------------|----------------------|---------------------------------|-----------------------------|
| Belgium ⁽¹⁾ | Bruxelles/National | 7.9 | 100% |
| Germany | Frankfurt-Main | 8 681.4 | 20.2% |
| | München | 8 268.6 | 19.2% |
| | Berlin/Tegel | 5 972.4 | 13.9% |
| | Hamburg | 4 270.7 | 9.9% |
| | Düsseldorf | 3 916.8 | 9.1% |
| Greece | Athens | 5 087.0 | 43.7% |
| | Thessaloniki | 1 523.6 | 13.1% |
| | Iraklion | 989.1 | 8.5% |
| | Rhodos | 720.5 | 6.2% |
| | Chania | 515.1 | 4.4% |
| Spain | Madrid/Barajas | 16 621.8 | 28.8% |
| | Barcelona | 10 094.0 | 17.5% |
| | Palma de Mallorca | 4 803.1 | 8.3% |
| | Las Palmas | 2 891.8 | 5.0% |
| | Tenerife - Norte | 2 359.5 | 4.1% |
| France | Airport System Paris | 24 420.2 | 41.7% |
| | Nice | 4 848.0 | 8.3% |
| | Marseille | 4 328.5 | 7.4% |
| | Toulouse | 3 800.1 | 6.5% |
| | Lyon/Satolas | 2 664.9 | 4.6% |
| Ireland | Dublin | 660.0 | 59.4% |
| | Cork | 287.3 | 25.8% |
| | Shannon | 164.4 | 14.8% |
| Italy | Roma/Fiumicino | 12 552.8 | 27.5% |
| | Milano/Malpensa | 5 536.6 | 12.1% |
| | Milano/Linate | 4 189.4 | 9.2% |
| | Catania | 3 122.6 | 6.8% |
| | Palermo | 2 716.6 | 6.0% |
| Netherlands | Amsterdam | 170.5 | 44.0% |
| | Maastricht | 110.2 | 28.4% |
| | Eindhoven | 79.0 | 20.4% |
| | Groningen | 25.9 | 6.7% |
| | Rotterdam | 2.2 | 0.6% |
| Austria | Wien/Schwechat | 505.6 | 46.6% |
| | Innsbruck | 168.0 | 15.5% |
| | Graz | 139.1 | 12.8% |
| | Klagenfurt | 120.1 | 11.1% |
| | Linz | 76.2 | 7.0% |
| Portugal | Lisboa | 2 173.2 | 52.0% |
| | Porto | 780.7 | 18.7% |
| | Ponta Delgada | 570.3 | 13.6% |
| | Faro | 264.8 | 6.3% |
| | Horta | 160.9 | 3.9% |
| Finland | Helsinki | 3 043.8 | 48.8% |
| | Oulu | 668.9 | 10.7% |
| | Rovaniemi | 288.4 | 4.6% |
| | Kuopio | 279.5 | 4.5% |
| | Vaasa | 227.4 | 3.6% |
| Sweden | Stockholm/Arlanda | 6 758.2 | 44.3% |
| | Göteborg | 1 395.1 | 9.1% |
| | Malmö | 1 308.7 | 8.6% |
| | Stockholm/Bromma | 987.0 | 6.5% |
| | Luleå | 927.0 | 6.1% |
| United Kingdom | London/Heathrow | 7 403.3 | 19.1% |
| | Edinburgh | 3 865.3 | 10.0% |
| | Glasgow | 3 443.3 | 8.9% |
| | London/Gatwick | 2 911.7 | 7.5% |
| | Manchester | 2 859.7 | 7.4% |

(1) Belgium reported for Brussels only.
Source : Eurostat.

Table 5.50: Maritime transport: passengers registered in the main ports in national traffic, 2000

| | Passengers carried (1000) | Share in total traffic (%) |
|----------------|---------------------------|----------------------------|
| Belgium | 4 | 0 |
| Denmark | 9 140 | 23 |
| Germany | 7 034 | 36 |
| Greece | 12 150 | 85 |
| Spain | 12 994 | 75 |
| France | 4 851 | 18 |
| Ireland | 0 | 0 |
| Italy | 39 896 | 87 |
| Netherlands | 0 | 0 |
| Portugal | 354 | 99 |
| Finland | : | : |
| Sweden | 1 302 | 4 |
| United Kingdom | 4 043 | 12 |

Source: Eurostat.

5.2.3. International passenger transport

Unlike the international transport of goods, data availability on international transport of passengers is not completely covered by various EU legal acts on the statistical returns from the transport sector. This is notably the case for road, inland waterway and rail transport. International transport by inland waterways is anyhow very limited. The previous chapter offered an overview of the amount of passenger kilometres of passenger cars, buses and coaches as well as railways performed on the national territory. It is recalled that these figures include the national legs of international journeys.

Data availability poorer for passenger transport

For statistical returns from the maritime and air transport domain however – covered by relatively recent legal acts – detailed data on passenger transport are available. Subsequently, this chapter will focus on those two transport domains. Data can not yet be expressed in the shape of passenger kilometres performed (which usually offers a good impression of quantity and distance covered) but rather on the basis of the number of passengers carried. Detailed information on the various transport links offer nevertheless quite a good overview of the situation in these sectors.

Double counting for intra-EU transport

For maritime transport, figures will focus on results for the reference year 2000, due to the fact that various derogations in statistical reporting were still applicable for previous years.

It is estimated that close to 160 million passengers have passed through port installations in the EU. Table 5.51 outlines that the numbers in international intra-EU are far higher than those registered in international extra-EU transport. There are basically two reasons for this : double counting in intra-EU transport applies since passengers are counted once by the port authority upon embarkation and another time (by another EU Member State) upon disembarkation. This double counting is avoided in extra-EU transport where EU port authorities register passengers only once (either embarking or disembarking – and referring to different journeys). The second reason is the fact that a very high share of the passengers is registered on the main European ferry routes, which are nearly all intra-EU connections.

Keeping this in mind, it appears that for total transport, Swedish and Danish ports registered the highest number of passengers (well over 30 million) closely followed by the United Kingdom with over 28 million.

By merely looking at the difference in passenger numbers in intra- and extra-EU passenger numbers a rough pattern can be identified. The

Table 5.51: International maritime passenger traffic 2000: passengers counted in ports - by country

| | International intra-EU transport - Number of passengers (1000) | International extra-EU transport - Number of passengers (1000) | Total international transport - Number of passengers (1000) |
|----------------|--|--|---|
| Belgium | 1 515 | 0 | 1 515 |
| Denmark | 27 113 | 4 143 | 31 256 |
| Germany | 10 429 | 2 202 | 12 631 |
| Greece | 2 040 | 93 | 2 133 |
| Spain | 333 | 958 | 1 291 |
| France | 20 627 | 826 | 21 453 |
| Ireland | 2 797 | : | 2 797 |
| Italy | 4 530 | 1 509 | 6 039 |
| Luxembourg | 0 | 0 | 0 |
| Netherlands | 2 002 | 1 | 2 003 |
| Austria | 0 | 0 | 0 |
| Portugal | 1 | 3 | 4 |
| Finland | 9 347 | 6 375 | 15 722 |
| Sweden | 31 259 | 2 719 | 33 978 |
| United Kingdom | 28 319 | 287 | 28 606 |

Source: Eurostat.

high intra-EU passenger numbers for Sweden and Denmark for instance go to the account of the various important ferry links (for Denmark these are mainly those with Sweden and Germany, for Sweden those with Denmark, Germany and Finland). The high figures for the United Kingdom and France suggest the intensive (intra-EU) cross-channel traffic.

Port-to/from-Maritime Coastal Area suggest main ferry links

This pattern can be confirmed by looking at the information displayed in Table 5.52, which details the top-20 routes in international maritime passenger transport (both intra- and extra-EU transport). Unlike air transport, detailed information on port-to-port transport cannot be disclosed. Thus, Table 5.52 outlines port-to/from-MCA (Maritime Coastal Area) information. The cross-Channel passenger transport can be found in the two first positions as well as position 10 and the traffic across the Øresund between Denmark and Sweden mainly in positions 3, 4, 12 and 13.

Within the top-20, only two port-to/from-MCA relations refer to extra-EU passenger transport : the relatively short distance between Helsinki and Estonia (rank 6) and Hirtshals (in the very north of Denmark) – Norway relation.

Air transport at EU level: +8% per year since 1993

It has already been outlined in Chapter 5.2.1 (*Passenger transport – General development*) that air transport has been growing extremely fast over the last decades. Detailed data on the development of air transport in the various EU Member States are available at Eurostat since 1993.

Air transport at EU level (both intra- and extra-EU) has been growing at an average pace of 8% every year since 1993 (see Table 5.53). Growth in 2000 compared to the previous year could be established at 8.7%. Growth in Sweden and Ireland has been particularly strong in the 1993-2000 period, registering an average annual growth rate of 17.7% and 16.3% respectively. But even the country with the slowest average growth (Greece) still displays +5.1%. Short-term growth was highest in Italy, where an increase of 13.7% was recorded in 2000 compared to 1999.

Highest extra-EU shares for countries with long-haul 'gateways'

Taking into account departures and arrivals, the share of intra-EU transport is high in most countries: in general over 60% except for Germany, France, the Netherlands and the UK (see Graph 5.54). The countries displaying the highest extra-EU shares coincide with those having Europe's major airports considered as gateways for inter-

Table 5.53: Total international air passenger transport: development by country

| | Change 1999-2000 (%) | Average annual growth 1993-2000 (%) |
|----------------|----------------------|-------------------------------------|
| EU-15 | + 8.68 | + 8.00 |
| Belgium | + 7.94 | +11.57 |
| Denmark | : | : |
| Germany | + 7.26 | + 6.98 |
| Greece | + 9.70 | + 5.14 |
| Spain | + 6.44 | + 8.76 |
| France | + 8.69 | + 7.04 |
| Ireland | + 9.17 | + 16.34 |
| Italy | + 13.67 | + 9.37 |
| Luxembourg | + 5.18 | + 6.69 |
| Netherlands | + 8.43 | + 9.91 |
| Austria | + 7.11 | + 7.62 |
| Portugal | + 8.09 | + 7.26 |
| Finland | + 9.48 | : |
| Sweden | + 7.17 | + 17.67 |
| United Kingdom | + 6.99 | + 7.45 |

Source: Eurostat.

continental and long-haul air traffic, like the Paris airports, Amsterdam-Schiphol, Frankfurt/Main and the London airports.

Graph 5.55 visualises the overall growth of international air transport and in the meantime gives an impression of the structure of the main relations. About half (51.7%) of the international passengers registered on the airports of the European Union are travelling on intra-EU flights. Amongst the passengers on extra-EU flights, relations with other European countries than those of the EU (15.8% of the total) as well as North America (13%) dominate.

The shares of the individual countries in the total extra-EU passenger transport vary considerably. The first row of Table 5.56 expresses the total share of the Member States in extra-EU passenger figures. With 27.6%, the UK leads by a substantial margin, followed by Germany and France with 20.9% and 15.5% respectively.

Germany first in traffic with non-EU Europe, France with Africa

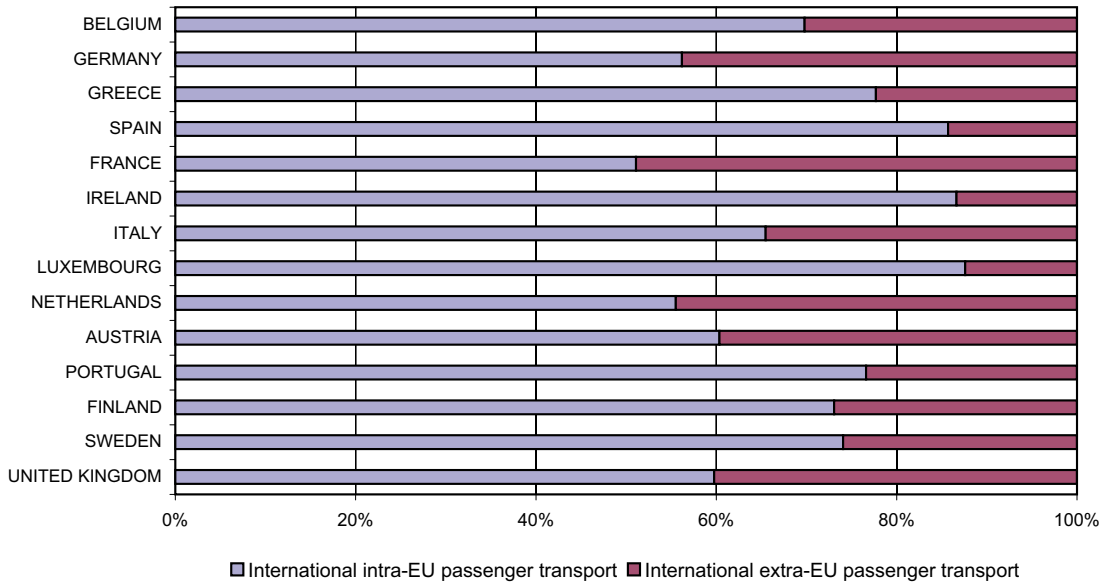
Germany leads in traffic to non-EU European countries with 27.1% of the passenger carried, well in front of the United Kingdom with 20.7%. Instead, the UK has still a clear dominance in traffic with America (36%) although the share slightly dropped compared to 1999 (37.7%). The UK is followed by Germany, France and the Netherlands. The latter three countries together still handle fewer passengers with America as the United Kingdom alone.

Table 5.52: Top 20 routes in international maritime passenger transport, 2000 (1000 passengers)

| | Between: Port | and: Maritime Coastal Area | Inwards | Outwards | Total |
|----|------------------|--------------------------------|---------|----------|--------|
| 1 | Calais/F | United Kingdom | 7 579 | 7 473 | 15 052 |
| 2 | Dover/UK | France: Atlantic and North Sea | 7 466 | 7 584 | 15 050 |
| 3 | Helsingborg/S | Denmark | 6 740 | 6 717 | 13 457 |
| 4 | Helsingør/DK | Sweden: Baltic | 6 659 | 6 663 | 13 322 |
| 5 | Stockholm/S | Finland | 3 615 | 3 622 | 7 237 |
| 6 | Helsinki/FIN | Estonia | 3 117 | 3 110 | 6 227 |
| 7 | Rødby/DK | Germany: Baltic | 2 764 | 2 666 | 5 430 |
| 8 | Puttgarden/D | Denmark | 2 666 | 2 764 | 5 430 |
| 9 | Turku/FIN | Sweden: Baltic | 1 762 | 1 752 | 3 514 |
| 10 | Portsmouth/UK | France: Atlantic and North Sea | 1 482 | 1 496 | 2 977 |
| 11 | Helsinki/FIN | Sweden: Baltic | 1 354 | 1 337 | 2 691 |
| 12 | København/DK | Sweden: Baltic | 1 326 | 1 328 | 2 654 |
| 13 | Malmö/S | Denmark | 1 294 | 1 270 | 2 564 |
| 14 | Holyhead/UK | Ireland | 1 273 | 1 245 | 2 518 |
| 15 | Frederikshavn/DK | Sweden: North Sea | 1 153 | 1 156 | 2 309 |
| 16 | Göteborg/S | Denmark | 1 156 | 1 153 | 2 309 |
| 17 | Mariehamn/FIN | Sweden: Baltic | 946 | 939 | 1 884 |
| 18 | Hirtshals/DK | Norway | 943 | 911 | 1 855 |
| 19 | Rotterdam/NL | United Kingdom | 816 | 817 | 1 632 |
| 20 | Trelleborg/S | Germany: Baltic | 730 | 747 | 1 477 |

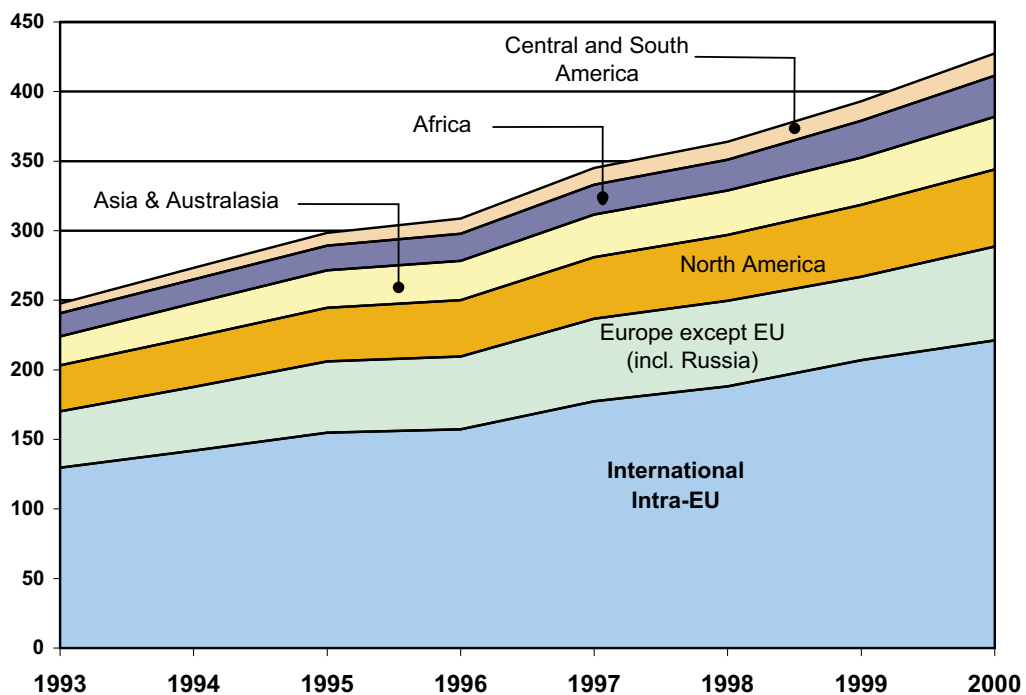
Source: Eurostat.

Graph 5.54: Distribution between international intra-EU and extra-EU passenger transport by air in 2000



No data available for Denmark.
Source: Eurostat.

Graph 5.55: Development of international passenger air transport by world region between 1993 and 2000 (million passengers)



Source: Eurostat.

The same ranking prevails for traffic with Asia and Australasia, although a slight decline for the United Kingdom can be observed here as well (from 34.7% in 1999 to 33.7% in 2000).

As in previous years, France holds the first position in traffic with Africa. It should however be said that the high share of 34.4% is mainly due to important traffic with North African destinations. If North Africa would be considered separately, the French share would be even higher. Germany comes second with 17.9% followed by the United Kingdom (15%) and Italy (12%).

Strong weight of North Africa

Graph 5.57 turns back to extra-EU transport at the level of the entire EU, with however a more detailed view on 'world destinations'. The main share in extra-EU air transport in 1999 is taken

by non-EU European countries (29.1% - European Republics of the ex-USSR not considered) closely followed by North America (26.1%).

The African continent accounts for 13.9% of extra-EU traffic; however, North Africa alone (with popular holiday destinations in Morocco and Tunisia) is responsible for 9.2% of this share. Far-East destinations account for 8.8%, the Near and Middle East for nearly 5.7% of the traffic. All other destinations have a share of well under 5%.

London/Heathrow the busiest, both in intra- and extra-EU passenger volumes

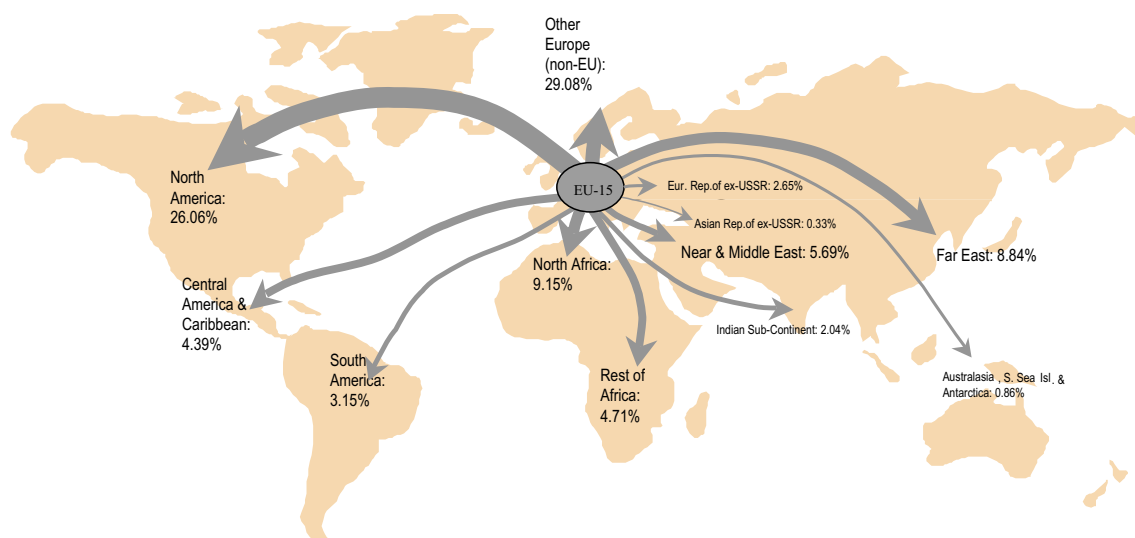
Considering either international intra-EU or international extra-EU passenger transport, the airport of London/Heathrow remains by far the busiest airport.

Table 5.56: Extra-EU passenger air transport to world regions in 2000 : shares of individual Member States (%)

| | B | DK | D | EL | E | F | IRL | I | L | NL | A | P | FIN | S | UK | EU-15 |
|-------------------------------|-----|----|------|-----|-----|------|-----|------|-----|------|-----|-----|-----|-----|------|-------|
| Total | 3.1 | : | 20.9 | 2.7 | 5.6 | 15.5 | 1.0 | 7.4 | 0.1 | 8.7 | 2.7 | 1.5 | 1.0 | 2.0 | 27.6 | 100 |
| Europe except EU | 3.5 | : | 27.1 | 5.1 | 7.5 | 9.2 | 0.6 | 5.8 | 0.2 | 7.4 | 5.2 | 1.2 | 2.0 | 4.4 | 20.7 | 100 |
| America | 2.7 | : | 16.5 | 0.7 | 7.0 | 13.9 | 2.3 | 6.7 | 0.0 | 9.8 | 0.6 | 2.5 | 0.3 | 0.9 | 36.0 | 100 |
| Asia & Australasia | 1,3 | : | 20,7 | 3,2 | 1,4 | 15,2 | 0,0 | 7,9 | 0,0 | 11,3 | 3,0 | 0,0 | 1,0 | 1,2 | 33,7 | 100 |
| Africa | 5.7 | : | 17.9 | 0.9 | 3.5 | 34.4 | 0.3 | 12.0 | 0.2 | 5.5 | 1.9 | 1.6 | 0.3 | 0.7 | 15.0 | 100 |

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

Graph 5.57: Extra-EU passenger air transport 2000: share in world destinations (% of total extra-EU passenger transport)



Source: Eurostat.

Table 5.58: Top-15 airports - Total passengers carried in international intra-EU transport

| Rank 2000 | Airport | Total pass. carried 2000 | Change 1999-2000 (%) | Rank 1999 |
|-----------|----------------------|--------------------------|----------------------|-----------|
| 1 | London/Heathrow | 24 373 689 | + 1.1 | 1 |
| 2 | Airport system/Paris | 22 831 619 | + 8.2 | 2 |
| 3 | Amsterdam/Schiphol | 21 293 303 | + 6.5 | 3 |
| 4 | Frankfurt (Main) | 16 772 699 | + 6.3 | 4 |
| 5 | Brussels/National | 15 065 947 | + 5.9 | 6 |
| 6 | London/Gatwick | 14 913 451 | + 3.7 | 5 |
| 7 | Palma de Mallorca | 13 738 940 | - 0.8 | 7 |
| 8 | Dublin | 11 593 568 | + 7.2 | 9 |
| 9 | Manchester Internat. | 10 739 443 | + 4.3 | 10 |
| 10 | Madrid/Barajas | 9 802 490 | + 19.9 | 12 |
| 11 | London/Stansted | 9 629 910 | + 33.5 | 15 |
| 12 | Munich | 9 158 719 | + 6.1 | 11 |
| 13 | Stockholm/Arlanda | 8 338 570 | + 5.1 | 14 |
| 14 | Milano/Malpensa | 7 980 770 | + 34.9 | 22 |
| 15 | Düsseldorf | 7 835 741 | - 4.0 | 13 |

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

Table 5.58 displays the 15 busiest airports in intra-EU passenger transport in 2000. The ranking is based on the total number of passengers at arrival and departure within the EU, both in scheduled and non-scheduled traffic. Compared to 1999, the 2000 ranking of the first 10 airports did not change much. In positions 10 to 15 however, the growth of the airports Madrid/Barajas (+ 19.9%), London/Stansted (+ 33.5%) and Milano/Malpensa (+ 34.9%) is substantial. Best climber in the ranking was Milano/Malpensa, which was still in 22nd position in 1999 and finds itself on 14th position in 2000. London/Stansted was 21st in 1998, 15th in 1999 and 11th in 2000.

Table 5.59: Top-15 airports - passengers carried in extra-EU transport

| Rank 2000 | Airport | Total pass. carried 2000 | Change 1999-2000 (%) | Rank 1999 |
|-----------|----------------------|--------------------------|----------------------|-----------|
| 1 | London/Heathrow | 32 511 682 | + 5.8 | 1 |
| 2 | Airport system/Paris | 26 246 505 | + 13.4 | 2 |
| 3 | Frankfurt (Main) | 23 509 108 | + 10.2 | 3 |
| 4 | Amsterdam/Schiphol | 17 805 743 | + 9.5 | 4 |
| 5 | London/Gatwick | 14 126 816 | + 6.7 | 5 |
| 6 | Milano/Malpensa | 7 033 394 | + 22 | 8 |
| 7 | Brussels/National | 6 521 014 | + 13.1 | 7 |
| 8 | Madrid/Barajas | 6 288 351 | + 8.2 | 6 |
| 9 | Rome/Fiumicino | 5 813 931 | + 13.4 | 10 |
| 10 | Munich | 5 441 639 | + 13.8 | 11 |
| 11 | Vienna/Schwechat | 4 857 120 | + 11.3 | 13 |
| 12 | Manchester/Intern. | 4 720 259 | + 6.7 | 12 |
| 13 | Düsseldorf | 4 158 033 | + 7.3 | 14 |
| 14 | Stockholm/Arlanda | 3 506 174 | + 8.8 | 15 |
| 15 | Athens | 3 375 802 | + 29.2 | 16 |

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

As mentioned earlier, London/Heathrow is the busiest airport for international extra-EU passenger transport too – and this by a very comfortable margin (32.5 million passengers – see Table 5.59). The Paris airport system (composed of Charles-de-Gaulle, Orly and Le Bourget airports) comes second, followed by Frankfurt-Main and Amsterdam. The airports of Athens and Milano/Malpensa display the most impressive growth in 2000, with 29.2% and 22.0% respectively compared to 1999.

6. Transport safety

Traffic accidents (considering road, rail, air and maritime traffic) claimed about 42 200 lives in the EU in 1999. More than forty times as much were injured.

The vast majority (97%) of fatal accidents occurred in road traffic. For the age category of under 45 years old, road accidents continue to be the first cause of mortality. Still, despite the fact that road transport at Community level more than doubled between 1970 and 1999, the number of fatal casualties decreased by 44% (see Graph 6.1). It should however be noted that in the development over time, important differences between the individual Member States remain.

The number of fatalities in rail accidents is relatively low. At Community level, the absolute number of fatal casualties 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).

Downward trend since the 1970s – but not everywhere

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.

Still over 40 000 deaths each year

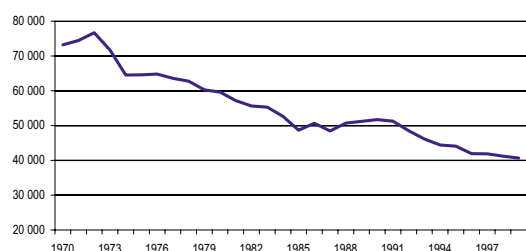
Table 6.3 shows that the total number of road accident fatalities at Community level decreased from 56 414 in 1990 to 42 122 in 1999. This is a decrease of more than 25% in less than a decade. Greece is the only country where the number of road fatalities does not show a downward trend during the last decade.

Fatalities per inhabitant: UK lowest

Table 6.4 outlines that in 1999, the United Kingdom recorded the lowest number of deaths per million inhabitants (60), followed by Sweden (65) and the Netherlands (69). On the other extreme, Portugal's rate is three times higher (221). Austria and Italy display figures close to the EU-15 average (112). In 1990, the EU average stood at 155.

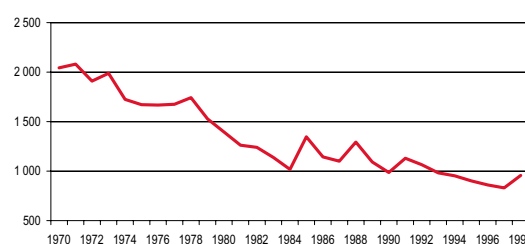
Graph 6.5 (EU-15) and Table 6.6 (by Member State) show the number of deadly victims per 1 000 million passenger kilometres travelled. The United Kingdom, Sweden, Denmark, Finland and the Netherlands display the lowest number of deaths per 1 000 million passenger kilometres. The risk of being killed in a car accident in

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.

Portugal and in Greece is nearly 4 times higher. On average, the risk of being killed in a road accident is 1% per million kilometres travelled.

Some 15% of all road accident deaths are pedestrians

In 1998, 58% of all road accident fatalities were the drivers and passengers of passenger cars, 21% cyclists and drivers and passengers of powered two-wheelers (see Graph 6.7). Pedestrians hurt in car accidents account for 15% of the fatalities. Among the pedestrians, the age group of 65 and over continues to be the most at risk.

Rail accidents: most fatal casualties 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 6.8 and 6.9 show the same information at Member States level for the period 1990–98.

Graph 6.5 and Table 6.9 indicate that only a minority of rail accident fatalities is actually passengers travelling in trains. Most fatalities have been recorded in accidents occurring at railway level crossings and in shunting procedures as well as track maintenance works where no passengers travelling in the trains died. This should be taken into account when looking at Graph 6.2 and Table 6.8.

Expressed in passenger kilometres travelled, it then appears that at Community level, rail transport is 15 times safer for the passengers than road transport (1998). A single major accident, like the one involving a high-speed train in Germany in 1998 and mainly responsible for the upward turn of the curve in Graph 6.2, can however considerably influence the general image.

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

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Belgium | 1 976 | 1 873 | 1 672 | 1 660 | 1 692 | 1 449 | 1 356 | 1 364 | 1 500 | 1 397 |
| Denmark | 634 | 606 | 577 | 559 | 546 | 582 | 514 | 489 | 499 | 514 |
| Germany | 11 046 | 11 300 | 10 631 | 9 949 | 9 814 | 9 454 | 8 758 | 8 549 | 7 792 | 7 772 |
| Greece | 2 050 | 2 112 | 2 158 | 2 159 | 2 253 | 2 411 | 2 058 | 2 199 | 2 226 | 2 131 |
| Spain | 9 032 | 8 836 | 7 818 | 6 378 | 5 615 | 5 751 | 5 483 | 5 604 | 5 957 | 5 738 |
| France | 11 215 | 10 483 | 9 900 | 9 867 | 9 019 | 8 891 | 8 541 | 8 444 | 8 918 | 8 487 |
| Ireland | 478 | 445 | 415 | 431 | 404 | 437 | 453 | 472 | 458 | 417 |
| Italy | 7 137 | 8 083 | 8 014 | 7 163 | 7 091 | 7 020 | 6 676 | 6 712 | 6 314 | 6 633 |
| Luxembourg | 71 | 80 | 73 | 76 | 74 | 68 | 72 | 60 | 57 | 58 |
| Netherlands | 1 376 | 1 281 | 1 253 | 1 235 | 1 298 | 1 334 | 1 180 | 1 163 | 1 066 | 1 090 |
| Austria | 1 558 | 1 551 | 1 403 | 1 283 | 1 338 | 1 210 | 1 027 | 1 105 | 963 | 1 079 |
| Portugal | 3 017 | 3 218 | 3 084 | 2 700 | 2 504 | 2 711 | 2 730 | 2 521 | 2 425 | 2 231 |
| Finland | 649 | 632 | 601 | 484 | 480 | 441 | 404 | 438 | 400 | 431 |
| Sweden | 772 | 745 | 759 | 632 | 589 | 572 | 537 | 541 | 531 | 580 |
| United Kingdom | 5 402 | 4 753 | 4 379 | 3 957 | 3 807 | 3 765 | 3 740 | 3 743 | 3 581 | 3 564 |
| EU-15 | 56 414 | 55 997 | 52 737 | 48 533 | 46 524 | 46 096 | 43 529 | 43 404 | 42 686 | 42 122 |
| index 1990 = 100 | 100 | 99 | 94 | 86 | 82 | 82 | 77 | 77 | 76 | 75 |

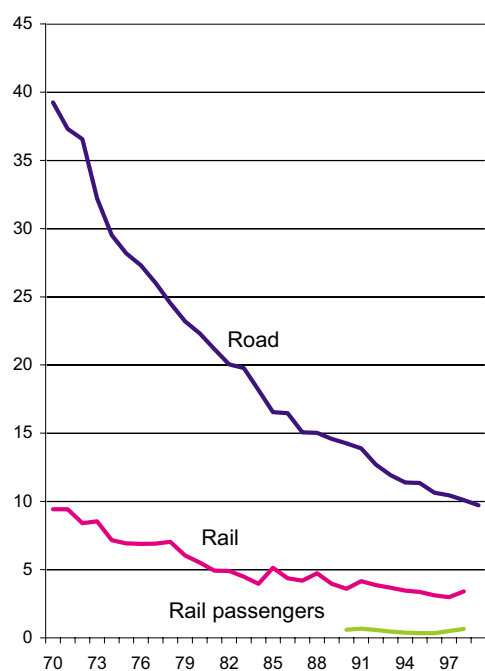
NB: Persons dying within 30 days following the accident. For countries that do not follow this definition (Greece: 3 days (until 1996) - Spain: 1 day (until 1992) ; France: 6 days ; Italy: 7 days ; Austria: 3 days (until 1991) and Portugal: 1 day), correction factors have been applied: Greece: 1.18, 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 | 1999 |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Belgium | 198 | 187 | 166 | 165 | 167 | 143 | 134 | 134 | 147 | 137 |
| Denmark | 123 | 118 | 112 | 108 | 105 | 111 | 98 | 93 | 94 | 97 |
| Germany | 139 | 141 | 132 | 123 | 121 | 116 | 107 | 104 | 95 | 95 |
| Greece | 202 | 206 | 209 | 208 | 216 | 231 | 196 | 209 | 212 | 202 |
| Spain | 232 | 227 | 200 | 163 | 143 | 147 | 140 | 142 | 151 | 145 |
| France | 198 | 184 | 173 | 172 | 156 | 154 | 147 | 145 | 153 | 145 |
| Ireland | 136 | 126 | 117 | 121 | 113 | 121 | 125 | 129 | 123 | 111 |
| Italy | 126 | 142 | 141 | 126 | 124 | 123 | 116 | 117 | 110 | 115 |
| Luxembourg | 186 | 207 | 186 | 191 | 183 | 166 | 173 | 143 | 134 | 134 |
| Netherlands | 92 | 85 | 83 | 81 | 84 | 86 | 76 | 75 | 68 | 69 |
| Austria | 202 | 198 | 177 | 161 | 167 | 150 | 127 | 137 | 119 | 133 |
| Portugal | 305 | 326 | 313 | 273 | 253 | 273 | 275 | 253 | 243 | 221 |
| Finland | 130 | 126 | 119 | 96 | 94 | 86 | 79 | 85 | 78 | 83 |
| Sweden | 90 | 86 | 88 | 72 | 67 | 65 | 61 | 61 | 60 | 65 |
| United Kingdom ¹ | 94 | 82 | 76 | 68 | 65 | 64 | 64 | 63 | 61 | 60 |
| EU-15 | 155 | 153 | 143 | 131 | 125 | 124 | 117 | 116 | 114 | 112 |
| index 1990 = 100 | 100 | 99 | 93 | 85 | 81 | 80 | 75 | 75 | 74 | 72 |

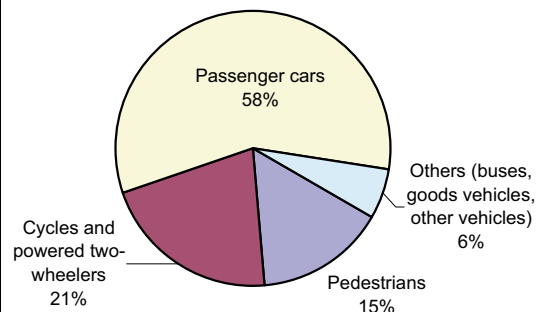
(1) Data refer to Great Britain only.
Source: Eurostat.

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



Source: Eurostat, UIC.

Graph 6.7: EU-15: Fatalities in road accidents in 1998: share by type of user



Source: UN-ECE.

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

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|----------------|------|------|------|------|------|------|------|------|------|------|
| Belgium | 22 | 20 | 17 | 17 | 17 | 14 | 13 | 13 | 14 | 13 |
| Denmark | 11 | 10 | 10 | 9 | 9 | 9 | 8 | 7 | 7 | 7 |
| Germany | 14 | 15 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 |
| Greece | 31 | 31 | 31 | 30 | 30 | 31 | 25 | 26 | 25 | 23 |
| Spain | 31 | 29 | 24 | 19 | 16 | 19 | 17 | 17 | 17 | 15 |
| France | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 12 | 11 |
| Ireland | 22 | 19 | 17 | 17 | 15 | 15 | 15 | 14 | 13 | 11 |
| Italy | 12 | 13 | 12 | 10 | 10 | 10 | 9 | 9 | 9 | 9 |
| Luxembourg | 16 | 18 | 16 | 16 | 15 | 12 | 13 | 10 | 10 | 10 |
| Netherlands | 9 | 9 | 8 | 8 | 8 | 8 | 7 | 7 | 6 | 7 |
| Austria | 22 | 20 | 18 | 16 | 17 | 15 | 13 | 14 | 12 | 13 |
| Portugal | 59 | 58 | 51 | 41 | 36 | 37 | 35 | 31 | 28 | 24 |
| Finland | 11 | 11 | 10 | 8 | 8 | 8 | 7 | 7 | 7 | 7 |
| Sweden | 8 | 7 | 8 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| United Kingdom | 8 | 7 | 7 | 6 | 6 | 6 | 6 | 6 | 6 | 5 |
| EU-15 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 |

Source: Eurostat.

Table 6.8: Number of persons killed in accidents involving railways (per 1 000 million pkm)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1998 absolute number of persons killed |
|----------------|------|------|------|------|------|------|------|------|------|--|
| Belgium | 3.1 | 2.7 | 3.2 | 3.4 | 4.5 | 3.0 | 3.8 | 2.6 | 4.2 | 30 |
| Denmark | 1.2 | 2.6 | 3.3 | 1.7 | 1.8 | 2.0 | 1.8 | 1.7 | 1.7 | 9 |
| Germany | 4.0 | 5.3 | 5.7 | 4.8 | 4.4 | 4.3 | 3.9 | 3.7 | 5.5 | 325 |
| Greece | 17.2 | 25.0 | 14.0 | 35.3 | 30.0 | 31.2 | 24.0 | 22.6 | 29.4 | 47 |
| Spain | 1.8 | 1.8 | 1.7 | 1.9 | 1.9 | 1.4 | 1.3 | 2.1 | 0.7 | 13 |
| France | 2.9 | 3.6 | 3.2 | 2.9 | 2.6 | 2.3 | 2.3 | 1.9 | 2.1 | 138 |
| Ireland | 11.4 | 8.5 | 9.0 | 2.4 | 8.7 | 5.4 | 6.2 | 10.0 | 10.0 | 14 |
| Italy | 1.7 | 2.0 | 2.3 | 1.7 | 1.6 | 2.3 | 2.0 | 1.9 | 2.3 | 97 |
| Luxembourg | 9.6 | 17.4 | 3.9 | 15.3 | 17.3 | 10.5 | 10.6 | 10.0 | 3.3 | 1 |
| Netherlands | 3.9 | 2.6 | 2.2 | 2.3 | 2.4 | 3.5 | 2.6 | 2.4 | 2.3 | 35 |
| Austria | 6.2 | 8.1 | 3.2 | 6.9 | 5.5 | 6.9 | 4.8 | 2.8 | 4.4 | 35 |
| Portugal | 23.1 | 24.4 | 26.0 | 24.5 | 29.2 | 19.8 | 27.1 | 25.9 | 21.1 | 97 |
| Finland | 10.8 | 10.5 | 10.1 | 6.7 | 9.9 | 5.3 | 3.7 | 6.2 | 7.1 | 24 |
| Sweden | 3.0 | 4.7 | 5.4 | 3.3 | 1.9 | 1.5 | 2.5 | 1.7 | 3.6 | 25 |
| United Kingdom | 2.3 | 2.1 | 1.2 | 1.3 | 1.4 | 0.9 | 0.8 | 1.4 | 1.9 | 67 |
| EU-15 | 3.6 | 4.2 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 2.9 | 3.5 | 957 |

Source: Eurostat, UIC.

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

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
|----------------|------|------|------|------|------|------|------|------|------|
| 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 | 0.0 | 0.0 | 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 | 0.0 |
| 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 | 0.0 | 0.0 |
| 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 | 1.1 | 0.0 |
| United Kingdom | 1.1 | 1.0 | 0.6 | 0.5 | 0.6 | 0.3 | 0.5 | 0.8 | 0.5 |
| EU-15 | 0.6 | 0.7 | 0.6 | 0.5 | 0.4 | 0.4 | 0.3 | 0.5 | 0.7 |

Source: Eurostat, UIC.

Fatalities 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?

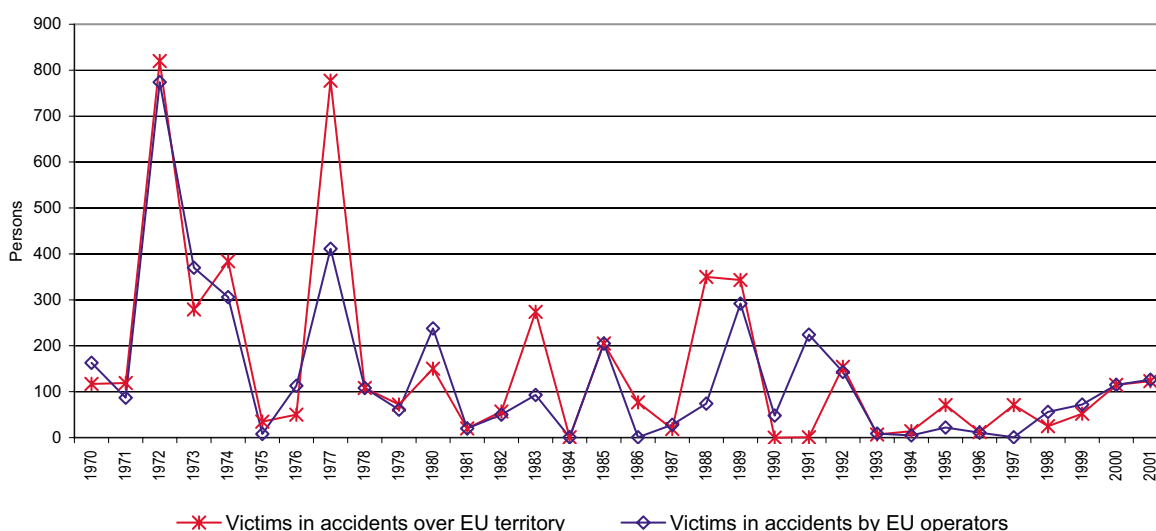
Graph 6.10 displays two curves for the period 1970 to 1999 (included): one curve expresses the number of fatal casualties in accidents on or over EU territory (accidents happening over international waters are excluded), the other curve represents the number of fatalities in accidents involving carriers registered in EU Member States. Please note that the figures include only passengers and crew members and exclude deaths on the ground.

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 aircraft) 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 fatalities — fatalities on the ground not included). These fatalities are included in the 'EU territory' curve but are excluded from the 'EU-operator' curve since the aircraft was operated by a North American company.

For the year 2000 and 2001, the number of fatalities for both curves would have been close to zero without the tragic accidents involving a Concorde in Paris (109 deaths, in 2000) and a Scandinavian aircraft in Milan (110 deaths, in 2001).

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 pkm 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 'fatalities per 1 000 million passenger kilometre'-ratio has therefore only very limited value. The same would apply for the establishment of the ratio 'deaths per flying hours'.

Graph 6.10 : Number of deaths in air accidents* 1970-2001



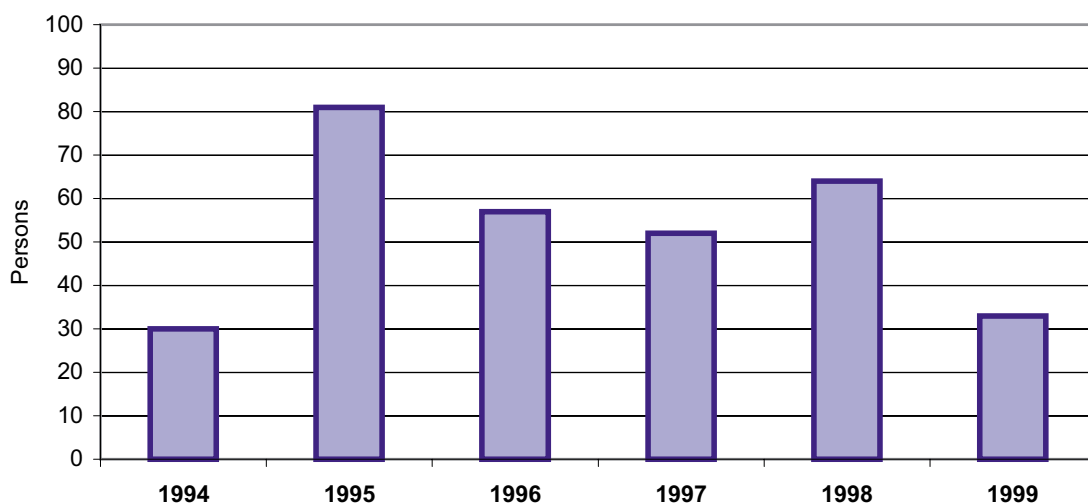
* Accidents during training and test flights, accidents involving aircrafts of armed forces and accidents in business flying excluded. In-flight accidents due to sabotage, terrorist attacks and war risks included.
Sources: Airclaims CASE2 database.

Deaths in maritime transport accidents

Reliable figures on the number of deaths occurring in maritime transport operations are not easy to obtain. With regards to the information displayed in Graph 6.11, only accidents involving vessels registered (flagged) in the various registers of the European Union (please refer to the note of Graph 6.11) have been taken into account, irrespective of the location of the accident. Persons who are considered as missing have been included. For the time range available (1994-1999), the absolute number of deaths fluctuates between 30 and 80 per year. One of the worst accidents that occurred in Europe in recent years was the sinking of the ferry *Estonia* on 28 September 1994, en route from Tallinn to Stockholm. The accident made 852 deaths. Since the *Estonia* is not registered in one of the ship registers as specified under Graph 6.11, the victims of this disaster are not included in the 1994 column.

The number of deaths as shown in the graph are however most likely to be underestimated since an increasing number of EU ship operators tend, for economic reasons, to register maritime vessels in non-EU Registers (the so-called «flags of convenience»). The share of the fleet of a Member State sailing under a «flag of convenience» can be substantial (see in particular Table 3.8 in Chapter 3, Means of transport and related comments).

Graph 6.11: Number of persons killed in maritime accidents* 1994-1999



* Ships from the following registers have been taken into account: Austria, Belgium, Danish International Register, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Madeira, Netherlands, Portugal, Spain, Sweden, United Kingdom.
Source: International Underwriters Association (IUA).

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 today 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.

CO₂: continuous increase from transport, substantial decrease in other sectors

The transport sector (excluding maritime transport) accounted for 32% of the total energy consumption in the EU in 2000. With regards to CO₂ emissions, it is responsible for a volume of 904 million tonnes (29% of the total CO₂ emissions at EU-level in 1999). This represents an increase of over 54% since 1985 and a rise of nearly 23% over the 1990-2000 decade, even though the overall CO₂ emissions (i.e. all sectors) increased by only 4% between 1985 and 1999. In fact, the other economic sectors have noticeably decreased their emissions: the industry

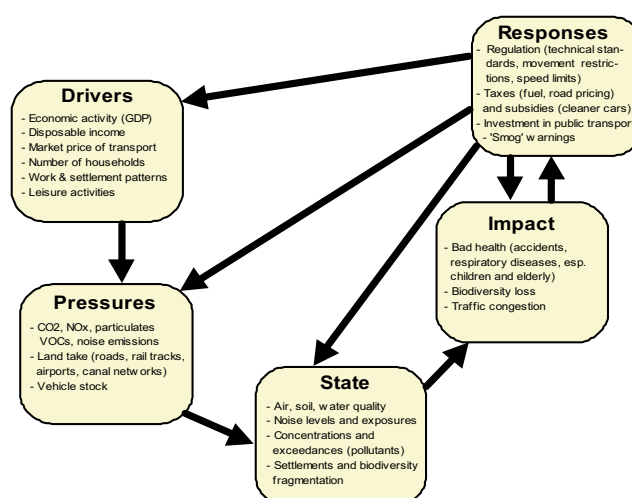
sector by 14% and the sector of households, services, etc. by 13% (both sectors between 1985 and 1999).

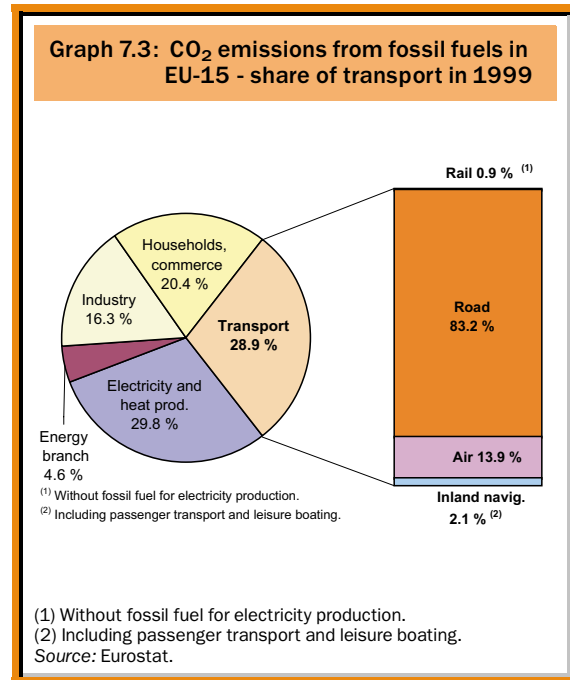
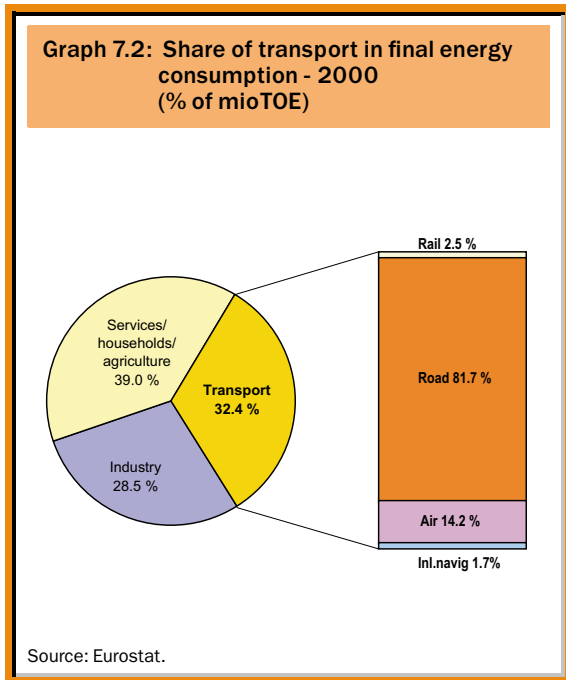
Improving the sustainability of the transport sector clearly requires a more comprehensive and integrated transport and environment policy approach, combining legislation and economic instruments in a transparent way across all transport modes. An integration implies a change in policy-making focus from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

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





port 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.

Consumption and emissions closely linked

With regards to fossil fuels, less consumption in general means less CO₂ emissions. Graph 7.2 shows the transport share in final energy consumption. Within the transport sector, road transport has a share of close to 82%, followed by air transport with 14%. Graph 7.3 outlines a similar picture with regard to the shares of the various transport modes in CO₂ emissions from fossil fuels.

Reformulated fuels

Although CO₂ emissions are often in the focus of public discussion (carbon dioxides are not harmful as such but are generally made responsible for

the «greenhouse effect»), 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. Quite remarkably, the transport performance over inland waterways has not decreased despite a considerable reduction of the fleet.

Research needed for high-altitude 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

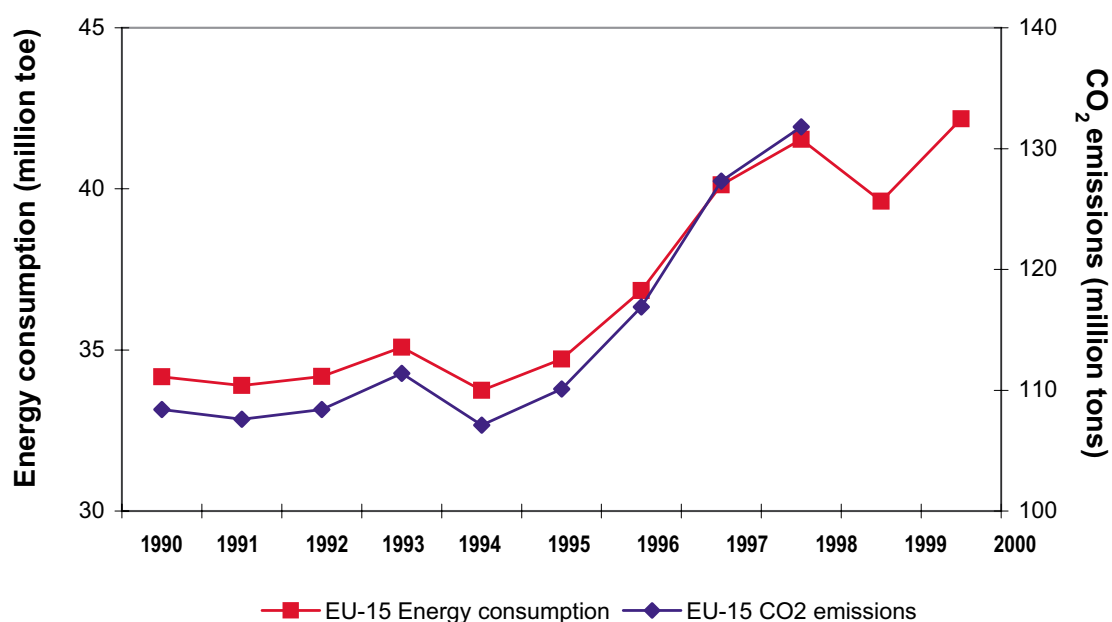
could significantly affect atmospheric ozone and cloud coverage. Substantial research is needed to sufficiently understand how aircraft perturb the atmosphere. Unless new, less-polluting engines and significantly more fuel-efficient aircraft technologies are introduced, the relative contribution of aviation to environmental changes will become more significant.

Serious ecological impacts from oil spills

The overall environmental impact of maritime transport is low compared to the other transport modes. However, major accidents of sea-going vessels can result in large oil spills or have other important ecological impacts. This is particularly true in the waters around the European Union featuring a relatively dense maritime traffic.

It remains however difficult to attribute both energy consumption and emissions to individual countries. As for the other transport modes, fossil fuel consumption and CO₂ emissions are closely linked. Graph 7.4 outlines this link at EU-15 level.

Graph 7.4: Evolution of energy consumption and CO₂ emissions of maritime transport (EU-15)



Source: Eurostat.

7.2. Energy consumption

More than a quarter of the total final 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 2000 (1960: 17%). As can be seen in Table 7.5 road transport alone accounts for over 250 million 'tonne of oil equivalent' at EU level, corresponding to 26.5% 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 nearly 82% (1960: 57%). Rail transport stands at 2.5% (1960: 31%) and transport via inland waterways at 1.7% (1960: 5%). The remaining 14% 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 7.6 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 that do not dispose of a significant inland waterway network.

Road share of over 75% for all countries, except the Netherlands

All countries show a high road transport share. At EU-15 level, the consumption of road transport in 2000 increased by 0.4% compared to 1999 (all products, see Table 7.5). The highest increase was recorded for Luxembourg (+13.9%) and Portugal (+8%). A decrease was registered for the United Kingdom (-2.8%) and Germany (-2.3%). Italy's consumption remained virtually the same.

Due to the growing share of electrified lines, the consumption of electricity for rail traction is increasing to the detriment of diesel fuel. The modal share for inland navigation is relatively high in Greece, Spain and the Netherlands and can partly be explained by the importance of the tourism sector in these Mediterranean countries and the relative weight of the inland waterways transport mode for the Netherlands. It further appears

Table 7.5: Final energy consumption (all products) of the transport sector - EU-15 (million toe)

| | 1985 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Share 2000 (%) |
|--------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|----------------|
| Final energy consumption | 823.9 | 862.7 | 898.6 | 936 | 927.8 | 943.6 | 952.4 | 952.3 | 100 |
| | of which: | | | | | | | | |
| Industry | 264.9 | 266.0 | 259.4 | 260.9 | 263.1 | 261.8 p | 263.0 p | 271.7 p | 28.5 |
| Services, households | 356.3 | 343.4 | 363.6 | 391.9 | 376.1 | 382.4 | 381.9 p | 371.5 p | 39.0 |
| TRANSPORT | 202.6 | 253.3 | 275.6 | 283.2 | 288.7 | 299.4 | 307.5 | 309.1 p | 32.5 |
| | of which: | | | | | | | | |
| Rail | 7.0 | 6.9 | 7.5 | 7.6 | 7.6 | 7.5 | 8.0 | 7.6 | 2.5 |
| Road | 170.2 | 212.3 | 229.0 | 234.5 | 238.5 | 246.0 | 251.3 | 252.3 p | 81.6 |
| Air | 21.1 | 27.8 | 32.5 | 34.2 | 36.0 | 39.5 | 42.1 | 43.8 | 14.2 |
| Inland navigation | 4.4 | 6.4 | 6.7 | 6.9 | 6.5 | 6.5 | 6.1 | 5.3 | 1.7 |

p : Provisional figure.
Source: Eurostat.

Table 7.6: Energy consumption of main fuels by transport mode (1 000 toe)

| | | 1985 | 1990 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | change 1985-2000 (%) | share in consump. 2000 (%) |
|-------------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|----------------------|----------------------------|
| Belgium | road | 5 119 | 6 442 | 7 084 | 7 211 | 7 211 | 7 504 | 7 596 | 7 819 | 53 | 81 |
| | rail - diesel | 113 | 70 | 77 | 74 | 61 | 63 | 64 | 60 | -47 | 1 |
| | rail - electric | 102 | 107 | 125 | 109 | 108 | 117 | 120 | 124 | 21 | 1 |
| | inl.navigation | 214 | 129 | 134 | 173 | 143 | 79 | 85 | 73 | -66 | 1 |
| Denmark | aviation | 558 | 952 | 945 | 1 070 | 1 340 | 1 589 | 1 552 | 1 521 | 173 | 16 |
| | road | 2 791 | 3 053 | 3 470 | 3 527 | 3 527 | 3 665 | 3 711 | 3 680 | 32 | 79 |
| | rail - diesel | 115 | 95 | 97 | 96 | 94 | 79 | 74 | 73 | -37 | 2 |
| | rail - electric | 12 | 18 | 21 | 22 | 23 | 28 | 29 | 30 | 140 | 1 |
| Germany | inl.navigation | 72 | 66 | 143 | 160 | 139 | 97 | 81 | 80 | 11 | 2 |
| | aviation | 570 | 645 | 674 | 711 | 726 | 769 | 807 | 820 | 44 | 18 |
| | road | 40 666 | 50 418 | 54 196 | 53 770 | 53 770 | 55 753 | 57 521 | 56 177 | 38 | 85 |
| | rail - diesel | 1167 | 922 | 727 | 732 | 677 | 624 | 586 | 571 | -51 | 1 |
| Greece | rail - electric | 1 131 | 1 175 | 1 392 | 1 423 | 1 450 | 1 383 | 1 362 | 1 368 | 21 | 2 |
| | inl.navigation | 724 | 656 | 554 | 509 | 402 | 369 | 301 | 279 | -62 | 0 |
| | aviation | 4 161 | 5 627 | 5 961 | 6 096 | 6 394 | 6 608 | 6 986 | 7 335 | 76 | 11 |
| | road | 3 057 | 3 903 | 4 584 | 4 805 | 4 805 | 5 164 | 5 256 | 5 320 | 74 | 76 |
| Ireland | rail - diesel | 53 | 64 | 43 | 45 | 42 | 42 | 40 | 40 | -23 | 1 |
| | rail - electric | 3 | 11 | 13 | 14 | 14 | 15 | 17 | 20 | 631 | 0 |
| | inl.navigation | 238 | 339 | 288 | 231 | 238 | 356 | 292 | 266 | 11 | 4 |
| | aviation | 1 179 | 1 264 | 1 226 | 1 230 | 1 187 | 1 201 | 1 284 | 1 325 | 12 | 19 |
| Spain | road | 11 811 | 17 676 | 20 466 | 21 713 | 21 713 | 24 029 | 25 297 | 26 061 | 121 | 80 |
| | rail - diesel | 182 | 212 | 288 | 354 | 404 | 455 | 485 | 489 | 169 | 2 |
| | rail - electric | 242 | 315 | 339 | 298 | 310 | 322 | 307 | 358 | 48 | 1 |
| | inl.navigation | 487 | 1 273 | 1 481 | 1 617 | 1 414 | 1 458 | 1 364 | 1 166 | 139 | 4 |
| France | aviation | 1 963 | 2 456 | 3 105 | 3 378 | 3 639 | 3 962 | 4 198 | 4 486 | 129 | 14 |
| | road | 29 385 | 36 171 | 37 300 | 38 851 | 38 851 | 41 021 | 40 886 | 42 409 | 44 | 83 |
| | rail - diesel | 488 | 384 | 384 | 338 | 417 | 454 | 372 | 367 | -25 | 1 |
| | rail - electric | 666 | 764 | 834 | 918 | 934 | 955 | 968 | 1 004 | 53 | 2 |
| Ireland | inl.navigation | 79 | 497 | 478 | 469 | 472 | 587 | 490 | 489 | 521 | 1 |
| | aviation | 2 657 | 3 836 | 4 688 | 4 998 | 5 128 | 6 047 | 6 448 | 6 683 | 152 | 13 |
| | road | 1 430 | 1 546 | 1 730 | 2 171 | 2 171 | 2 706 | 2 991 | 3 155 | 121 | 81 |
| | rail - diesel | 43 | 46 | 49 | 77 | 87 | 102 | 115 | 124 | 186 | 3 |
| Italy | rail - electric | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 87 | 0 |
| | inl.navigation | 5 | 7 | 7 | 12 | 13 | 15 | 18 | 18 | 260 | 0 |
| | aviation | 206 | 365 | 375 | 415 | 433 | 448 | 529 | 574 | 178 | 15 |
| | road | 24 751 | 30 185 | 33 702 | 33 834 | 33 834 | 36 382 | 36 544 | 36 403 | 47 | 89 |
| Luxembourg | rail - diesel | 192 | 198 | 194 | 174 | 194 | 192 | 140 | 138 | -28 | 0 |
| | rail - electric | 418 | 540 | 625 | 658 | 664 | 676 | 678 | 695 | 66 | 2 |
| | inl.navigation | 192 | 198 | 227 | 218 | 227 | 213 | 225 | 202 | 5 | 0 |
| | aviation | 1 759 | 1 872 | 2 418 | 2 618 | 2 710 | 3 173 | 3 555 | 3 491 | 98 | 9 |
| Netherlands | road | 512 | 863 | 1 109 | 1 140 | 1 140 | 1 204 | 1 353 | 1 541 | 201 | 82 |
| | rail - diesel | 9 | 8 | 2 | 2 | 5 | 5 | 8 | 7 | -22 | 0 |
| | rail - electric | 4 | 5 | 7 | 9 | 7 | 7 | 8 | 8 | 116 | 0 |
| | inl.navigation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Austria | aviation | 74 | 131 | 189 | 205 | 251 | 282 | 332 | 320 | 333 | 17 |
| | road | 6 771 | 8 038 | 8 949 | 9 522 | 9 631 | 9 515 | 9 535 | 9 629 | 42 | 70 |
| | rail - diesel | 40 | 37 | 35 | 31 | 32 | 30 | 30 | 35 | -12 | 0 |
| | rail - electric | 95 | 109 | 127 | 135 | 135 | 140 | 141 | 140 | 47 | 1 |
| Portugal | inl.navigation | 697 | 556 | 697 | 657 | 687 | 657 | 667 | 667 | : | 5 |
| | aviation | 1 233 | 1 608 | 2 589 | 2 768 | 2 997 | 3 261 | 3 388 | 3 343 | 171 | 24 |
| | road | 4 017 | 4 754 | 5 369 | 5 462 | 5 477 | 5 241 | 5 618 | 5 846 | 46 | 86 |
| | rail - diesel | 54 | 58 | 70 | 78 | 81 | 41 | 42 | 47 | -11 | 1 |
| Finland | rail - electric | 190 | 229 | 269 | 275 | 246 | 188 | 272 | 279 | 47 | 4 |
| | inl.navigation | 0 | 0 | 0 | 0 | 0 | 4 | 7 | 7 | : | 0 |
| | aviation | 217 | 324 | 459 | 507 | 525 | 553 | 542 | 587 | 171 | 9 |
| | road | 2 059 | 3 026 | 4 104 | 4 363 | 4 363 | 4 929 | 5 179 | 5 592 | 172 | 86 |
| Sweden | rail - diesel | 58 | 56 | 55 | 50 | 54 | 47 | 51 | 57 | -2 | 1 |
| | rail - electric | 23 | 27 | 26 | 28 | 29 | 31 | 31 | 31 | 33 | 0 |
| | inl.navigation | 53 | 43 | 46 | 46 | 44 | 46 | 38 | 43 | -17 | 1 |
| | aviation | 465 | 574 | 620 | 623 | 602 | 647 | 740 | 790 | 70 | 12 |
| United Kingdom | road | 2 896 | 3 631 | 3 505 | 3 416 | 3 416 | 3 635 | 3 699 | 3 670 | 27 | 85 |
| | rail - diesel | 72 | 63 | 62 | 54 | 55 | 54 | 52 | 47 | -34 | 1 |
| | rail - electric | 31 | 37 | 43 | 40 | 43 | 44 | 45 | 46 | 47 | 1 |
| | inl.navigation | 65 | 30 | 42 | 38 | 34 | 42 | 77 | 70 | 8 | 2 |
| EU-15 | aviation | 252 | 459 | 406 | 436 | 460 | 480 | 506 | 505 | 101 | 12 |
| | road | 5 371 | 6 074 | 6 432 | 6 385 | 6 385 | 6 510 | 6 409 | 6 330 | 18 | 83 |
| | rail - diesel | 83 | 39 | 39 | 39 | 35 | 16 | 8 | 24 | -71 | 0 |
| | rail - electric | 225 | 213 | 234 | 264 | 254 | 241 | 259 | 266 | 18 | 3 |
| EU-15index (1985 = 100) | inl.navigation | 82 | 87 | 67 | 69 | 71 | 94 | 104 | 94 | 15 | 1 |
| | aviation | 545 | 760 | 849 | 845 | 871 | 879 | 939 | 928 | 70 | 12 |
| | road | 28 621 | 36 312 | 36 687 | 38 063 | 38 063 | 38 264 | 39 424 | 38 310 | 34 | 75 |
| | rail - diesel | 725 | 607 | 596 | 572 | 476 | 477 | 962 | 433 | -40 | 1 |
| EU-15index (1985 = 100) | rail - electric | 254 | 454 | 636 | 638 | 667 | 720 | 736 | 747 | 194 | 1 |
| | inl.navigation | 913 | 1 193 | 915 | 1 053 | 1 047 | 992 | 906 | 921 | 1 | 2 |
| | aviation | 5 143 | 6 767 | 7 810 | 8 214 | 8 611 | 9 444 | 10 174 | 10 958 | 113 | 21 |
| | road | 169 258 | 212 092 | 228 688 | 234 233 | 234 357 | 245 521 | 251 019 | 251 943 | 49 | 82 |
| EU-15index (1985 = 100) | rail - diesel | 3 393 | 2 859 | 2 718 | 2 716 | 2 714 | 2 681 | 3 029 | 2 514 | -26 | 1 |
| | rail - electric | 3 388 | 4 004 | 4 692 | 4 831 | 4 886 | 4 871 | 4 975 | 5 119 | 51 | 2 |
| | inl.navigation | 3 821 | 5 075 | 5 081 | 5 252 | 4 933 | 5 009 | 4 656 | 4 375 | 14 | 1 |
| | aviation | 20 982 | 27 641 | 32 316 | 34 116 | 35 874 | 39 342 | 41 979 | 43 668 | 108 | 14 |
| EU-15index (1985 = 100) | road | 100 | 125 | 135 | 138 | 138 | 145 | 148 | 149 | | |
| | rail - diesel | 100 | 84 | 80 | 80 | 80 | 79 | 89 | 74 | | |
| | rail - electric | 100 | 118 | 138 | 143 | 144 | 144 | 147 | 151 | | |
| | inl.navigation | 100 | 133 | 133 | 137 | 129 | 131 | 122 | 114 | | |
| EU-15index (1985 = 100) | aviation | 100 | 132 | 154 | 163 | 171 | 187 | 200 | 208 | | |

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.

that at EU-15 level, aviation recorded the highest increase in fuel consumption between 1985 and 2000: + 108% (and a 4% increase compared to 1999). In aviation, the limits of a correct attribution of the consumption to a country are reached: the figures express the volume of aviation fuel delivered in the respective country but this fuel is not necessarily burned in, or better: over that country.

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 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 7.7 indicates the share in fuels delivered in 1998 and 2001 and gives an insight on how this fuel mix differs between the countries and that in all countries, there is a gradual shift towards a higher share of diesel sales. This shift is particularly noticeable for Spain, France and Italy. It should be noted that the information in Table 7.7 includes fuel used by goods transport, which is almost entirely diesel fuel.

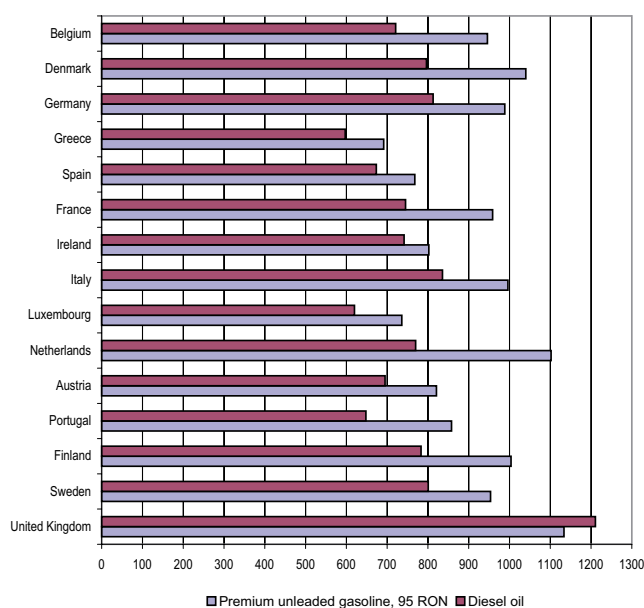
Table 7.7: Share of fuel in sales (%)

| | 1998 (Second quarter) | | 2001 (First quarter) | |
|----------------|--------------------------|-------------------------------|-------------------------|-------------|
| | Diesel | Petrol (leaded & unleaded) | Diesel | Petrol |
| EU-15 | 49.8 | 50.2 | 57.2 | 42.8 |
| Belgium | 65.9 | 34.1 | 69.8 | 30.2 |
| Denmark | 49.5 | 50.5 | 55.7 | 44.3 |
| Germany | 41.5 | 58.5 | 47.3 | 52.7 |
| Greece | 45.5 | 54.5 | 48.4 | 51.6 |
| Spain | 57.3 | 42.7 | 71.7 | 28.3 |
| France | 63.0 | 37.0 | 70.7 | 29.3 |
| Ireland | 42.6 | 57.4 | 48.0 | 52.0 |
| Italy | 48.0 | 52.0 | 63.5 | 36.5 |
| Luxembourg | 56.3 | 43.7 | 66.4 | 33.6 |
| Netherlands | 56.0 | 44.0 | 57.8 | 42.2 |
| Austria | 62.7 | 37.3 | 67.2 | 32.8 |
| Portugal | 57.1 | 42.9 | 62.4 | 37.6 |
| Finland | 47.2 | 52.8 | 51.8 | 48.2 |
| Sweden | 34.3 | 65.7 | 36.7 | 63.3 |
| United Kingdom | 40.3 | 59.7 | 43.3 | 56.7 |

Source: Eurostat.

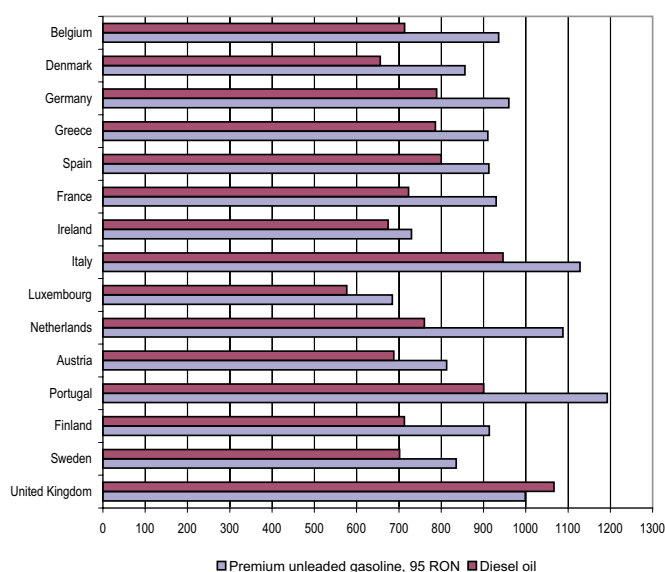
At EU level, 57% of the inland deliveries consist of diesel oil (2001). In 10 out of 15 Member States, diesel oil has the majority in sales. The highest shares are recorded in Spain, France and Belgium (around 70%), the lowest in Sweden (37%).

Graph 7.8: Sales price (all taxes included) of unleaded petrol and diesel fuel - First half of 2002 (Euro per 1 000 litres)



Source: Eurostat.

**Graph 7.9: Sales price (all taxes included) of unleaded petrol and diesel fuel - First half of 2002
(Purchasing power standard per 1 000 litres)**



Source: Eurostat.

Luxembourg: low in euro, lower in PPS

Graph 7.8 outlines the sales price (first half of 2002) of unleaded petrol and diesel fuel in the individual Member States. It should be noted that the indications include all taxes. For both fuel types and in absolute terms, the highest prices are recorded in the United Kingdom, while the lowest are paid in Greece.

The most substantial price differences between unleaded petrol and diesel fuel exist in the Netherlands and Denmark. The lowest differences

can be found in Ireland, Greece and Spain. The only country where petrol is cheaper than diesel is the United Kingdom.

If one looks at the sales price of fuels (including all taxes) expressed in purchase power standards (Graph 7.9 — 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. Unleaded petrol in Portugal displays the highest prices in purchasing power standard, yet relatively low in euro prices.

Energy consumption in maritime transport

At an even larger extent than the consumption of fuel in aviation, the attribution of fuel consumption to a country is somewhat problematic. A large vessel might for instance bunker fuel in the port of Antwerp, but its next journey will carry it quickly out of Belgian territorial waters.

When looking at energy balances, it appears that unlike the other transport modes (including aviation), the position 'marine bunkers' is not included in the category 'available for final consumption', but stands as a separate position suggesting that it could be considered as an 'export'.

These remarks should be taken into account when looking at Table 7.10. The figures express, in million TOE, the quantities delivered from the marine bunkers of the individual countries. The energy consumed in the maritime transport consists entirely of hydrocarbons. The main types of fuels used are 'residual fuel oil' and 'gas/diesel oil'.

It appears that at EU-15 level, more than 42 million TOE have been delivered in 2000, a 51% increase compared to 1985. The highest relative increase was registered for Ireland, Denmark, Greece and Sweden. Considerable fluctuations can be noticed for many Member States throughout the period observed. In absolute terms, the Netherlands alone - with Rotterdam as the world's largest port - accounts for nearly 32% of the EU deliveries in 2000 (13.3 million TOE). Spain and Belgium follow with 5.9 million TOE and 5.3 million TOE respectively.

Table 7.10: Energy consumption in maritime transport: marine bunkers (in million TOE)

| | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Change 1985-2000 (%) |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|
| Belgium | 2.31 | 4.09 | 4.19 | 4.15 | 4.27 | 4.10 | 3.90 | 4.50 | 5.06 | 5.40 | 4.36 | 5.34 | 132 |
| Denmark | 0.41 | 0.95 | 0.86 | 0.90 | 1.33 | 1.50 | 1.57 | 1.49 | 1.37 | 1.38 | 1.29 | 1.32 | 223 |
| Germany | 3.44 | 2.47 | 2.09 | 1.76 | 2.20 | 2.04 | 2.05 | 2.03 | 2.15 | 2.03 | 2.07 | 2.18 | -37 |
| Greece | 1.10 | 2.53 | 2.32 | 2.67 | 3.10 | 3.29 | 3.54 | 3.11 | 3.12 | 3.47 | 3.09 | 3.56 | 223 |
| Spain | 2.63 | 3.81 | 3.83 | 3.89 | 3.38 | 3.06 | 3.15 | 4.60 | 5.68 | 5.97 | 5.82 | 5.93 | 126 |
| France | 2.38 | 2.52 | 2.62 | 2.53 | 2.38 | 2.12 | 2.48 | 2.68 | 2.92 | 2.85 | 2.88 | 2.98 | 25 |
| Ireland | 0.03 | 0.02 | 0.03 | 0.02 | 0.05 | 0.04 | 0.12 | 0.16 | 0.15 | 0.16 | 0.17 | 0.15 | 406 |
| Italy | 3.40 | 2.65 | 2.52 | 2.43 | 2.42 | 2.34 | 2.42 | 2.29 | 2.38 | 2.63 | 2.42 | 2.71 | -20 |
| Luxembourg | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Netherlands | 8.67 | 10.82 | 11.08 | 11.18 | 11.58 | 11.07 | 11.21 | 11.41 | 12.09 | 12.19 | 12.60 | 13.29 | 53 |
| Austria | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Portugal | 0.47 | 0.60 | 0.61 | 0.60 | 0.51 | 0.48 | 0.48 | 0.50 | 0.49 | 0.38 | 0.58 | 0.66 | 40 |
| Finland | 0.46 | 0.56 | 0.53 | 0.67 | 0.53 | 0.41 | 0.33 | 0.37 | 0.40 | 0.51 | 0.55 | 0.66 | 45 |
| Sweden | 0.55 | 0.66 | 0.78 | 0.89 | 0.89 | 1.05 | 1.04 | 1.10 | 1.30 | 1.55 | 1.50 | 1.34 | 143 |
| United Kingdom | 2.12 | 2.49 | 2.44 | 2.50 | 2.43 | 2.28 | 2.42 | 2.61 | 2.89 | 3.02 | 2.29 | 2.05 | -3 |
| EU-15 | 27.96 | 34.16 | 33.91 | 34.18 | 35.08 | 33.77 | 34.69 | 36.84 | 40.01 | 41.54 | 39.62 | 42.17 | 51 |

Source: Eurostat.

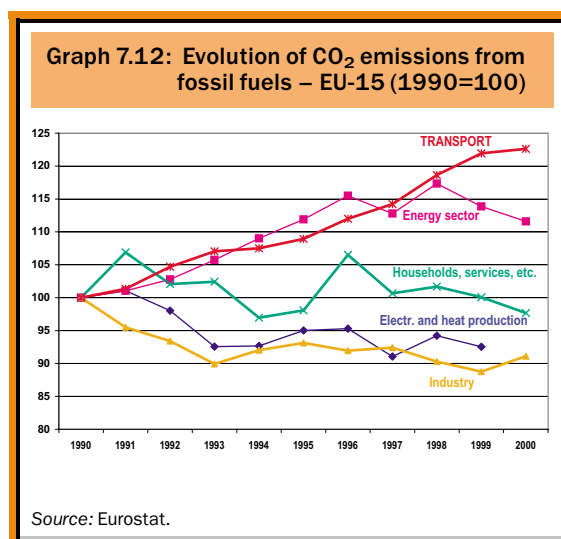
7.3. Emissions

The transport share (not including maritime and pipeline transport) of total final energy consumption in the EU reached 32% in 2000 (see Table 7.5 in the previous chapter). Nearly the entire consumption of this sector consists of fossil fuels.

Fossil fuel combustion produces carbon dioxide (CO₂) and other emissions, many of them harmful to human health. 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, catalytic converters) and other factors such as speed, loading factor, temperature and state of maintenance of engines.

Transport continues with steady increase

Due to their role in global warming, CO₂ emissions are the most significant product of the use of fossil fuels. In absolute terms, electricity and heat production is the sector producing the highest CO₂ emissions, but the quantities have remained stable over recent years. This sector is followed by transport, which continues to increase steadily. Whereas CO₂ emissions from electricity and heat production were at the same level in 1999 as in 1985, the transport sector showed an increase of



53% (see Table 7.11). The indexed evolution between 1990 and 2000 (Graph 7.12) shows how the various sectors 'behaved' compared to the steady increase of transport. Within the transport sector, road transport takes the lion's share (see Table 7.13).

Table 7.11: EU-15: total internal emissions of CO₂ by sector (million t of CO₂)

| | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Change 1985-2000 (%) |
|---------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------------------|
| Total internal emissions | 2 988 | 3 082 | 3 118 | 3 070 | 3 016 | 3 002 | 3 052 | 3 135 | 3 062 | 3 117 | 3 103 | : | : |
| Electr. and heat production | 927 | 998 | 1 009 | 978 | 924 | 925 | 948 | 951 | 909 | 940 | 924 | : | : |
| Energy sector | 127 | 130 | 132 | 134 | 138 | 142 | 146 | 151 | 147 | 153 | 148 | 145 | + 15 |
| Final energy consumption | 2 085 | 2 100 | 2 132 | 2 108 | 2 107 | 2 083 | 2 109 | 2 186 | 2 162 | 2 189 | 2 192 | 2 194 | + 5 |
| Industry | 670 | 629 | 601 | 588 | 566 | 579 | 586 | 579 | 582 | 568 | 559 | 573 | -14 |
| Households, services, etc. | 827 | 734 | 784 | 749 | 752 | 711 | 720 | 782 | 739 | 746 | 734 | 717 | -13 |
| Transport | 587 | 737 | 747 | 772 | 789 | 792 | 803 | 825 | 842 | 874 | 899 | 904 | + 54 |
| of which: | | | | | | | | | | | | | |
| Belgium | 18 | 23 | 23 | 24 | 25 | 25 | 25 | 26 | 27 | 28 | 28 | 29 | + 60 |
| Denmark | 11 | 12 | 12 | 12 | 12 | 13 | 13 | 13 | 14 | 14 | 14 | 14 | + 30 |
| Germany | 138 | 170 | 171 | 177 | 182 | 179 | 182 | 181 | 184 | 188 | 194 | 191 | + 38 |
| Greece | 14 | 17 | 18 | 18 | 19 | 19 | 19 | 19 | 20 | 22 | 22 | 21 | + 53 |
| Spain | 44 | 66 | 71 | 73 | 72 | 75 | 77 | 82 | 83 | 90 | 95 | 97 | + 121 |
| France | 97 | 122 | 121 | 124 | 130 | 127 | 129 | 134 | 137 | 145 | 145 | 151 | + 56 |
| Ireland | 5 | 6 | 6 | 6 | 6 | 7 | 6 | 8 | 9 | 10 | 11 | 12 | + 133 |
| Italy | 81 | 97 | 100 | 104 | 106 | 106 | 109 | 110 | 112 | 119 | 120 | 120 | + 49 |
| Luxembourg | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 6 | + 218 |
| Netherlands | 25 | 30 | 31 | 33 | 34 | 34 | 36 | 38 | 40 | 40 | 40 | 41 | + 59 |
| Austria | 13 | 15 | 17 | 17 | 17 | 17 | 18 | 18 | 18 | 17 | 19 | 19 | + 52 |
| Portugal | 8 | 11 | 12 | 13 | 13 | 14 | 14 | 15 | 16 | 17 | 18 | 19 | + 146 |
| Finland | 10 | 13 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 13 | + 31 |
| Sweden | 18 | 21 | 20 | 21 | 21 | 22 | 22 | 22 | 22 | 22 | 22 | 22 | + 20 |
| United Kingdom | 104 | 132 | 130 | 133 | 136 | 137 | 137 | 142 | 144 | 146 | 153 | 150 | + 44 |

Source: Eurostat.

Table 7.13: EU-15: total emissions of CO₂: share by transport mode (million t of CO₂)

| | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | Change 1985-2000 (%) |
|-------------------------------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|
| Total transport sector | 587 | 620 | 641 | 682 | 713 | 737 | 747 | 772 | 789 | 792 | 803 | 825 | 842 | 874 | 899 | 904 | 54 |
| | of which: | | | | | | | | | | | | | | | | |
| rail transport ⁽¹⁾ | 11.1 | 10.8 | 10.2 | 9.8 | 9.4 | 8.9 | 8.8 | 8.8 | 8.8 | 8.3 | 8.5 | 8.5 | 8.5 | 8.1 | 9.3 | 7.8 | -30 |
| road transport | 500.4 | 526.7 | 546.4 | 581.8 | 605.6 | 626.3 | 635.4 | 656.3 | 670.2 | 670.1 | 677.5 | 694.2 | 706.5 | 729.1 | 745.7 | 749.5 | 50 |
| air transport | 62.5 | 65.4 | 68.9 | 75.4 | 79.5 | 82.3 | 82.4 | 85.3 | 88.7 | 92.4 | 96.2 | 101.5 | 106.6 | 117.0 | 124.8 | 129.9 | 108 |
| inland navigation | 13.4 | 17.0 | 15.5 | 15.4 | 18.7 | 19.5 | 20.2 | 21.2 | 21.2 | 21.4 | 20.5 | 21.2 | 20.1 | 20.0 | 18.7 | 16.4 | 23 |

(1) Without fossil fuel for electricity production.
Source: Eurostat.

CO₂ from aviation doubled

Due to the increasing share of electrified tracks (and thus the gradual increase in electric traction), CO₂ emissions from rail transport decreased by 30% between 1985 and 2000. Emissions generated in power plants for the electricity production used as tractive power is however excluded here.

On the other hand, and in line with its energy consumption, air transport showed the highest increase in CO₂ emissions (108% growth over the period 1985-2000), albeit at a lower level in absolute terms. With the very strong growth in traffic, the environmental impacts of air transport are growing as well. Air transport has its corresponding share in the greenhouse effect and 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, especially from oxides of nitrogen (NO_x), volatile organic compounds and particulates.

Secondary pollutants cause smog

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

Emission standards already set for 2008

Progress has been made in reducing the emissions from road vehicles. This not only concerns the level of CO₂ emitted (the reduction of which is mainly linked to the use of more fuel-efficient vehicles) but also the levels of noxious substances. Table 7.14 summarises the various emission standards applying to serial production vehicles in the European Union. Standards applicable for the year 2005 (passenger cars and lorries) and even 2008 (lorries) have been set. The early establishment of these standards is important for the automotive industry, since it allows the preparation of production lines. From

the year 2005 onwards, new models of 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. The widespread availability of low-sulphur gasoline is important for the introduction of cars equipped with direct gasoline injection (already widely introduced for diesel engines), offering considerable potential for fuel efficiency and allowing a further reduction of NO_x emissions. 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.

Since 2000 new models of petrol-engined cars have been fitted with on-board diagnostics (OBD), constantly checking for proper functioning of the catalytic converter. OBD will become compulsory for diesel-engined cars from 2003, and for heavy commercial vehicles from 2005. In case of a deterioration of the vehicle's emission performance, OBD alerts the driver who should then have the vehicle repaired, ensuring emissions are minimised throughout the vehicle's operating life.

Emissions of lead to zero

In 2000, leaded petrol was phased out in 12 of the EU Member States. Italy, Greece and Spain obtained derogations, and in those countries leaded petrol disappeared roughly one year later. Over the past 15 years, lead emissions from road traffic have fallen in proportion to the increase in the share of unleaded petrol, and are now virtually at zero.

In certain countries, the share of diesel fuel sales clearly exceeds those of unleaded gasoline (Table 7.7 in Chapter 7.2 — Energy consumption). The burning of diesel fuel raises the question of particulate emissions. Vehicle emission standards have regulated the mass of particulates emitted, and these have been, and will continue to be

Table 7.14: 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 | PM ¹ | | |
| 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 ² | 4.5 | 1.1 | 8 | 0.612 | 0.36 |
| EURO II | 01.10.1996 | 13-mode ² | 4.0 | 1.1 | 7 | 0.15 | |
| EURO III | 01.01.2000 | ESC ² | 2.1 | 0.66 | 5 | 0.10 | |
| EURO III | 01.01.2000 | ETC ² | 5.5 | 0.78 | 5 | 0.16 | |
| EURO IV | 01.10.2005 | ESC ² | 1.5 | 0.46 | 3.5 | 0.02 | |
| EURO IV | 01.10.2005 | ETC ² | 4.0 | 0.55 | 3.5 | 0.03 | |
| EURO V | 01.10.2008 | ESC ² | 1.5 | 0.46 | 2 | 0.02 | |
| EURO V | 01.10.2008 | ETC ² | 4.0 | 0.55 | 2 | 0.03 | |

(1) CO = carbonmonoxide; NO_x = nitrogenoxide; VOCs = volatile organic compounds; PM = particulate matter.

(2) 13-mode = according to 88/77/EEC - engine mounted at test stand and measured in 13 stationary modes; ESC = European steady cycle; ETC = European transient cycle.

Source: Eurostat.

reduced. However, there is the suspicion that human health is particularly susceptible to the very smallest sizes of particle (nano-particles). Ironically, a consequence of reducing the mass of total particulate emissions has been that greater numbers of these nano-particle are emitted. Particulate filters (or traps) can reduce the mass and number of particles emitted and several manufacturers have already begun to fit them to their diesel vehicles.

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 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 7.15 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 efficiency) 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. Measures taken by the railway industry are divided between infrastructure operators (acoustic grinding of rails, noise barriers, speed limits at night) and train operators (replacement of cast-iron brakes with low-noise composite materials). 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. Since the first of April 2002, the EU enforced the use of aircraft that at least comply with the 'Chapter 3' noise emission standards. The United States already phased out the previous 'Chapter 2' standard in 1999.

Awaiting aircraft according to 'Chapter 4'

In June 2001, the ICAO Council adopted a new noise certification standard, to become 'Chapter 4'. The new standard will be obligatory applicable to new aircraft types submitted for certification after 1 January 2006 and voluntarily for aircraft originally certified according to 'Chapter 3' standards. The new noise standard is established for certification purposes and not as a basis for restrictions on operation of aeroplanes.

Avoid economic hardship for developing nations

The adoption of the new standard should be considered as an important step towards the improvement of the noise performance of air transport activities. However, since most of the current production aircraft already comply with the Chapter 4 standard, the impact of the adoption of 'Chapter 4' will only materialise over a longer period as fleets are modernised and renewed. Accompanying measures are therefore required to further improve the noise situation: apart from the fact that it is now widely recognised that certain operating restrictions can be imposed on an airport-by-airport basis (mainly for so-called 'city-airports'), measures will include the withdrawal of aircraft that only marginally comply with 'Chapter 3' noise emissions standards (so-called hush-kitted aircraft, i.e. modified aircraft to comply with 'Chapter 3' noise standards, but originally certified according to 'Chapter 2'). The Council of Ministers, with the support of the European Parliament, had adopted a non-addition regime preventing the further registration in the EU of such aircraft. Table 7.16

Table 7.15: 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 | . | 78 | . | 77 | . | 75 |
| Motorcycles ·80 - ·175cm ³ | . | 80-83 | . | 79 | . | 77 |
| Motorcycles ·175cm 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: DG Energy and Transport.

Table 7.16: Aircraft equipped with 'hushkits' (aircrafts in service only - situation: end 2001)

| | Total n° of aircraft in operation | of which certified Chapter 3 with hushkit | |
|----------------|-----------------------------------|---|------------|
| | | number | % of total |
| EU-15 | 4 872 | 84 | 2 |
| Belgium | 131 | 11 | 8 |
| Denmark | 191 | 2 | 1 |
| Germany | 899 | 1 | - |
| Greece | 88 | - | - |
| Spain | 438 | 11 | 3 |
| France | 664 | 6 | 1 |
| Ireland | 119 | 29 | 24 |
| Italy | 439 | 4 | 1 |
| Luxembourg | 56 | - | - |
| Netherlands | 233 | - | - |
| Austria | 163 | - | - |
| Portugal | 116 | - | - |
| Finland | 82 | 8 | 10 |
| Sweden | 178 | - | - |
| United Kingdom | 1075 | 12 | 1 |

Source: Airclaims CASE2 database.

outlines that 84 'hush-kitted' aircraft (2% of the EU-15 fleet) were still in service by the end of 2001.

Despite all regulatory measures taken at EU-level, undue economic hardship for operators from developing nations should be avoided. The Commission has taken steps allowing for the granting of exemptions where appropriate. Overall, a further improvement in the reduction of

noise pressure can be expected in the long term, it remains however to be seen if these improvements are not offset by a further increase of the air traffic intensity.

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 CO₂ 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').

Efficiency of use

A key to a further reduction of pollutant emissions is the efficiency of use of all transport modes. The more vehicles are efficiently used

Table 7.17: Total internal emissions of CO₂ by maritime vessels (in million t)

| | 1985 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Change 1985-1998 (%) |
|----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|
| Belgium | 7.3 | 13 | 13.3 | 13.2 | 13.6 | 13 | 12.4 | 14.3 | 16.1 | 17.2 | 136 |
| Denmark | 1.3 | 3 | 2.7 | 2.8 | 4.2 | 4.6 | 5 | 4.7 | 4.6 | 4.3 | 231 |
| Germany | 10.9 | 7.8 | 6.6 | 5.6 | 7 | 6.5 | 6.5 | 6.4 | 6.8 | 6.4 | -41 |
| Greece | 3.5 | 8 | 7.4 | 8.5 | 9.8 | 10.4 | 11.2 | 9.9 | 9.9 | 11 | 214 |
| Spain | 8.3 | 12 | 12.1 | 12.3 | 10.7 | 9.7 | 10 | 14.6 | 18 | 18.9 | 128 |
| France | 7.6 | 8 | 8.3 | 8.1 | 7.6 | 6.7 | 7.9 | 8.5 | 9.3 | 9 | 18 |
| Ireland | 0.1 | 0.1 | 0.1 | 0 | 0.2 | 0.1 | 0.4 | 0.5 | 0.5 | 0.5 | 400 |
| Italy | 10.8 | 8.4 | 8 | 7.7 | 7.7 | 7.4 | 7.7 | 7.3 | 7.5 | 8.3 | -23 |
| Luxembourg | - | - | - | - | - | - | - | - | - | - | - |
| Netherlands | 27.5 | 34.4 | 35.2 | 35.6 | 36.9 | 35.2 | 35.6 | 36.3 | 38.5 | 38.8 | 41 |
| Austria | - | - | - | - | - | - | - | - | - | - | - |
| Portugal | 1.5 | 1.9 | 1.9 | 1.9 | 1.6 | 1.5 | 1.5 | 1.6 | 1.6 | 1.2 | -20 |
| Finland | 1.5 | 1.8 | 1.7 | 2.1 | 1.7 | 1.3 | 1 | 1.2 | 1.3 | 1.6 | 7 |
| Sweden | 1.8 | 2.1 | 2.5 | 2.8 | 2.8 | 3.3 | 3.3 | 3.5 | 4.1 | 4.9 | 172 |
| United Kingdom | 6.6 | 7.8 | 7.7 | 7.8 | 7.6 | 7.1 | 7.6 | 8.2 | 9.1 | 9.5 | 44 |
| EU-15 | 88.6 | 108.4 | 107.6 | 108.4 | 111.4 | 107.1 | 110.1 | 116.9 | 127.3 | 131.8 | 49 |

Source: Eurostat.

(higher occupancy rate, eco-driving style), the less pollutant emissions per person per kilometre travelled are generated. Occupancy rates have tended to decrease for more than a decade in Europe both for passenger cars and for buses and coaches. The opposite trend appears in air transport, where a steady increase in the occupancy rate has taken place over the last 25 years (57% utilisation of available passengers-kilometres in 1975 against 71% in 1999). Occupancy rates for rail transport, at the level of the European Union, have remained more or less constant over the last 30 years. Regarding freight transport, efficiency has been increased in road transport, also due to a further liberalisation of this sector (cross-trade, cabotage – see Chapter 5.1), but especially for rail and air transport during the last two decades, even if it seems that the efficiency of the latter mode has – since 1994 – come to a limit which is difficult to improve.

Emissions of maritime transport

As for energy consumption, a clear allocation to individual Member States and even EU-15 of CO₂ emitted by international maritime vessels is not possible. It should be recalled that the combustion of marine fuel takes place largely in territories/waters other than those where the fuel has been bunkered. This shows the limits of a territorial allocation of emissions. Bearing this in mind, Table 7.17 shows the emissions of CO₂ of the individual countries, calculated on the basis of fuel sales. On the basis of EU-wide sales, it appears that throughout a large period of the 1990s, emissions have remained stable. Only for 1997 and 1998, a noticeable increase has been registered. Compared to 1985, total emissions in 1998 stood nearly 50% higher.

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)
- Regulation (EC) No 91/2003 of the European Parliament and of the Council of 16 December 2002 on rail transport statistics (OJ L 14, 21.01.2003)
- Council Regulation (EC) No 1172/98 of 25 May 1998 on statistical returns in respect of carriage of goods by road (OJ L 163, 6.6.1998 replaces Council Directive 78/546/EEC of 12 June 1978 and Council Directive 89/462/EEC of 18 July 1989).
- Regulation (EC) No 437/2003 of the European Parliament and of the Council of 27 February 2003 on statistical returns in respect of the carriage of passengers, freight and mail by air (OJ L 66, 11.3.2003).
- Council Directive 95/64/EC of 8 December 1995 on statistical returns in respect of carriage of goods and passengers by sea (OJ L 320, 30.12.1995)

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Contact points: Eurostat data shops (see list at the end of this publication)
<http://europa.eu.int/comm/eurostat/>

3. International statistical sources

- **United Nations — Economic Commission For Europe (UN-ECE)**
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- **European Conference of Ministers of Transport (ECMT)**

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- **Lloyd's/Lloyd's Maritime Information System**

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4. National statistical sources

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