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# Foreword

On this 50th anniversary of the Treaty of Rome, if political will has been the motor of European integration, transport has - to some extent - been the wheels, enabling people and goods to circulate in an increasingly larger Union.

Transport connects countries and their peoples but it also facilitates their economic growth - this recognition is at the heart of 'Keep Europe Moving', the mid-term review of the 2001 White Paper on EU transport policy.

Transport statistics are therefore not just about transport. They are an indicator of economic activity and European integration, as shown for instance by the increase in the proportion of intra-EU transport, both in terms of passengers and freight. Transport statistics are, of course, also useful for looking at problems such as aviation security, rising prices at the petrol pump and the impact of transport on health.

With this in mind, the fifth edition of the Panorama of Transport sets out to describe, from various angles, the development of the transport sector from 1990 to 2005 in the EU-25, a time span that saw two waves of enlargement, the largest in 2004. Reflecting transport's place in society, as well as its impact, the Panorama looks at infrastructure; equipment; enterprises, employment and economic performance; freight and passenger transport performance; safety, and lastly, energy consumption and the impact on the environment.

The Panorama principally exploits the wealth of data available on Eurostat's main dissemination database New Cronos, as well as various data compiled by different services and agencies of the EU, Japan and the United States. It must be noted that some of these data, out of Eurostat’s scope, could not be fully controlled and verified. Of course, the publication presents only a selection of the most important data available. Readers who wish to find out more or consult the freshest data are invited to visit Eurostat's dedicated transport pages.

**Hervé CARRE**
Director General

Eurostat

**Panorama of Transport, 1990-2005**

**Fifth edition**

This publication has been produced by Eurostat unit G5 responsible for transport. The opinions expressed are those of the individual authors alone and do not necessarily reflect the position of the European Commission.


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# 1. Transport in the EU

# 1. TRANSPORT IN THE EU

## Keeping Europe moving

There are close to 460 million citizens in the EU-25, and most of them will use transport to go to work, to go to school or to do the shopping, from the school child to the old-age pensioner. An average of 36 kilometres will be travelled every day, and 27 of these will be by car. In fact, in 2005 there was 1 car for every two inhabitants (Chapter 3). The ever-increasing mobility of citizens is today part of everyday life.

And when it comes to filling up the shelves in shops, forwarding energy and building materials for transport and our homes, among others, one tonne of goods will travel a daily average distance of 23 kilometres for every EU citizen, 10 of these going by road.

Mobility of persons and goods is an essential component of the competitiveness of European industry and services; mobility is also an essential citizen right. The goal of the EU's sustainable transport policy is to ensure that our transport systems meet society's economic, social and environmental needs, as highlighted by the mid-term review of the 2001 White Paper, 'Keep Europe moving' (see box). Effective transportation systems are essential for Europe's prosperity, having significant impacts on economic growth, social development and the environment.

The trans-European transport network (TEN-T) plays a crucial role in securing the free movement of passengers and goods in the European Union. It is a key element in the relaunched Lisbon strategy for competitiveness and employment in Europe for these reasons alone: to unblock major transport routes and ensure sustainable transport, including through major technological projects (Chapter 2).

With all this in mind, it therefore comes as no surprise that transport is an integral part of the Treaty establishing the European Community (see box), with statistics playing a key role in implementing EU transport policy.

### The momentum for EU transport policy starts in the treaties

(Extracts from the Treaty establishing the European Community, incorporating changes made by the Treaties of Maastricht and 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 waterways.

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

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.

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. (...)

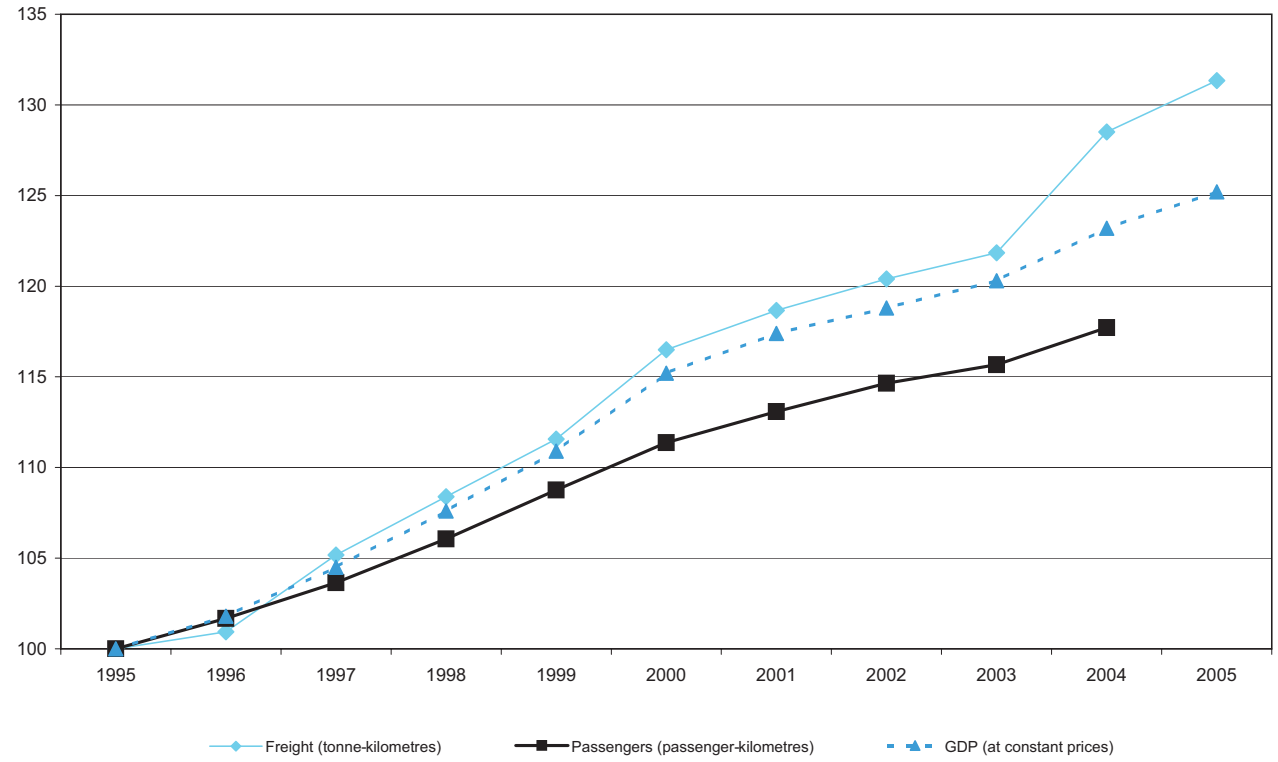
*For more information, visit: http://eur-lex.europa.eu/en/index.htm*

## A mirror of the economy

Trends in transport mirror economic developments to some extent. While goods transport (measured in tonne kilometres) grew on average by 2.8 % per year between 1995 and 2005 in the EU-25 - thereby surpassing average growth in GDP (at constant prices) of 2.3 % - passenger transport increased by a slower rate of 1.8 % (based on data covering the 1995-2004 period and measured in passenger kilometres). Overall, against a 25 % increase in GDP between 1995 and 2005, goods transport grew by 31 %. Passenger transport went up by 18 % between 1995 and 2004, against an increase in GDP of 23% over the same period(Figure 1.1).

Changes in the structure and location of manufacturing industries, changes in production methods due to demands for 'just-in-time' shipments, growing requirements for staff mobility in the services sector and the general increase in car ownership, leisure time and disposable income… all of these factors determine this global development.

**Figure 1.1 Evolution of freight and passenger transport compared with growth in GDP (at constant prices), 1995-2004/5 (1995 = 100)**




*Source:* DG Energy and Transport

## Road dominates

Road transport clearly dominates transport. This transport mode in fact becomes the leitmotif throughout the Panorama, independently of editorial engineering.

The road transport share accounted for about 84 % of passenger transport performed in 2004 when passenger cars, powered two-wheelers and buses and coaches are taken together. In freight, however, although road transport accounted for the single largest share (44 %) in 2005, sea transport was not far behind with a share of 39 % (Figure 1.2).

### 'Keep Europe moving'

...A fitting title for steering EU transport policy forward in today's Europe. The Commission communication 'Keep Europe moving - Sustainable mobility for our continent'* of 2006 builds on the objectives of EU transport policy since its major relaunch in 1992 and on the measures identified in the 2001 White Paper 'European transport policy for 2010: time to decide'.

The White Paper identified as main challenges the imbalance in the development of the different transport modes, congestion on routes and cities, as well as in airspace, and the impact on the environment. It proposed policies to adjust the balance between the modes, stressed the need to do away with bottlenecks in the trans-European networks (TENs) and to reduce the number of road accidents. It called for an effective policy on infrastructure charging and argued that its position in international organisations should be strengthened.

However, the White Paper expected a strong economic growth which did not materialise as such. Moreover, the measures envisaged were judged insufficient on their own to continue achieving the fundamental objectives of EU policy, in particular to contain the negative environmental and other effects of transport growth while facilitating mobility as the quintessential purpose of transport policy.

**A more flexible transport policy toolbox**

The orientations of the transport policy outlined in the mid-term review build upon the White Paper, notably the continuity of sustainable mobility policy in Europe, while offering a more flexible toolbox for tackling problems and for addressing new challenges arising from a different context of an enlarged Europe, menacing petrol prices, Kyoto commitments and globalisation. The key policy objectives are built around four main pillars:

- Mobility - the EU must offer the necessary level of mobility to people and business protection, innovation and the international dimension.
- Protection - protect the environment, ensure energy security, promote minimum labour standards, protect the passenger and the citizen.
- Innovation - increase the efficiency and sustainability of the growing transport sector, develop & bring to the market new innovative solutions.
- International dimension - the EU must be a united, leading player on the international transport stage.

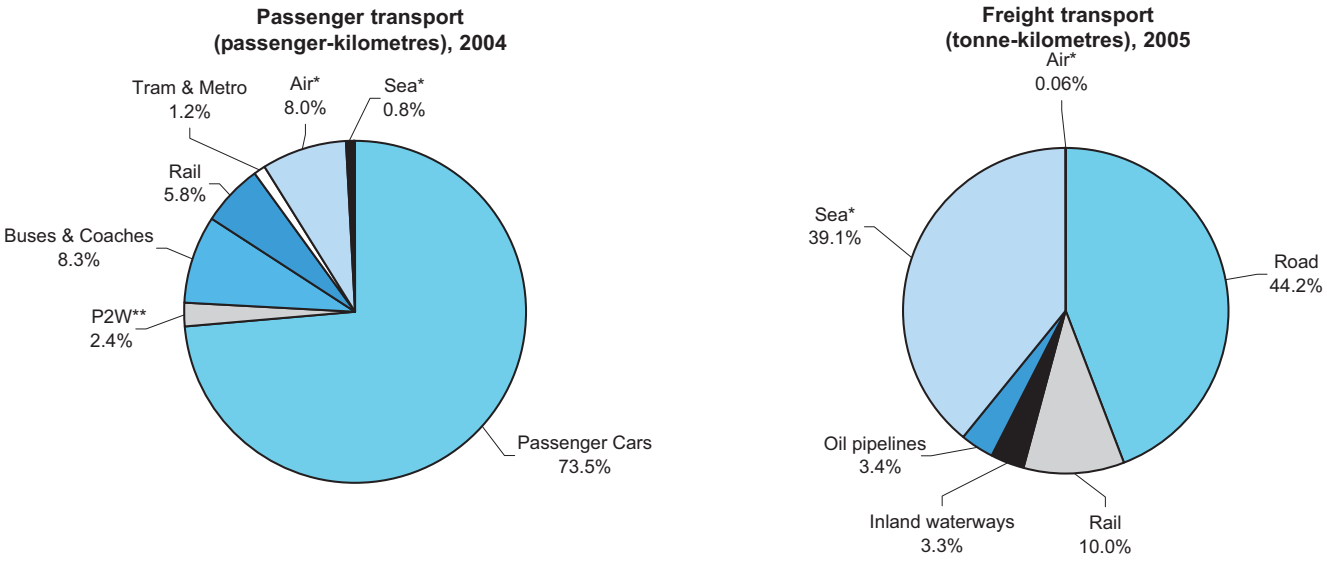
Next to actions foreseen in the 2001 White Paper, such as boosting rail and maritime connections for long distance freight transport, additional instruments to achieve these objectives are foreseen. These include a freight logistics action plan to create better synergies between road, sea, rail and river, and to integrate various transport modes in logistics chains. This will give the industry a competitive edge but also diminish the environmental impact per unit of freight.

Other tools include intelligent transport systems to make mobility greener and more efficient; a debate on how to change mobility of people in urban areas; an action plan to boost inland waterways; and an ambitious programme for green power in trucks and cars.

*For more information, visit: http://ec.europa.eu/transport/transport_policy_review/index_en.htm*

** Communication from the Commission to the Council and the European Parliament 'Keep Europe moving - Sustainable mobility for our continent', the mid-term review of the European Commission's 2001 Transport White Paper, COM(2006) 314 of 22.6.2006.*

**Figure 1.2 Comparative modal shares of passenger and freight transport**

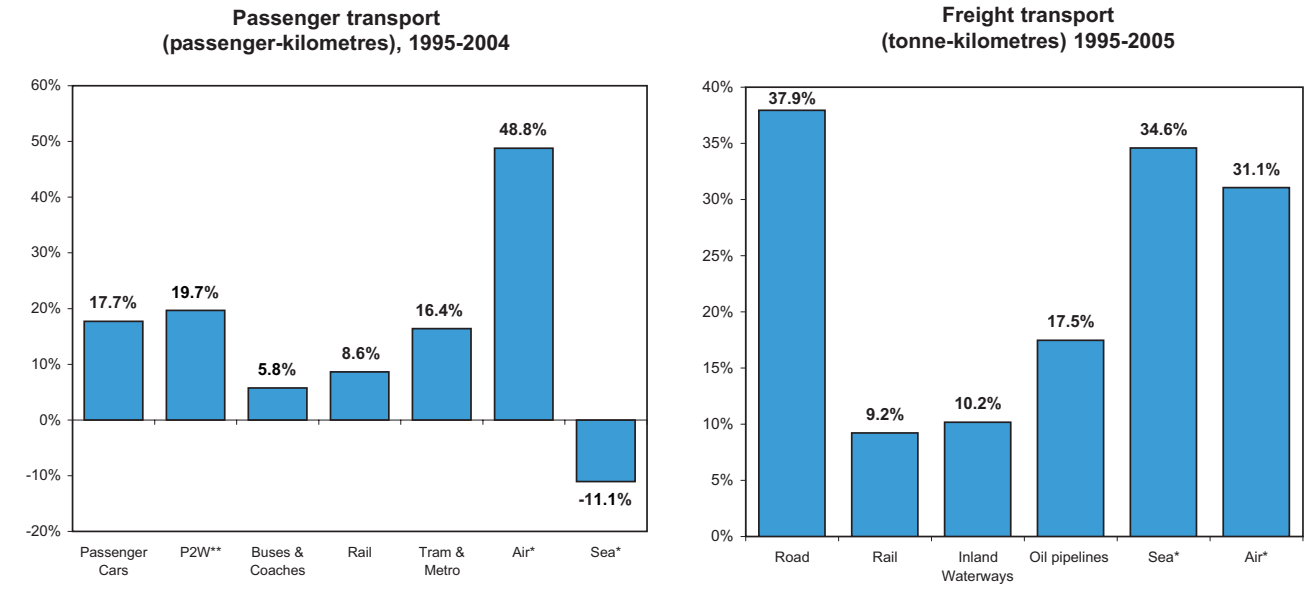



*Source:* DG Energy and Transport

*Air and sea: data only include intra-EU traffic and are estimates made by the Commission based on airport-to-airport data collected under Regulation (EC) 437/2003 and on port-to-port data collected under Council Directive 95/64/EC.
**'P2W': Powered two-wheelers.

Demand factors, such as a reduction in heavy bulk transport and the increasing importance of door-to-door and just-in-time services, have undoubtedly contributed to the high modal share of road transport and particularly its growth in freight of 38 % - the fastest growth recorded of all transport modes (Figure 1.3).

**Figure 1.3 Evolution of passenger and freight transport, EU-25, 1995-2004/5**




*Source:* DG Energy and Transport

*Air and sea: data only include intra-EU traffic and are estimates made by the Commission based on airport-to-airport data collected under Regulation (EC) 437/2003 and on port-to-port data collected under Council Directive 95/64/EC.
**'P2W': Powered two-wheelers.

The shares carried by rail were 6 % for passenger transport and 10 % for freight transport, the results of around 9 % growth on 1995 figures. With regard to rail freight, the largest increases were generally recorded in those Member States that opened up their rail market early.

Air transport was, perhaps unsurprisingly, clearly more important for passenger transport (with an 8 % share), in which it also recorded the fastest growth of all transport modes (49 %). This was in spite of the decline following the 11 September attacks, reflecting the process of liberalisation already begun in the late 1980s.

By contrast, sea transport was clearly more important for freight transport, registering the second fastest growth after road transport (35 %), but the only decline in passenger transport (-11 %), a trend reflecting for example the shift from ferry transport to other transport modes, such as rail or road.

Although freight performance over inland waterways only increased by 10 % in the EU-25, growths were much larger in certain Member States (50 % in Belgium and 30 % in France). See Chapter 5.

## An industry in its own right

As shown in Chapter 4, the transport services sector in the European Union is an important industry in its own right and makes a major contribution to the functioning of the European economy as a whole: the sector accounted for EUR 363 billion in value added and employed about 8.2 million people in 2004. These figures represent around 7 % of the non-financial business economy (NACE Sections C-K less J) respectively.

This is without counting the transport equipment industry which adds, for example, a further 3 million persons, or the numerous other sectors or services which depend to varying degrees on transport; the tourist industry is an obvious example.

## At least 43 000 killed in transport accidents in 2005

In 2005, the death toll arising from transport accidents stood at upwards of 43 000, with the relatively low level of fatalities in rail, sea and air transport accidents standing in sharp contrast to the around 41 300 road fatalities (Chapter 6).

Major progress has been made towards improving maritime and aviation safety, including most recently the introduction of a blacklist of unsafe airlines. A broad set of common safety standards is enforced with the help of the dedicated European maritime, aviation and railway agencies: EMSA, EASA and ERA. With regard to road safety, the Commission's target of halving the number of deaths in the period 2001 to 2010 remains valid and numerous initiatives are underway to raise awareness, improve vehicle design and technology.

## Road transport largest energy guzzler and polluter

Finally, but clearly not least importantly, is transport's impact on energy resources and our environment, and particularly that of road transport, as is spotlighted in Chapter 7. In 2004, road transport was clearly the largest energy consumer, eating up almost 83 % of total final energy consumption. It was also the largest emitter of greenhouse gases, among transport modes ejecting 93 % of transport emissions (excluding international aviation and maritime transport, as well as electrical traction for rail transport).

# 2. Transport infrastructure

# 2. TRANSPORT INFRASTRUCTURE

## The arteries and connections to make transport go around

The EU possesses one of the world's densest transport networks, with roads, rail- and waterways and air corridors criss-crossing one another. For rail and motorway networks, for example, the EU counts considerably more infrastructure per 1000 km$^2$ than the United States, and not much less than Japan. This density reflects a number of factors, including of course relative population density and transport demand.

Moreover, the EU's unprecedented enlargement in 2004 has added to the network, spreading it principally eastwards and making it continental. This network will continue to develop through time when these countries' own infrastructures adapt to changing transport needs, together with increased connections between east- and western Europe and between the EU and beyond.

In its mid-term review of the 2001 White Paper, 'Keep Europe Moving', the Commission reaffirmed its commitment to promoting high-quality and safe infrastructure through optimising existing capacity by either creating new or upgrading existing infrastructure. This includes encouraging the development of rail, sea and inland waterway transport infrastructure as viable and sustainable alternatives to congested road corridors.

When looking at the breakdown of the EU-25's transport network in 2003 - an estimated 5.1 million km comprising road, rail, inland waterways and oil pipelines - the road network (including motorways) represented about 95 % of the total, leaving a 'modal share' of only around 4 % to rail, and the remainder to inland waterways and oil pipelines.

Of the estimated 20 % growth in the entire network over the 1990-2003 period, the most significant evolution concerned road infrastructure, and especially motorways which grew by around 41 % (Table 2.1). Other roads extended by about 22 %, although readers should be aware that, given problems of data comparability, this percentage change is not watertight. It is a different picture however for rail, which saw around 8 % of its lines withdrawn from service. Pipelines - carrying oil - also increased by 13 %.

**Table 2.1 Evolution of main networks*, EU-25, 1990-2003 (in km)**

| | 1990 | 2003 | % change 1990-2003 |
|---|---|---|---|
| **Total network, of which:** | ***4 279 666*** | ***5 142 900*** | ***20%*** |
| **Railway lines** | 215 441 | 198 963 | -8% |
| **Roads (exc. motorways)** | *3 960 000* | *4 820 000* | *22%* |
| **Motorways** | 41 125 | *58 100* | *41%* |
| **Oil pipelines** | *25 400* | *28 700* | *13%* |
| **Inland waterways** | *37 700* | *:* | *:* |

*Source:* Eurostat, national statistics, DG Energy and Transport

*The network comprises the length of the respective transport way and not the total of component tracks, lanes or two-way directions.

## Table 2.2 Evolution of selected main networks*, by country, 1990-2003 (in km)

| | | EU-25 | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | Railways | 215 441 | 3 479 | : | 9 451 | 2 344 | 40 981 | 1 026 | 1 944 | 2 484 | 14 539 | 34 070 | 16 066 | - | 2 397 | 2 007 | 271 | 7 838 |
| | Motorways | 41 125 | 1 666 | 273 | 357 | 663 | 10 854 | 41 | 26 | 190 | 4 693 | 6 824 | 6 193 | 120 | - | 421 | 78 | 267 |
| | Oil pipelines | *25 400* | 301 | 578 | : | 330 | 3 038 | - | - | - | 2 678 | 4 948 | 4 086 | - | 766 | : | - | 2 574 |
| | Inland waterways | *37 700* | 1 515 | 470 | : | - | 6 669 | : | - | 6 | 70 | 6 197 | 1 366 | - | 347 | 369 | 37 | 1 373 |
| 2000 | Railways | 201 547 | 3 471 | 4 320 | 9 444 | 2 273 | 36 588 | 968 | 1 919 | 2 385 | 13 868 | 29 272 | 16 187 | - | 2 331 | 1 905 | 274 | 8 005 |
| | Motorways | 54 431 | 1 702 | 319 | 499 | 978 | 11 712 | 93 | 103 | 707 | 9 049 | 9 766 | 6 478 | 257 | - | 417 | 114 | 448 |
| | Oil pipelines | 27 143 | 294 | 578 | 736 | 330 | 2 370 | - | - | - | 3 780 | 5 746 | 4 346 | - | 766 | 500 | - | 848 |
| | Inland waterways | : | 1 534 | 470 | 664 | - | 6 754 | 320 | - | 6 | : | 5 789 | 1 477 | - | 106 | 380 | 37 | 1 373 |
| 2001 | Railways | 198 300 | 3 454 | 4 320 | 9 523 | 2 273 | 35 986 | 967 | 1 919 | 2 377 | 13 868 | 29 445 | 16 357 | - | 2 305 | 1 696 | 274 | 7 736 |
| | Motorways | 55 965 | 1 727 | 324 | 517 | 972 | 11 786 | 93 | 125 | 742 | 9 571 | 10 068 | 6 478 | 257 | - | 417 | 126 | 448 |
| | Oil pipelines | 27 575 | 294 | : | 736 | 330 | 2 370 | - | - | - | 3 779 | 5 746 | 4 358 | - | 766 | 500 | - | 848 |
| | Inland waterways | : | 1 527 | 470 | 664 | - | 6 687 | 320 | - | 6 | : | 5 378 | 1 477 | - | : | 436 | 37 | 1 484 |
| 2002 | Railways | 198 603 | 3 518 | 4 318 | 9 600 | 2 273 | 35 814 | 967 | 1 919 | 2 383 | 13 856 | 29 352 | 16 307 | - | 2 270 | 1 775 | 274 | 7 949 |
| | Motorways | *56 200* | 1 729 | 324 | 518 | 1 010 | 12 037 | 98 | 125 | : | 9 739 | 10 223 | 6 487 | 268 | - | 417 | 147 | 533 |
| | Oil pipelines | 27 600 | 294 | 578 | 736 | 330 | 2 370 | - | - | - | 3 784 | 5 746 | 4 379 | - | 766 | 500 | - | 848 |
| | Inland waterways | : | 1 527 | 470 | 664 | - | 6 642 | 320 | - | 6 | : | 5 637 | 1 477 | - | : | 477 | 37 | 1 440 |
| 2003 | Railways | 198 963 | 3 521 | 4 318 | 9 602 | 2 273 | 36 054 | 959 | 1 919 | 2 414 | 14 387 | 29 269 | 16 287 | - | 2 270 | 1 774 | 275 | 7 950 |
| | Motorways | *58 100* | 1 729 | 328 | 518 | 1 027 | 12 044 | : | 176 | : | 10 296 | 10 379 | 6 487 | 268 | - | 417 | 147 | 542 |
| | Oil pipelines | *28 700* | : | : | 674 | 330 | 2 370 | - | - | - | : | 5 746 | : | - | 766 | 500 | - | 2 047 |
| | Inland waterways | : | 1 516 | : | 664 | - | 6 636 | 320 | - | : | : | 5 384 | : | - | : | 290 | : | 1 440 |

| | | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | HR | TR | LI | NO | CH | US | JP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | Railways | 2 798 | 5 624 | 26 228 | 3 064 | : | 1 196 | 3 660 | 5 846 | 11 193 | 16 914 | : | : | : | 4 044 | 2 978 | 192 732 | : |
| | Motorways | 2 092 | 1 445 | 257 | 316 | 113 | 228 | 192 | 225 | 939 | 3 181 | 291 | 281 | - | 73 | 1 148 | : | : |
| | Oil pipelines | 391 | 777 | 2 039 | - | 3 694 | - | - | - | - | 2 462 | 865 | : | - | 521 | 239 | 343 651 | : |
| | Inland waterways | 5 046 | 351 | 3 997 | 124 | 1 782 | - | : | 6 072 | 390 | 1 631 | : | - | - | - | 21 | 41 484 | : |
| 2000 | Railways | 2 802 | 5 683 | 22 560 | 2 814 | 11 364 | 1 201 | 3 662 | 5 854 | 11 037 | 17 044 | 2 726 | 8 671 | 9 | 4 179 | 3 216 | 159 792 | : |
| | Motorways | 2 289 | 1 633 | 358 | 1 482 | 113 | 427 | 296 | 549 | 1 499 | 3 600 | 411 | 1 773 | - | 144 | 1 270 | 89 426 | : |
| | Oil pipelines | 418 | 777 | 2 278 | - | 4 423 | - | - | - | - | 3 954 | 601 | 2 112 | - | 7 908 | 108 | 249 120 | : |
| | Inland waterways | : | 351 | 3 813 | : | 1 779 | - | 172 | 7 842 | : | 1 153 | : | - | - | - | 745 | 42 000 | : |
| 2001 | Railways | 2 809 | 5 549 | 20 134 | 2 814 | 11 364 | 1 229 | 3 662 | 5 850 | 11 021 | 17 052 | 2 726 | 8 671 | 9 | 4 178 | 3 224 | 157 485 | : |
| | Motorways | 2 499 | 1 645 | 398 | 1 659 | 113 | 435 | 296 | 591 | 1 507 | 3 609 | 429 | 1 851 | - | 143 | 1 305 | 89 996 | : |
| | Oil pipelines | 418 | 777 | 2 285 | - | : | - | - | - | - | 4 368 | 601 | : | - | 7 941 | 108 | 255 167 | : |
| | Inland waterways | : | 351 | 3 812 | : | 1 779 | - | 172 | 7 872 | : | 1 153 | : | - | - | - | : | 42 000 | : |
| 2002 | Railways | 2 806 | 5 616 | 20 223 | 2 818 | 11 364 | 1 229 | 3 657 | 5 850 | 11 095 | 17 052 | 2 726 | 8 671 | 9 | 4 077 | 3 222 | 161 201 | 27 517 |
| | Motorways | 2 516 | 1 645 | 405 | 1 836 | : | 457 | 302 | 603 | 1 544 | 3 609 | 455 | 1 851 | - | 173 | 1 342 | 89 848 | : |
| | Oil pipelines | 418 | 777 | 2 285 | - | 4 305 | - | - | - | - | 4 367 | 601 | : | - | : | 108 | 259 514 | : |
| | Inland waterways | : | 351 | 3 640 | : | : | - | 172 | 7 872 | : | 1 065 | : | - | - | - | : | 42 000 | : |
| 2003 | Railways | 2 811 | 5 656 | 19 900 | 2 818 | 11 364 | 1 229 | 3 657 | 5 851 | 11 037 | 17 050 | 2 726 | 8 697 | 9 | 4 077 | 3 231 | 159 593 | : |
| | Motorways | 2 541 | 1 670 | 405 | 2 002 | : | 477 | 313 | 653 | 1 591 | 3 609 | 554 | 1 881 | - | 213 | 1 351 | 91 287 | 7 196 |
| | Oil pipelines | : | 777 | 2 293 | - | : | - | - | - | - | 4 325 | : | : | - | 944 | 108 | 258 998 | : |
| | Inland waterways | : | 351 | 3 643 | : | : | - | 172 | 7 884 | : | 1 065 | : | - | - | - | : | 42 000 | : |

*Source*: Eurostat, national statistics, DG Energy and Transport, North American Transportation Statistics Database, OECD

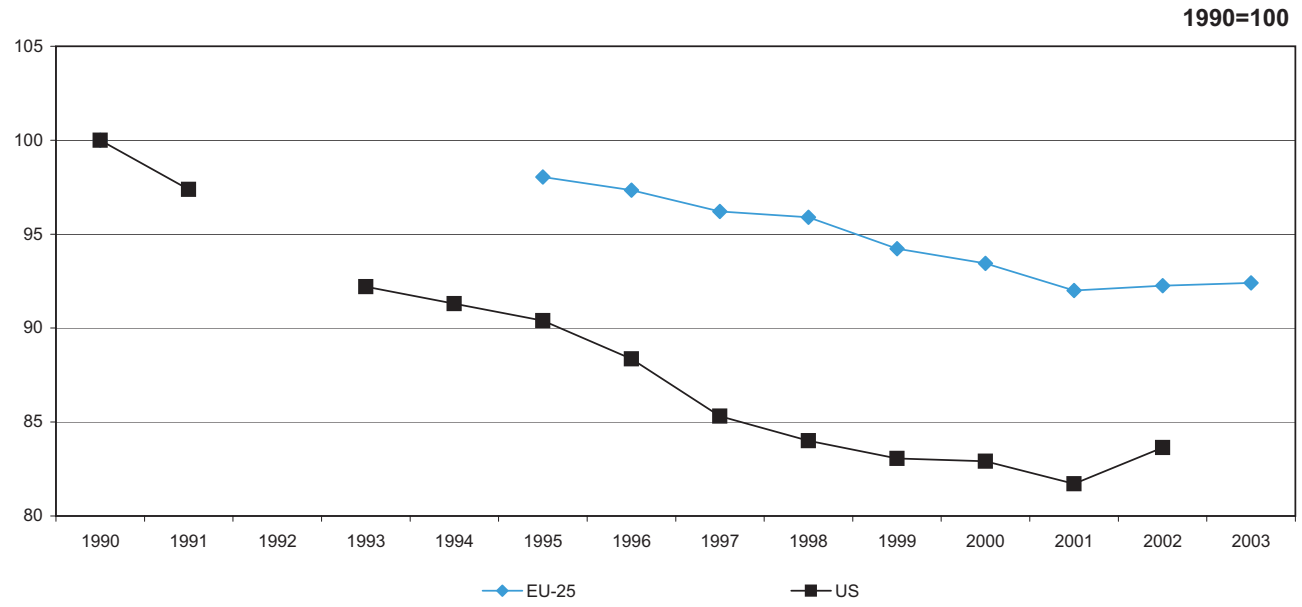
*Due to problems of data comparability, notably differences in the definition of roads, data on roads other than motorways are not shown in this table. Please see Table 2.5.
MT: None of these transport modes apply.

## Railway network loses lines

As shown in Figure 2.1, railway length in the EU-25 declined between 1990 and 2003 by close to 8 %. This decrease was however half as much as that recorded by the United States (16 %), based on comparable 2002 data available.

Data for the 1995-2003 period show that EU-25 infrastructure decreased pretty much steadily between 1995 and 2001. While in 2002 infrastructure extent started to turn upwards in the United States, rising by almost two percentage points, growth was only very slight in the EU.

**Figure 2.1 Evolution of railways*, EU-25 and US, 1990-2003** (based on km)**




*Source:* Eurostat, North American Transportation Statistics Database

*Length of line in km, as opposed to track extent.
** No data available for: EU-25 between 1991 and 1994; US for 1992 and 2003.

In 2003, the total length of railways - in terms of line length - in the EU-25 spanned close to 199 thousand km, and half of these were electrified (Table 2.3). With regard to network density, the EU-25 counted 50 km of railway lines per 1000 km$^2$ in 2003, much more than the density in the United States (17 km / 1000 km$^2$) but only about two-thirds as much as in Japan (73 km / 1000 km$^2$ in 2002).

When interpreting these differences, however, readers should also take into account the huge differences in the size of territory. The EU-25 is well over 10 times the size of Japan, and only two-fifths as large as the United States.

With 36 054 km, Germany had the longest network, representing a share of over 18 % of the EU-25 total. The next largest networks were in France (14.7 %) and Poland (10 %). However, from the angle of network density, the Czech Republic ranked first with 122 km per 1000 km$^2$, ahead of Belgium (115 km) and Luxembourg (106 km). In fact, Germany's density came fourth place with 101 km.

Interestingly, the lowest density in Finland (with 17 km per 1000 km$^2$) illustrates the typical situation of a country with a large-territory / low-population ratio. When replacing the parameter of area by the number of inhabitants, Finland recorded 112 km of track per 100 000 inhabitants, second to Sweden with 123 km, which had the highest ratio.

Although one could expect an area ratio similar to Finland's in neighbouring Sweden, its network density of 25 km/1000 km$^2$ was not far behind that in slightly larger Spain (28 km/1000 km$^2$), ratios which reflect these countries' respective network lengths of 11 037 and 14 387 km.

**Table 2.3** Railways*: key indicators, 2003 (in km)

| | km | % electrified | km/100 000 inhab. | km/1000 km$^2$ |
|---|---|---|---|---|
| **EU-25** | **198 963** | ***50*** | **44** | ***50*** |
| **BE** | 3 521 | 83 | 34 | 115 |
| **BG** | 4 318 | 66 | 55 | 39 |
| **CZ** | 9 602 | 31 | 94 | 122 |
| **DK** | 2 273 | 27 | 42 | 53 |
| **DE** | 36 054 | 55 | 44 | 101 |
| **EE** | 959 | 14 | 71 | 21 |
| **IE** | 1 919 | 3 | 48 | 27 |
| **EL** | 2 414 | 3 | 22 | 18 |
| **ES** | 14 387 | 57 | 35 | 28 |
| **FR** | 29 269 | 50 | 49 | 54 |
| **IT** | 16 287 | 69 | 28 | 54 |
| **LV** | 2 270 | 11 | 97 | 35 |
| **LT** | 1 774 | 7 | 51 | 27 |
| **LU** | 275 | 95 | 61 | 106 |
| **HU** | 7 950 | 36 | 78 | 85 |
| **NL** | 2 811 | 73 | 17 | 68 |
| **AT** | 5 656 | 58 | 72 | 69 |
| **PL** | 19 900 | 60 | 52 | 64 |
| **PT** | 2 818 | 38 | 27 | 31 |
| **RO** | 11 364 | 35 | 52 | 48 |
| **SI** | 1 229 | 41 | 62 | 61 |
| **SK** | 3 657 | 43 | 68 | 75 |
| **FI** | 5 851 | 41 | 112 | 17 |
| **SE** | 11 037 | 69 | 123 | 25 |
| **UK** | 17 050 | 31 | 29 | 70 |
| **HR** | 2 726 | 36 | 61 | 48 |
| **TR** | 8 697 | 20 | 12 | 11 |
| **LI** | 9 | : | 26 | 56 |
| **NO** | 4 077 | 62 | 90 | 13 |
| **CH** | 3 231 | 100 | 44 | 78 |
| **US** | 159 593 | : | 55 | 17 |
| **JP** | 27 517** | : | 22 | 73 |

*Source:* Eurostat, national statistics, DG Energy and Transport, North American Transportation Statistics Database

*Length of line, as opposed to track extent.
**2002 data.
Note that CY and MT do not have any railway network.

The low rail network density for Greece (18 km per 1000 km$^2$), second to Finland's, is mainly due to the geographical characteristics of the country: numerous islands and extensive mountainous regions.

When it comes to the share of tracks electrified, approximately half the lines in the EU-25 used this power in 2003. The Benelux countries had the highest shares, with for example four fifths of Belgium's network using electricity. Four countries had less than a fifth of their network thus powered, including Ireland and Greece where shares were only 3 %.

The 8 % decline in railway line length in the EU-25 was the net result of mainly decreases - and the largest decreases recorded - in the three largest networks in Germany (12 %), France (14 %) and Poland (24 %). These were offset by only small increases in at least eight Member States, ranging between around 0.5% and 3 %. Of note also is the relative stability recorded in the large rail networks of the UK, Italy, Spain and Sweden: changes of around +/- 1%.

## Lorries take the train on Europe's longest freight rail highway

Europe's longest lorrytrailer-carrying railway freight service will start operating commercially in July 2007. The 1 060 kilometre-long 'piggy-back' transit line will transport trailers from Bettembourg in Luxembourg to Boulou (near Perpignan) in the south of France, close to the Spanish border.

The rail service needs about 14 hours to make the journey. Not only will it help to reduce road congestion and cut journey times (down from around 20 hours), the service is also expected to reduce transport costs.

Echoing the drive-on capability of EuroShuttle - the Channel train carrying cars under the Tunnel - the Bettembourg-Boulou rail-freight line allows lorry drivers to load their lorries directly on the train using a system of pivotal rail trailers. The initial capacity of some 30 000 trailers by year is expected to increase to some 300 000 trailers by 2015.

The Bettembourg-Boulou rail-freight line - a perfect marriage between road and rail transport - is a prime example of how intermodality can work. The line is about 2.5 times as long as the similar service in operation between Fribourg in Germany and Novara in Italy.

*For more information, visit: http://www.lorry-rail.com/home/*

### Putting 'interoperability' onto the rails through ERTMS…

For locomotives, crossing a frontier still remains somewhat exceptional, and only a few locomotives are equipped with the multiple systems required to easily cross national borders. This is because the rail systems around the EU are still very national in terms of different systems for signalling, security, tunnel clearance and sometimes even gauge!

Taking the Thalys high-speed train as an example, which connects Paris, Brussels, Cologne and Amsterdam, it must be equipped with no less than seven different systems, including specific sensors and control panels. This complexity leads to additional costs and an increased risk of breakdowns, not to mention making the driver's job considerably more complicated.

This is where the European rail traffic management system (ERTMS) has an important role to play. ERTMS aims to remedy this lack of unification in the area of signalling and speed control - a major obstacle to the development of international rail traffic. Information is transmitted from the ground to the train, where an on-board computer uses it to calculate, for example, the maximum authorised speed and then automatically slows down the train if necessary.

Other initiatives include the development of locomotives that can be adapted to lines with different voltages or even run on several voltages, and of course the move away from different gauges.

*For more information, visit: http://ec.europa.eu/transport/rail/interoperability/ertms_en.htm*

## High-speed lines firmly rooted

Aided in recent years by the Trans-European Networks in Transport, known more familiarly as 'TEN-T' (see below), dedicated high-speed railway lines - capable of speeds of 250 km/h or more - increased between 1990 and 2003 to reach a total extent of 2 799 km in the EU-25 (Table 2.4). This said, up to at least 2003, such high-speed lines were only present in 5 countries: France (with a share of 50 %), Germany (23 %), Spain (13 %), Italy (8 %) and Belgium (5 %).

France was clearly the main contributor to the network between 1990 and 2003, and indeed the only one at the very outset. France's contribution almost doubled from 667 km to 1124 km between 1990 and 1995, to match almost as much as the shares of the other four countries taken together. Based on a complete set of data for the 1996-2003 period, growth in Belgium was proportionally the steepest, with its network growing almost 11-fold. Although the Eurostar network is present in the United Kingdom, this country's lines had not been adapted for high speeds of at least 250 km/h by 2003, which is why they are not included in Table 2.4.

**Table 2.4 Evolution in the EU's high-speed rail network*, 1990-2003 (in km)**

| | Belgium | Germany | Spain | France | Italy | EU-15 |
|---|---|---|---|---|---|---|
| **1990** | - | : | - | 667 | : | **:** |
| **1995** | - | : | 377 | 1 124 | : | **:** |
| **1996** | 12 | 434 | 377 | 1 152 | 237 | **2 212** |
| **1997** | 71 | 434 | 377 | 1 152 | 237 | **2 271** |
| **1998** | 71 | 486 | 377 | 1 147 | 237 | **2 318** |
| **1999** | 73 | 491 | 377 | 1 147 | 237 | **2 325** |
| **2000** | 73 | 491 | 377 | 1 147 | 237 | **2 325** |
| **2001** | 73 | 510 | 377 | 1 382 | 237 | **2 579** |
| **2002** | 127 | 644 | 377 | 1 400 | 237 | **2 785** |
| **2003** | 140 | 645 | 377 | 1 400 | 237 | **2 799** |

*Source: DG Energy and Transport*

*Lines capable of speeds of 250 km/h or more.

### High-speed rail stretches out

Pioneered by the Japanese in the mid-sixties, high-speed trains have increasingly been bolting across parts of Europe, in France (TGV, Eurostar and Thalys), Germany (ICE and Thalys), Spain (AVE), Italy (Eurostar Italia) and Belgium (Eurostar and Thalys).

The aim is to further expand this high-speed rail grid by connecting up more and more networks. Around 2 500 km of line are currently under construction or at the planning stage. The longest of these is clearly the TGV-Est between Paris and Strasbourg (302 km). This is followed by several lines of around 200 km long between: Rome and Naples; Milan and Bologna; Madrid and Valladolid; and Nyland and Umeå (Sweden).

Although the EU's high-speed network in 2003 only counted five Member States, this number will certainly grow to include many others, first among which will probably be Sweden, the Netherlands, the United Kingdom and Portugal.

See TEN-T section below.

## Road network: big and still growing

As could be expected, of all the transport networks the road network (comprising motorways, state roads, provincial roads and communal roads) is the densest. Given that the different types of roads are open to various interpretations by Member States, problems of comparability arise between Member States and when comparing different years. For example, 'communal roads' sometimes includes roads without a hard surface.

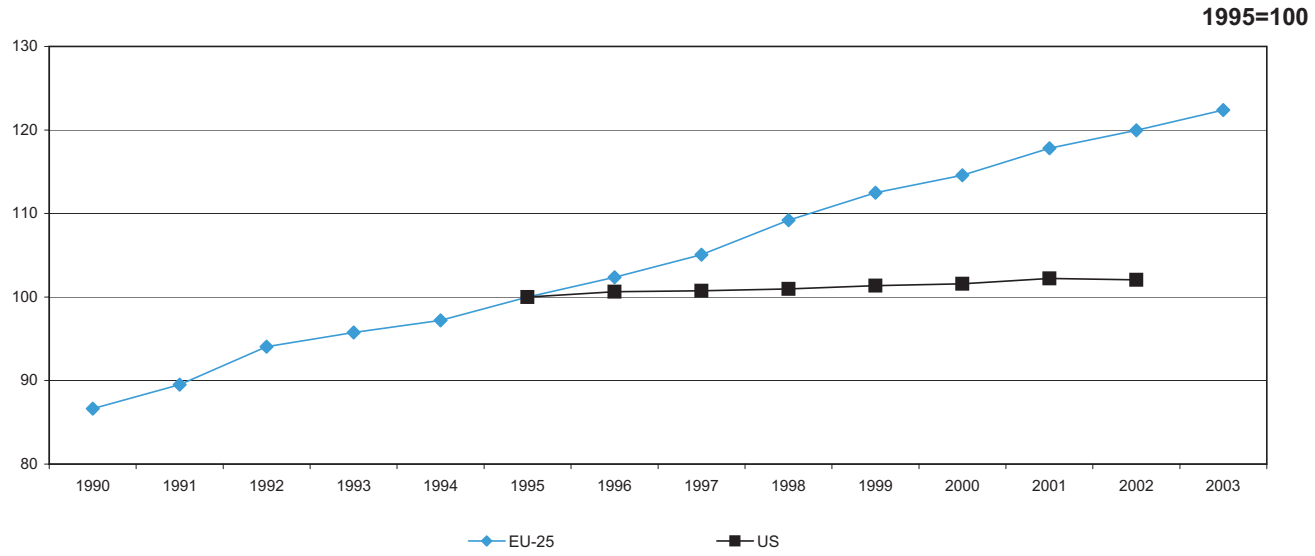
Based on the latest available data, however, it is possible to reasonably estimate that roads formed a network of about 4.8 million km in 2003. With this length, and a bit of imagination, you could drive at least 120 times around the Earth, although drivers in the United States would get to do the round trip more often with their network of 6.4 million km! This said, in terms of network density, the EU-25 counted about 1 200 km per 1000 $km^2$, considerably more than the US (690 km per 1000 $km^2$), but much less than Japan's (about 3 100 km per 1000 $km^2$).

## Motorways: in the fast lane

Motorways are continually extending across the EU, yet here again there is no single definition of what a motorway is, which makes country comparisons only very tentative. As shown in Figure 2.2 (page 14), between 1990 and 2003, the length of the EU's motorway network grew by approximately 41 %. Averaging 2.7 % annually, growth was fairly constant over the period.

Moreover, when compared with the very slow increase in infrastructure in the United States (based on data available between 1995 and 2002), motorway growth in the EU-25 was clearly in the fast lane. Of course, this does not mean that motorways were more important in the EU, as will be shown below, but rather that growth in the US was probably slowing down after previous records of similar expansion.

**Figure 2.2 Evolution of motorways, EU-25* and US, 1990-2003 (based on km)**




*Source:* Eurostat, national statistics, DG Energy and Transport, North American Transportation Statistics Database

*EU-25 data for 1990 to 1992 partially estimated.

A total of 23 Member States possessed motorway networks - i.e. excluding Malta and Latvia. All of these displayed increases, apart from Lithuania, whose slight decrease of 1 % could perhaps be explained by part of the motorway being reclassified as a normal road.

Leaving out Greece (because of data availability), Ireland seems to have recorded the most spectacular increase, with its network extent being almost seven times as much as it had in 1990. With a growth closer to six times the extent of its network in 1990, Portugal came second place, ahead of Finland where the network was three times as long as it was in 1990. However, if we cast our eyes to candidate country Turkey, its motorway growth was almost as much as Ireland's.

Totalling an estimated 58 100 km in 2003, motorways represented approximately 1.2 % of the total road network in the EU-25, based on available country data (Table 2.5). This was double the share for Japan (0.6 %), and only slightly less than the share in the United States (1.4 %). As mentioned previously, care should however be taken when comparing country data because of differences in the definition of roads.

The share for the EU-25 was only slightly less than the share of 1.4 % for the former EU-15, which reflects the smaller shares - of around 0.5 % and below - of motorway networks in five of the new Member States, and especially those with the largest road networks: Poland, Hungary and the Czech Republic. Of the EU-15, only Ireland displayed a similarly low motorway share. By contrast, Spain had the highest share of motorways in its road network (5.9 %).

**Table 2.5** Share of motorways in total road network, based on available data* (in km)

| | Year | Total road network (km) | Of which motorways (km) | % share of motorways |
|---|---|---|---|---|
| **EU-25** | | **4 817 168** | **57 211** | 1.2% |
| **BE** | 2003 | 149 739 | 1 729 | 1.2% |
| **BG** | 2004 | 19 276 | 331 | 1.7% |
| **CZ** | 2003 | 127 747 | 518 | 0.4% |
| **DK** | 2002 | 71 952 | 1 010 | 1.4% |
| **DE** | 2004 | 644 441 | 12 174 | 1.9% |
| **EE** | 2002 | 52 981 | 98 | 0.2% |
| **IE** | 2003 | 95 811 | 176 | 0.2% |
| **EL** | 2001 | 114 607 | 742 | 0.6% |
| **ES** | 2002 | 164 139 | 9 739 | 5.9% |
| **FR** | 2003 | 998 001 | 10 379 | 1.0% |
| **IT** | 2002 | 668 721 | 6 487 | 1.0% |
| **CY** | 2003 | 11 760 | 268 | 2.3% |
| **LV** | 2003 | 59 434 | - | - |
| **LT** | 2003 | 84 676 | 417 | 0.5% |
| **LU** | 2001 | 5 201 | 126 | 2.4% |
| **HU** | 2003 | 160 757 | 542 | 0.3% |
| **MT** | 2002 | 2 086 | - | - |
| **NL** | 2000 | 125 839 | 2 289 | 1.8% |
| **AT** | 2000 | 106 630 | 1 633 | 1.5% |
| **PL** | 2003 | 377 694 | 405 | 0.1% |
| **PT** | 2002 | 79 428 | 1 836 | 2.3% |
| **RO** | 2001 | 72 924 | 113 | 0.2% |
| **SI** | 2003 | 38 400 | 477 | 1.2% |
| **SK** | 2003 | 17 773 | 313 | 1.8% |
| **FI** | 2003 | 103 395 | 653 | 0.6% |
| **SE** | 2003 | 139 847 | 1 591 | 1.1% |
| **UK** | 2003 | 416 226 | 3 609 | 0.9% |
| **HR** | 2004 | 28 344 | 742 | 2.6% |
| **TR** | 2001 | 426 404 | 1 851 | 0.4% |
| **IS** | 2003 | 13 004 | - | - |
| **LI** | 2004 | 380 | : | : |
| **NO** | 2003 | 91 929 | 213 | 0.2% |
| **CH** | 2003 | 71 293 | 1 351 | 1.9% |
| **US** | 2003 | 6 514 931 | 91 287 | 1.4% |
| **JP** | 2003 | 1 182 593 | 7 196 | 0.6% |

*Source:* Eurostat, national statistics, DG Energy and Transport, North American Transportation Statistics Database, OECD

*Years selected according to availability of data for the total road network and for motorways (ranging from 2000 to 2004).

**Table 2.6** Motorway density by population and area, 2003 (in km)

| | km | km/100 000 inhab. | km/1000 $km^2$ |
|---|---|---|---|
| **EU-25** | ***58 131*** | ***13*** | ***15*** |
| **BE** | 1 729 | 17 | 57 |
| **BG** | 328 | 4 | 3 |
| **CZ** | 518 | 5 | 7 |
| **DK** | 1 027 | 19 | 24 |
| **DE** | 12 044 | 15 | 34 |
| **EE** | 98* | 7 | 2 |
| **IE** | 176 | 4 | 3 |
| **EL** | 742** | 7 | 6 |
| **ES** | 10 296 | 25 | 20 |
| **FR** | 10 379 | 17 | 19 |
| **IT** | 6 487 | 11 | 22 |
| **CY** | 268 | 37 | 29 |
| **LT** | 417 | 12 | 6 |
| **LU** | 147 | 33 | 57 |
| **HU** | 542 | 5 | 6 |
| **NL** | 2 541 | 16 | 61 |
| **AT** | 1 670 | 21 | 20 |
| **PL** | 405 | 1 | 1 |
| **PT** | 2 002 | 19 | 22 |
| **RO** | 113** | 1 | 0 |
| **SI** | 477 | 24 | 24 |
| **SK** | 313 | 6 | 6 |
| **FI** | 653 | 13 | 2 |
| **SE** | 1 591 | 18 | 4 |
| **UK** | 3 609 | 6 | 15 |
| **HR** | 554 | 12 | 10 |
| **TR** | 1 881 | 3 | 2 |
| **NO** | 213 | 5 | 1 |
| **CH** | 1 351 | 18 | 33 |
| **US** | 91 287 | 31 | 10 |
| **JP** | 7 196 | 6 | 19 |

*Source:* Eurostat, national statistics, DG Energy and Transport

* 2002 data - **2001 data
Note: CY, LV, MT and IS do not have any motorway network. LI: no data available.

When relating the length of the entire motorway network to the territory of the EU (Table 2.6), the result is a network density of 15 km per 1000 $km^2$, which was approximately halfway between the rates for the United States of 10 km/1000 $km^2$ (for a network of 91 827 km) and Japan, at 19 km/1000 $km^2$ (for a network of around 7 196 km). Again, these differences reflect of course the huge differences in the size of territory.

Germany again displayed the biggest network in the EU, totalling 12 044 km, accounting for close to 21 % of the total. The second and third highest shares of the network were held by France (17.9 %) and Spain (17.7 %).

However, in terms of density - i.e. the number of kilometres per 1000 km$^2$ - the Benelux countries offer the densest motorway network with values between 57 km/1000 km$^2$ and 61 km/1000 km$^2$, densities which were four times the EU-25 average of 15 km per 1000 km$^2$.

When comparing motorway length with the number of inhabitants, it was in fact Cyprus that displayed the highest value with 37 km per 100 000 inhabitants, followed by Luxembourg (33 km).

### Bridges and tunnels

Infrastructure also of course includes bridges and tunnels especially for rail and road infrastructure which help to join up networks over water and land or through mountains, linking up communities, regions and countries.

Although the portions of the individual networks using bridges and tunnels are included in the data presented in this chapter, Eurostat does not yet hold data which would allow analysis of, for example, their density.

Measuring a total of 50 km, the Channel Tunnel between France and England is currently the second-longest tunnel in the world. Japan's Seikan tunnel (54 km) is currently the longest, a position that will change however when Switzerland's Gotthard Base tunnel is completed (57 km).

Denmark's Great Belt East bridge is the world's second-longest suspension bridge, after Japan's Akashi-Kaikyo bridge (2 km), and measures 1.6 km.

## Inland waterways: neither ebb nor flow

Navigable inland waterways are defined here as 'rivers, lakes and canals, over which vessels of a carrying capacity of not less than 50 tonnes can navigate when normally loaded'. The EU's network of navigable waterways is mostly used for the transport of goods; examples are few for the transport of passengers other than for leisure (such as scheduled passenger lines on the North Italian lakes and transport in and around Venice, Italy). Inland waterways offer a unique transport system, and considerable potential - especially with regard to the Balkan countries - since the opening of the Main-Danube canal.

Only nine of the 25 Member States recorded inland waterways measuring 1000 km or above in 2003 (See Table 2.2). Finland possessed the longest with 7 884 km - about a fifth of the total - an extent which can mostly be explained by Finland's numerous lakes. It was followed by the waterway networks in Germany (6 636 km), the Netherlands (6 183 km: based on 2005 data not shown) and France (5 384 km). However, many of the other countries have very small networks, mostly used only as through-channels for sea-going vessels, which brings the total number of Member States with waterway networks up to 18.

### 'NAIADES': revitalising inland waterways

The EU's inland waterway network offers considerable potential as a link for notably the transport of freight in door-to-door logistics chains.

However, it suffers from several infrastructural bottlenecks that hinder the emergence of intermodal services especially along the Danube and Main corridor but also on the Elbe and Odra. These include for example low bridges on the rivers Main and Upper Danube and partly obsolete port infrastructure in South-Eastern Europe. Other problems include limited draught - the depth of water needed for a ship to float - and unsuitable lock dimensions.

Enter the 'NAIADES' action plan. Standing for 'Navigation and Inland Waterway Action and Development in Europe', NAIADES aims to bolster inland waterways in the EU by focusing on five strategic areas: (1) increasing market share, (2) fleet modernisation, (3) attracting skilled labour, (4) image-building, and (5) building new infrastructure. The programme runs between 2006 and 2013.

In this connection, readers should also note the two TEN-T waterway networks currently being improved. The Rhine/Meuse-Main-Danube network is a major freight route connecting the North Sea (port of Rotterdam) to the Black Sea (in particular the port of Constanta), but in which insufficient draught makes the navigation of large-tonnage vessels problematic.

The Seine-Scheldt rivers link forms part of a vital transport route, connecting in particular the ports of Le Havre, Rouen, Dunkirk, Antwerp and Rotterdam, which will work thanks to the construction of a wider gauge canal to the north of Paris. See section on TEN-T.

*For more information on NAIADES, visit http://ec.europa.eu/transport/iw/index_en.htm*

The total length of these waterways in the EU-25 was probably in the region of 37 000 km in 2003, which was very little change on the 1990 estimate. This would mean a density of 9.4 km per 1000 km$^2$, twice as much as the ratio in the United States (about 4.5 km per 1000 km$^2$, based on approximately 41 800 km of length, excluding the Great Lakes).

The core waterway network with rivers and canals of international importance (Class IV and higher[1]) is formed by more than 12 000 kilometres of interconnected waterways, close to 450 locks and several hundred inland ports and transhipment sites[2]. Smaller waterways (Classes I - III) make up the remainder. Even though their density is clearly lower than the road and rail networks, waterways connect most European economic centres.

1 The standard used for classifying the navigability of inland waterways is the European Agreement on Main Inland Waterways of International Importance (AGN) of 1996.

2 Communication from the Commission on the Promotion of Inland Waterway Transport 'Naiades': An Integrated European Action Programme for Inland Waterway Transport, Brussels, 17.1.2006, COM(2006) 6 final.

## Oil pipelines: half as long as motorways

In addition to the road, rail and inland waterway transport modes, coverage of pipelines has its place here, for they too enable the transport of goods. For statistical purposes, only oil pipelines (excluding mainly pipelines whose total length is less than 50 km, or those located entirely at sea or on an industrial site) are considered here (see box).

Readers should also note that the pipeline network here is not 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, it becomes obvious that this mode is far from negligible, when considering the volumes forwarded.

Based on available data, oil pipelines in the EU-25 extended to around 28 700 kilometres in 2003, a length equal to approximately half the motorway network for example. Compared with the estimated extent in 1990, this represented an increase of about 13 %.

However, the EU-25's density of approximately 7.3 km per 1000 $km^2$ is somewhat small when compared, for example, with that in the United States of around 27.7 km per 1000 $km^2$, the total length of whose network was close to 10 times as long!

France had the longest oil pipeline network of 5 746 km, meaning a 20 % share of the EU-25 total. The other largest networks could be found in Italy, the United Kingdom and Spain, while Germany, Hungary and Poland had over two thousand km each. When looking however at the wider European map, France's network was in fact outstretched by the pipelines in large oil-producing country Norway (7 941 km in 2001).

### Transport by pipeline

Pipelines are real arteries sprawling throughout Europe, carrying essentially oil and gas. However, Eurostat only collects data on oil pipelines for the time being, reflecting the availability of data at national statistical offices.

The world's longest oil pipeline - measuring around 4 000 km - comes into the EU. Starting in Siberia, the 'Druzhba' pipeline runs to Mozyr in southern Belarus, where it divides into a northern and southern branch. While the northern branch crosses the remainder of Belarus to reach Poland and Germany, the latter one runs south into Ukraine, Slovakia, the Czech Republic, and Hungary.

Of the numerous gas pipelines across Europe, there are several important ones running into the EU: two from Norway (one to Continental Europe and one to the United Kingdom); two from Algeria (one via Tunisia and then onto Siciliy for mainland Italy and one via Morocco to Spain) and one from Russia via the Ukraine and through a line connecting the Siberian fields through Belarus with Poland and Germany.

Langeled, the gas pipeline running from Norway to the United Kingdom, which opened in 2006, is the world's longest sub-sea gas pipeline.

Russia's increasingly important role as an energy provider for the EU is demonstrated by the ongoing construction of another main pipeline - the North European gas pipeline - which will run from Russia via the Baltic Sea to Germany.

On a more humourous note, beer-loving football spectators will be pleased to know that at a major football stadium in Gelsenkirchen, Germany, they can enjoy beer literally on tap, as it is piped along a 5 km-long pipeline which serves the stadium's numerous bars!

# Airports: intermodal nodes by nature

The EU's airspace is one of busiest in the world, but unlike land networks, one cannot easily talk about 'network length' in aviation. Even if 'air corridors' exist, information on them is not easily retrievable and their extent - because of their virtual nature - is in any case changeable, according to traffic volume, for example during holiday periods.

In addition, 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. The latter could, for instance, be measured on the basis of the number or length of runways, but reliable and comparable information is presently unavailable. Airports are, by their nature, intermodal nodes on a route network requiring virtually no en-route surface infrastructure.

Instead, the most suitable and readily available indicator of air network infrastructure is the number of airports. In 2004, the EU-25 counted close to 370 airports with a passenger volume of over 15 000. Of these, 255 were 'main' airports handling at least 150 000 passengers per year. 112 of these were large or very large airports handling at least 1.5 million passengers.

**Table 2.7 Main airports* together handling at least 80 %** of the country's total passenger traffic, 2004**

| Belgium (4 main airports) | Rank |
|---|---|
| Bruxelles/National | 1 |
| **Bulgaria (3)** | **Rank** |
| Sofia | 1 |
| Burgas | 2 |
| Varna | 3 |
| **Czech Republic (2)** | **Rank** |
| Praha/Ruzyne | 1 |
| **Denmark (6)** | **Rank** |
| Kobenhavn/Kastrup | 1 |
| **Germany (25)** | **Rank** |
| Frankfurt-Main | 1 |
| Munchen | 2 |
| Düsseldorf | 3 |
| Berlin/Tegel | 4 |
| Hamburg | 5 |
| Stuttgart | 6 |
| Köln/Bonn | 7 |
| **Estonia (1)** | **Rank** |
| Tallinn/Ulemiste | 1 |
| **Ireland (6)** | **Rank** |
| Dublin | 1 |
| Cork | 2 |
| **Greece (18)** | **Rank** |
| Athens | 1 |
| Irakleion | 2 |
| Thessaloniki | 3 |
| Rodos | 4 |
| Kerkyra | 5 |
| Kos | 6 |
| **Spain (32)** | **Rank** |
| Madrid/Barajas | 1 |
| Barcelona | 2 |
| Palma De Mallorca | 3 |
| Malaga | 4 |
| Las Palmas/Gran Canaria | 5 |
| Alicante | 6 |
| Tenerife Sur/Reina Sofia | 7 |
| Arrecife/Lanzarote | 8 |
| Ibiza | 9 |
| Puerto Del Rosario/ Fuerteventura | 10 |

| France (39) | Rank |
|---|---|
| Paris/Charles-De-Gaulle | 1 |
| Paris/Orly | 2 |
| Nice/Cote D'azur | 3 |
| Lyon/Satolas | 4 |
| Marseille/Marignane | 5 |
| Toulouse/Blagnac | 6 |
| Bordeaux/Merignac | 7 |
| **Italy (30)** | **Rank** |
| Roma/Fiumicino | 1 |
| Milano/Malpensa | 2 |
| Milano/Linate | 3 |
| Venezia/Tessera | 4 |
| Catania/Fontanarossa | 5 |
| Napoli/Capodichino | 6 |
| Palermo/Punta Raisi | 7 |
| Bergamo/Orio Al Serio | 8 |
| Torino/Caselle | 9 |
| Bologna/Borgo Panigale | 10 |
| Villafranca (Military) | 11 |
| **Cyprus (2)** | **Rank** |
| Larnaka | 1 |
| Pafos | 2 |
| **Latvia (1)** | **Rank** |
| Riga | 1 |
| **Lithuania (1)** | **Rank** |
| Vilnius Intl | 1 |
| **Luxembourg (1)** | **Rank** |
| Luxembourg Findel | 1 |
| **Hungary (1)** | **Rank** |
| Budapest/Ferihegy | 1 |
| **Malta (1)** | **Rank** |
| Malta/Luqa | 1 |
| **The Netherlands (4)** | **Rank** |
| Amsterdam Schiphol | 1 |
| **Austria (6)** | **Rank** |
| Wien/Schwechat | 1 |
| Salzburg | 2 |
| **Poland (6)** | **Rank** |
| Warszawa/Okecie | 1 |
| Krakow/Balice | 2 |
| Katowice/Pyrzowice | 3 |
| **Portugal (8)** | **Rank** |
| Lisboa | 1 |
| Faro | 2 |
| Porto | 3 |
| Madeira | 4 |

| Romania | Rank |
|---|---|
| Bucuresti/Otopeni | 1 |
| Timisoara/Giarmata | 2 |
| **Slovenia (1)** | **Rank** |
| Ljubjana | 1 |
| **Slovakia (2)** | **Rank** |
| Bratislava | 1 |
| **Finland (11)** | **Rank** |
| Helsinki-Vantaa | 1 |
| Oulu | 2 |
| Tampere-Pirkkala | 3 |
| **Sweden (18)** | **Rank** |
| Stockholm/Arlanda | 1 |
| Goteborg/Landvetter | 2 |
| Malmo/Sturup | 3 |
| Stockholm/Skavsta | 4 |
| Stockholm/Bromma | 5 |
| **United Kingdom (31)** | **Rank** |
| London/Heathrow | 1 |
| London/Gatwick | 2 |
| Manchester/Intl. | 3 |
| London/Stansted | 4 |
| Birmingham | 5 |
| Glasgow | 6 |
| Edinburgh | 7 |
| London/Luton | 8 |
| **Turkey (14)** | **Rank** |
| Istanbul/Ataturk | 1 |
| Antalya | 2 |
| Ankara/Esenboga | 3 |
| Izmir/Adnan Menderes | 4 |
| Mugla/Dalaman | 5 |
| **Iceland (3)** | **Rank** |
| Keflavik | 1 |
| Reykjavik Ad | 2 |
| **Norway (16)** | **Rank** |
| Oslo/Gardermoen | 1 |
| Bergen/Flesland | 2 |
| Trondheim/Vaernes | 3 |
| Stavanger/Sola | 4 |
| Tromso | 5 |
| Bodo | 6 |
| **Switzerland (3)** | **Rank** |
| Zurich | 1 |
| Geneve/Cointrin | 2 |

*Source:* Eurostat (Transport)

*Airports handling at least 150 000 passengers per year.
**The 80% share has been calculated without excluding the double-counting effect of domestic passengers reported as departures by one national airport and as arrivals by the national partner airport.

Table 2.7 provides an overview of the number of main airports in the individual Member States and furthermore shows those individual airports that, together, are responsible for at least 80 % of a country's total traffic (both national and international). As can be seen, in many small countries one main airport alone was enough to absorb at least 80 % of passengers. This was the case, for example, in the Benelux countries, among others, including of course countries which had in any case just one airport. The highest number of 'main' airports could be found in France (39).

Also noteworthy is the fact that similarly-sized countries show different characteristics, reflecting the dominance of certain airports because of hub importance and aspects such as tourism. Spain and Poland, for example, have around 40 million inhabitants each, but whereas Poland had only six main airports, of which three accounted for at least 80 % of passenger traffic, Spain had 32 main airports, of which 10 were needed to attain this same threshold. Spain's attractiveness as a tourist destination in both its mainland and island territory clearly explains these higher numbers.

For details on air cargo handled at the various European airports, see Chapter 5 (Transport of goods).

### Some regional airports boosted by low-cost carriers

With the liberalisation of the EU's air transport market, low-cost air carriers have been increasing their market share of air transport in recent years. In fact, it would not be exaggerating to say that low-cost carriers have been transforming European air travel, bringing it within easy reach of an increasingly wider public across Europe.

Based on monthly data from OAG, 27 % of intra-EU seat capacity for scheduled flights was accounted for by low-cost carriers in May 2006, or 13.8 million seats out of a total of 51.5 million. This compares strikingly with the same share of just 6 % in May 2001. Other OAG data shows that the UK displayed the greatest number of low-cost flights operating to and from Europe in 2006, a long way ahead of Germany, Spain, Italy and France.

Flying from airports with easily expandable capacity and low overheads, low-cost carriers nearly always operate from a regional airport, considered as a secondary airport for a city or a capital, such as London-Stansted for London, Girona and Reus for Barcelona, and Frankfurt-Hahn for Frankfurt. Point-to-point flights turnaround tends to be faster, not only because routes are generally under two hours' duration aids, but also because these airports have comparatively few flights to handle.

New route networks connecting Europe's regions have thus been created, boosting the economic development not only of the airport, but also of the surrounding region. Two relevant examples of this are Germany's Frankfurt-Hahn airport - a former US military airport - and Belgium's Charleroi airport on the land of a former coalfield.

Extra capacity, low overheads and location also explain the importance of some regional airports for air freight. See page 90.

*For more information, visit: http://www.oag.com/graphics/lowcostcarriers.pdf*

### Opening up the skies with SESAR

Today's Air Traffic Management (ATM) system is operated very much as it has been operating for the last two or more decades. While broadband internet and satellite communications are becoming commonplace, pilots and controllers are still using VHF radio communications; in the era of the information society, air traffic controllers still cannot rely completely on automated decision support tools.

This technological time-lag limits the overall flexibility of the ATM system, in particular by obliging aircraft to follow rigid trajectories between fixed points, which is far from optimal in terms of time, congestion, fuel consumption and noise. Given the general increase in air traffic and the expected increase in the future, planes will have difficulty taking off, let alone fly, if nothing is done to improve the situation.

This is where the EU's Single European Sky initiative comes in, and notably SESAR - the Single European Sky industrial and technological programme: an ambitious initiative to reform the architecture of European air traffic control to meet future capacity and safety needs. The core feature of SESAR is to eliminate the hitherto fragmented approach to ATM, by enabling airspace integration into Functional Airspace Blocks (FABs), defined in line with operational traffic flows, and no longer constrained by national borders.

Among the technological benefits expected are: high capacity digital and voice telecommunications between ground and aircraft; advanced traffic flow management systems; automated decision support tools for air traffic controllers; advanced automated systems for optimised landings and takeoffs, and airport movements; and active satellite navigation (EGNOS/GALILEO) for all flight phases (take-off/cruise/landing).

*For more information, visit: http://ec.europa.eu/transport/air_portal/index_en.htm*

## Seaports: harbours of potential

With around two-thirds of its boundaries facing the sea and its large number of ports, the EU's maritime sector "is proving to be a valuable alternative to land transport", according to the Commission's mid-term review of the 2001 White Paper, 'Keep Europe Moving'. This is also being demonstrated, it states, by the concept of 'motorways of the sea', which is also one of the priority axes of the TEN-T (see below).

Table 2.8 provides an overview of the number of main seaports in the individual Member States and furthermore shows those individual seaports that, together, are responsible for at least 80 % of a country's total traffic (both national and international). The 20 EU-25 Member States that have seaports totalled 302 'main' ports between them, i.e. ports handling over 1 million tonnes of goods per year.

The highest number of main seaports could be found in the United Kingdom (46) and Italy (43). Moreover, in these two similarly-populated countries, it took about the same number of main ports to absorb at least 80 % of traffic (respectively 18 and 17 ports).

However, when looking at equally-as-populated France, the port structure and concentration was different: it only had 20 main ports and the 80 % threshold was reached by only six ports. The larger number of main ports in the UK and Italy can be explained by a number of reasons. In the case of the UK, maritime routes are important notably for connecting the island with mainland Europe as well as with neighbouring Ireland and further away Scandinavia. Italy, in addition to being a peninsula, serves as a maritime gateway for EU trade with countries in south-eastern Europe and beyond.

Unlike the situation for airports, only one country with several main ports displays one port absorbing at least 80 % of the traffic: Estonia (Tallinn).

In terms of passenger infrastructure, the main passenger ports correspond to those offering the major European ferry connections. See Chapter 5.

## Table 2.8 Main sea ports* together handling at least 80 % of the country's cargo traffic, 2004

| Belgium (4 main ports) | Rank |
|---|---|
| Antwerpen | 1 |
| Zeebrugge | 2 |
| **Bulgaria (2)** | **Rank** |
| Burgas | 1 |
| Varna | 2 |
| **Denmark (25)** | **Rank** |
| Fredericia (Og Shell-Havnen) | 1 |
| Århus | 2 |
| Statoil-Havnen | 3 |
| Københavns Havn | 4 |
| Enstedværkets Havn | 5 |
| Rødby (Færgehavn) | 6 |
| Helsingør (Elsinore) | 7 |
| Esbjerg | 8 |
| Kalundborg | 9 |
| Frederikshavn | 10 |
| Aalborg Portland (Cementfabrikken Rordal) | 11 |
| Aalborg | 12 |
| Odense | 13 |
| Køge | 14 |
| Rønne | 15 |
| Aabenraa | 16 |
| Hirtshals | 17 |
| Asnæsværkets Havn | 18 |
| **Germany (17)** | **Rank** |
| Hamburg | 1 |
| Wilhelmshaven | 2 |
| Bremerhaven | 3 |
| Lübeck | 4 |
| Rostock | 5 |
| Bremen, Blumenthal | 6 |
| **Estonia (5)** | **Rank** |
| Tallinn | 1 |
| **Ireland (7)** | **Rank** |
| Dublin | 1 |
| Limerick | 2 |
| Cork | 3 |
| Waterford | 4 |
| **Greece (26)** | **Rank** |
| Piraeus | 1 |
| Thessaloniki | 2 |
| Eleusis | 3 |
| Agii Theodori | 4 |
| Volos | 5 |
| Megara | 6 |
| Rio (080) | 7 |
| Antirio (015) | 8 |
| Patras | 9 |
| Larymna | 10 |
| Aliverio | 11 |
| Heraklion | 12 |
| Igoumenitsa | 13 |
| Milos Island | 14 |
| Perama | 15 |
| Chalkida | 16 |
| Almyros Volou (897) | 17 |
| Paloukia Salaminas | 18 |
| Kavala | 19 |
| Antikyra | 20 |
| **Spain (27)** | **Rank** |
| Algeciras | 1 |
| Barcelona | 2 |
| Valencia | 3 |
| Bilbao | 4 |
| Tarragona | 5 |
| Cartagena | 6 |
| Gijón | 7 |
| Huelva | 8 |
| Las Palmas | 9 |
| Santa Cruz de Tenerife | 10 |
| La Coruña | 11 |
| Palma Mallorca | 12 |
| **France (20)** | **Rank** |
| Marseille | 1 |
| Le Havre | 2 |
| Dunkerque | 3 |
| Nantes Saint-Nazaire | 4 |
| Rouen | 5 |
| Calais | 6 |
| **Italy (43)** | **Rank** |
| Genova | 1 |
| Trieste | 2 |
| Taranto | 3 |
| Augusta | 4 |
| Gioia Tauro | 5 |
| Venezia | 6 |
| Ravenna | 7 |
| Porto Foxi | 8 |
| Livorno | 9 |
| Santa Panagia | 10 |
| La Spezia | 11 |
| Milazzo | 12 |
| Savona - Vado | 13 |
| Brindisi | 14 |
| Napoli | 15 |
| Cagliari | 16 |
| Gela | 17 |
| Piombino | 18 |
| **Cyprus (3)** | **Rank** |
| Limassol (Lemesos) | 1 |
| Larnaca (Larnaka) Oil Terminal | 2 |
| Vassilico (Vassiliko) | 3 |
| **Latvia (4)** | **Rank** |
| Ventspils | 1 |
| Riga | 2 |
| **Lithuania (1)** | **Rank** |
| Klaipeda | 1 |
| **Malta (2)** | **Rank** |
| Malta (Valetta) | 1 |
| Marsaxlokk | 2 |
| **Netherlands (10)** | **Rank** |
| Rotterdam | 1 |
| Amsterdam | 2 |
| **Poland (5)** | **Rank** |
| Gdansk | 1 |
| Gdynia | 2 |
| Swinoujscie (Swinoujscie) | 3 |
| Szczecin | 4 |
| **Portugal (6)** | **Rank** |
| Sines | 1 |
| Leixões | 2 |
| Lisboa | 3 |
| Setúbal | 4 |
| **Romania (3)** | **Rank** |
| Constanta | 1 |
| **Slovenia (1)** | **Rank** |
| Koper | 1 |
| **Finland (22)** | **Rank** |
| Sköldvik | 1 |
| Helsinki | 2 |
| Kotka | 3 |
| Naantali | 4 |
| Rauma | 5 |
| Hamina | 6 |
| Rautaruukki/Raahe | 7 |
| Pori | 8 |
| Turku | 9 |
| Kokkola | 10 |
| Hanko | 11 |
| Kemi | 12 |
| Oulu | 13 |
| **Sweden (28)** | **Rank** |
| Göteborg | 1 |
| Brofjorden Scanraff | 2 |
| Trelleborg | 3 |
| Malmö | 4 |
| Luleå | 5 |
| Helsingborg | 6 |
| Oxelösund (ports) | 7 |
| Stockholm | 8 |
| Karlshamn | 9 |
| Norrköping | 10 |
| Stenungsund (ports) | 11 |
| Gävle | 12 |
| Kappelskär | 13 |
| Storugns | 14 |
| Husum | 15 |
| Nynäshamn (ports) | 16 |
| Slite (ports) | 17 |
| Ystad | 18 |
| Halmstad | 19 |
| Västerås | 20 |
| **United Kingdom (46)** | **Rank** |
| Immingham | 1 |
| Tees & Hartlepool | 2 |
| London | 3 |
| Milford Haven | 4 |
| Southampton | 5 |
| Forth | 6 |
| Liverpool | 7 |
| Sullom Voe | 8 |
| Felixstowe | 9 |
| Dover | 10 |
| Kirkwall | 11 |
| Medway | 12 |
| Belfast | 13 |
| Hull | 14 |
| Clydeport | 15 |
| Bristol | 16 |
| River Hull & Humber | 17 |
| **Iceland (1)** | **Rank** |
| Reykjavík | 1 |
| **Norway (20)** | **Rank** |
| Bergen, Mongstad, Sture, Ågotnes, Eikefet, Askøy, Modalen | 1 |
| Narvik | 2 |
| Haugesund, Tysvær, Karmøy/Kårstø, Skudeneshavn, Kopervik | 3 |
| Tønsberg/Slagentangen/Valløy | 4 |
| Porsgrunn, Rafnes, Herøya, Brevik, Skien, Langesund, Voldsfjorden | 5 |
| Oslo | 6 |
| Kristiansund N/Grip | 7 |
| Stavanger, Sola/Risavik, Forus, Dusavik, Mekjarvik | 8 |
| Mo i Rana/Rana | 9 |
| Fredrikstad/Sarpsborg | 10 |
| Drammen/Solumstrand/Tørkopp/Lier/Hurum/Tofte/Svelvik | 11 |
| Brønnøy | 12 |
| Kristiansand S | 13 |
| Larvik | 14 |
| Verdal/Levanger | 15 |
| Trondheim/Flakk | 16 |
| Alesund | 17 |
| Morr | 18 |
| Flora | 19 |

Source: Eurostat (Transport)
* Ports handling over 1 million tonnes of goods per year.

### Urban, metropolitan transport

Based on data from the International Union of Public Transport (UITP) and the European Rail Research Advisory Council (ERRAC), the EU-25 counted 137 tram and light rail systems in 2004 (in other words, 7 033 km of track), possessed by 17 Member States. Germany alone accounted for 56 systems and approximately two-fifths of the track extent.

In 2004, there were 30 metro systems in the EU-25 possessed by 16 of the larger Member States. This amounted to 2 165 km of track in 2004. Although France had the highest number of metro systems (six), the track extent in the United Kingdom was the longest at 480 km, divided between its three networks.

*For further information, visit: http://www.uitp.com and http://www.errac.org*

## Other infrastructure: from bus lanes to cycle paths

Apart from these main, more traditional types of infrastructure and networks, one could also mention networks connected with other modes of transport such as tramways, trolley bus lines, tram-train rails, bus lanes or tracks (in the case of guided buses), cycle paths… In fact, the possibilities for inventory-making seem to grow with technological development.

### Tram-trains: innovative network sharing

Tram-trains are a perfect example of how networks can be shared between transport modes. A tram-train is a light-rail system in which trams are able to run on railway tracks. Karlsruhe in Germany was the first European city to develop this partial interoperability, away back in the late seventies.

The main plus is that commuters travelling to and from outside a city do not need to change from train to tram and vice versa. Another benefit of course derives from the fact that the rails are effectively shared, thus reducing the need for additional infrastructure.

Other cities have set up such networks such as RijnGouweLijn in the Netherlands, Kassel and Saarbrücken, both in Germany. There are also examples of railway trains being able to run on tram lines, making the potential for two-way interoperability very real.

Public authorities, particularly in congested cities, are increasingly focussing their efforts on developing such transport modes as complements to existing options, where co-habitation or 'intermodality' can be essential to transport success.

For instance, in terms of co-habitation, putting buses on the same roads as cars without separate priority bus lanes and traffic signals can ultimately turn passengers off the bus instead of getting them on, if the traffic jams are no better.

With regard to intermodality, 'park and ride' infrastructure - typically where commuters travelling into work leave their car in a car park located outside a city centre to continue their journey by a dedicated bus link - would not work without a satisfactory bus timetable. The same can be said for 'bike and ride' facilities.

Although data - especially at EU level - for these other types of networks are, at present, very difficult to pin down, this may well change in tandem with their importance in tomorrow's transport infrastructure.

### Cycle paths: EuroVelo

Bicycles have the freedom to use most of the road network, except of course motorways and some other high speed roads. Seen like this, the potential is at least as large as the road network length of 4.8 million km mentioned previously, and certainly much more, if one includes dirt tracks, canal paths, etc.

That said, the measure of designated paths for bicycles offers a better idea of the development of cycle paths and their cohabitation with other transport modes, since they provide clearly delimited paths often with traffic signals and protective barriers, and intermodal connections such as parking at railway stations. However, the absence of reliable data on designated cycle paths at EU level puts a spoke in the wheels of measurement.

A promising starting figure however is offered by EuroVelo, a project of the European Cyclists' Federation to develop a European cycle route network consisting of 12 long-distance cycle routes crossing the whole continent of Europe. According to the European Cyclists' Federation, the current length of these routes is approximately 30 000 km. Made up of existing and planned cycle routes at regional and national level, the EuroVelo routes are planned to reach around twice this figure.

*For more information: www.eurovelo.org*

## 'TEN-T' for Trans-European Networks in Transport

Rome wasn't built in a day. And it would have taken much longer had it not been for the Empire's extensive road network and maritime routes which stretched out to many parts of today's Europe. Likewise, but of course for different reasons, if the EU is to become a success with a thriving economy, goods and people need to be able to circulate rapidly and easily between Member States, and even beyond. This has become all the more important given the recent and future waves of enlargement, especially as the connections between the old and new Member States are sometimes especially wanting.

This is where the transport dimension of the EU's Trans-European networks (TENs) comes into play: 'TEN-T' for short. Made Community policy over a decade ago with the Maastricht Treaty, 'TEN-T' aims to improve economic and social cohesion, by linking island, landlocked and peripheral regions with the Union's more central regions, through interconnecting and interoperable national networks by land, air, sea and inland waterways, including Galileo, the European satellite navigating system (see box).

According with these objectives, the Community develops guidelines covering the objectives, priorities, identification of projects of common European interest and broad lines of measures. There are currently 30 infrastructure projects (Decision 884/2004/EC), which are outlined below.

**Trans-European networks in transport (TEN-T): 30 priority axes and projects**

1. Railway axis: Berlin-Verona/Milan-Bologna-Naples-Messina-Palermo
2. High-speed railway axis: Paris-Brussels-Cologne-Amsterdam-London
3. High-speed railway axis of south-west Europe
4. High-speed railway axis east
5. Betuwe line
6. Railway axis Lyons-Trieste-Divaca/Koper-Divaca-Ljubljana-Budapest Ukrainian border
7. Motorway axis Igoumenitsa/Patras-Athens-Sofia-Budapest
8. Multimodal axis Portugal/Spain-rest of Europe
9. Railway axis Cork-Dublin-Belfast-Stranraer
10. Malpensa airport
11. Øresund fixed link
12. Nordic triangle railway/road axis
13. United Kingdom/Ireland/Benelux road axis
14. West coast main line
15. Galileo
16. Freight railway axis Sines/Algeciras-Madrid-Paris
17. Railway axis Paris-Strasbourg-Stuttgart-Vienna-Bratislava
18. Rhine/Meuse-Main-Danube inland waterway axis
19. High-speed rail interoperability on the Iberian peninsula
20. Fehmarn belt railway axis
21. Motorways of the sea (see full list in Map 2.1)
22. Railway axis Athens-Sofia-Budapest-Vienna-Prague-Nuremberg/Dresden
23. Railway axis Gdansk-Warsaw-Brno/Bratislava-Vienna
24. Railway axis Lyons/Genoa-Basle-Duisburg-Rotterdam/Antwerp
25. Motorway axis Gdansk-Brno/Bratislava-Vienna
26. Railway/road axis Ireland/United Kingdom/continental Europe
27. 'Rail Baltica' axis Warsaw-Kaunas-Riga-Tallinn-Helsinki
28. 'Eurocaprail' on the Brussels-Luxembourg-Strasbourg railway axis
29. Railway axis of the Ionian/Adriatic intermodal corridor
30. Inland waterway Seine-Scheldt

A specific novelty concerns the development of 'motorways of the sea' which has intermodality at its heart. Its aim is to foster integrated intermodal options, based on short sea shipping, providing frequent, high-quality alternatives to road transport. In time, the goal is to develop a network of motorways of the sea between different European regions, each linked to inland modes of transport. In this way, the vast transport potential of European seas and waterways can be more effectively tapped.

## TEN-T in figures

As shown in Table 2.9, the largest TEN-T networks in 2003 in the EU-27 were rail (83 300 km) - including 9 600 km of new and upgraded high-speed lines - and road (74 500 km). The total length of the TEN-T inland waterways network was about 14 100 km.

**Table 2.9 Extent of TEN-T networks in 2003 and planned for 2020 (in km)**

| | 2003 | 2020 |
|---|---|---|
| **Rail** | 83 300 | : |
| **Road** | 74 500 | 95 700 |
| **Inland waterways** | 14 100 | : |

*Source:* DG Energy and Transport

Completing the network by 2020 involves the construction of the so-called 'missing links', and increasing the existing road and rail networks. This will have a huge impact in reducing journey time for passengers and goods. A 2004 study for the Commission indicated that significant time savings would be gained from the completion of the 30 priority axes/projects which form the 'backbone' of TEN-T, through a substantial reduction in road congestion and improved rail performance.

Given that freight transport between Member States is expected to show the largest increase overall, without TEN-T, this increase in transport would be very hard to handle, with possible effects on economic growth. Moreover, completing the networks will also bring important dividends for the environment, notably by reducing the amount of $CO_2$ emissions expected from transport in 2020.

## Growing beyond the EU

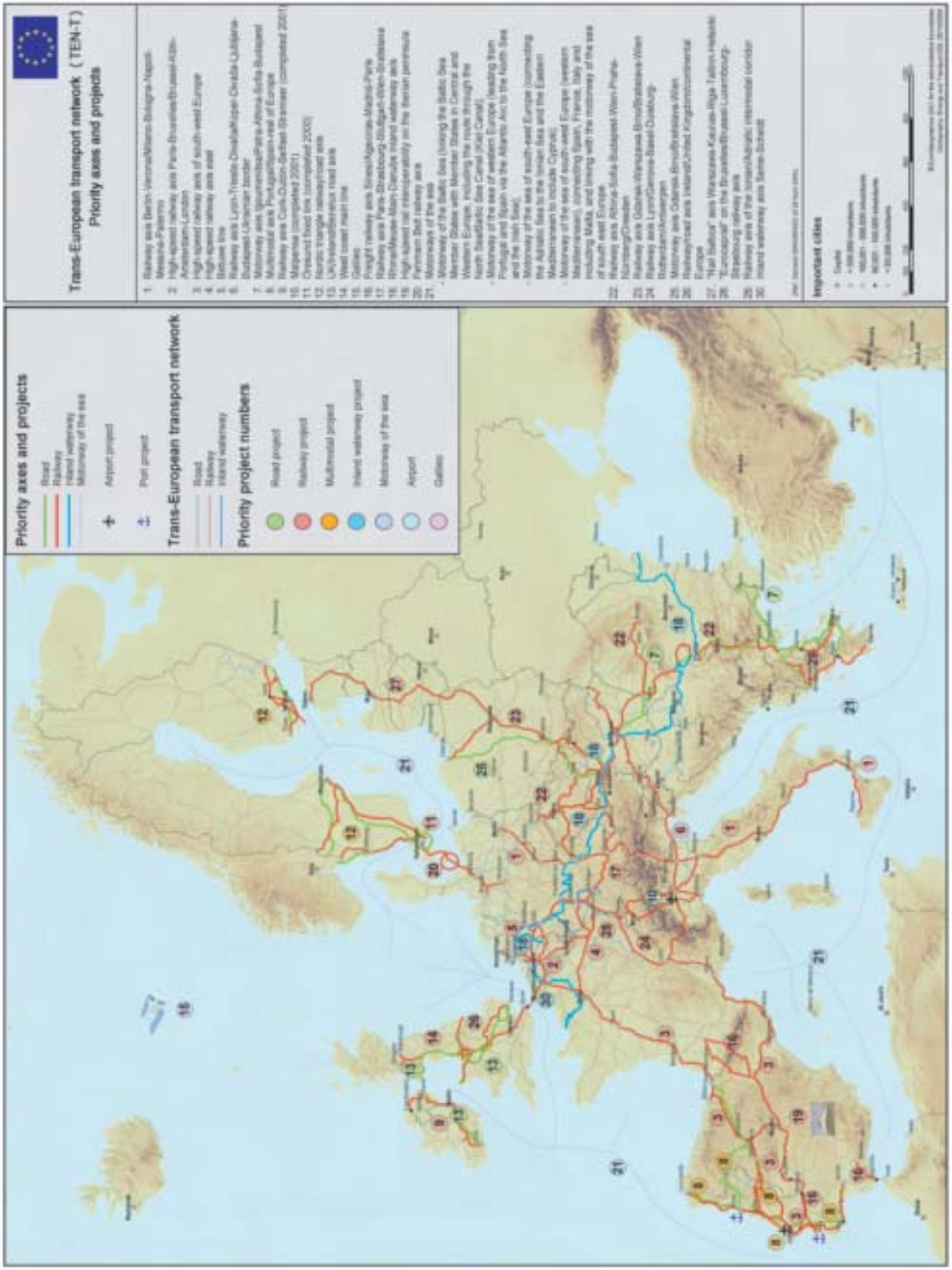
The new European map that rolled out following the EU's most unprecedented enlargement in 2004 seems to have served as a wake-up call for EU leaders: part of the EU's success depends on how it gets on with its neighbours. In addition to acceding and candidate countries, these include notably countries around the Mediterranean, Russia, Ukraine, Belarus, and Moldova and with Armenia, Azerbaijan and Georgia.

This growing external awareness found concrete form in the 'European Neighbourhood Policy'[3] and more specifically in the report 'Networks for peace and development: Extension of the major trans-European transport axes to the neighbouring countries and regions'[4].

This report made a number of recommendations including a mix of infrastructure projects and simpler measures aiming to stimulate trade and facilitate traffic flows between countries along five major transnational transport axes connecting the EU with the neighbouring countries in the North, East and South-East as well as around the Mediterranean and Black Sea regions. Better integration of national networks, according to the authors, will foster regional cooperation and integration not only between the EU and its neighbours but also between the neighbouring countries themselves.

3 Communication from the Commission, 'European Neighbourhood Policy', COM(2004) 373 final, 12.5.2004.
4 Report from the High Level Group chaired by ex-transport commissioner Loyola de Palacio. For more information, visit: http://ec.europa.eu/ten/transport/external_dimension/hlg/index_en.htm.

**Map 2.1** 30 priority axes and projects of the trans-European transport network (TEN-T)



**Map 2.2** **Outline plan for railways in the trans-European transport network (TEN-T)**

**Map 2.3** Outline plan for roads in the trans-European transport network (TEN-T)

**Map 2.4** Outline plan for airports in the trans-European transport network (TEN-T)

**Map 2.5** Outline plan for inland waterways and ports in the trans-European transport network (TEN-T)

# 3. Means of transport

# 3. MEANS OF TRANSPORT

## The wheels and the wings

The previous chapter made an inventory of the EU's infrastructure: an overview which is also very suggestive of the differences in numbers to be expected when looking at the various transport modes in terms of vehicle stock. In this chapter, means of transport - enabling the transport of goods and/or persons - covers essentially passenger cars, buses, lorries (including road trailers and semi-trailers), trains (locomotives, wagons and rail goods vehicles), inland waterway vessels, aircraft and powered two-wheelers.

## Ever-expanding car growth

Despite efforts to promote the popularity of other transport modes, notably in congested areas, the car remains the personal means of transport par excellence, allowing people to get from A to B when and how they want; a growing independence that has meant concomitantly a dramatic increase in the number of passenger cars.

### Pre-tax car prices in Denmark lowest in the EU

Based on the Commission's bi-annual car price report (data as at May 2006), Denmark remains the least expensive Member State, in terms of pre-tax prices for cars, with the average price being 8.4 % below the EU-25 average. It was followed by Hungary (8 %). By contrast, the Czech Republic has become the most expensive country, with prices 7.3 % higher than the EU average. However, the Czech Republic is somewhat an exception to the rule, since new Member States still appear to be, on average, cheaper than former, EU-15 Member States.

Within the EU-25, close to 600 out of nearly 1 700 price quotes listed in the report show prices that exceed by 20 % the cheapest national market in the EU.

*For more information, visit: http://ec.europa.eu/comm/competition/car_sector/price_diffs/*

### Car prices grew slower than general inflation

Car prices have been increasing over time, but not as fast as general inflation, according to the Harmonised Index of Consumer Prices (HICP), which charts the evolution of prices. The price of new or second-hand vehicles bought by households from garages or car dealers (excluding household-to-household sales) rose by just 4.4 % between 2001 and 2006 in the EU-25. This was significantly slower than the increase of 11 % in the all-items index. Based on data available for 24 Member States (of the EU-25), prices rose fastest in Latvia (+27 %), Portugal (+16 %) and Denmark (+14 %), and declined most in Cyprus (-28%), Estonia (-23 %) and Lithuania (-17 %).

*For more information, see the pages dedicated to economy and finance on Eurostat's website: http://epp.eurostat.ec.europa.eu/*

Table 3.1 Evolution of the number of passenger cars, 1990-2005 (in 1000)

| | 1990 | 1995 | 2000 | 2004 | 2005 | % change 1990-2005 | Cars per 1000 inhabitants in 2005 |
|---|---|---|---|---|---|---|---|
| **EU-25** | **160 159** | **178 402** | **200 740** | **215 389** | **219 787** | 37% | **476** |
| **BE** | 3 864 | 4 273 | 4 678 | 4 874 | 4 919 | 27% | 468 |
| **BG** | 1 317 | 1 648 | 1 993 | 2 438 | 2 538 | 93% | 329 |
| **CZ** | 2 410 | 3 043 | 3 439 | 3 816 | 3 959 | 64% | 386 |
| **DK** | 1 594 | 1 679 | 1 854 | 1 916 | 1 965 | 23% | 362 |
| **DE** | 36 772 | 40 988 | 43 772 | 45 376 | 46 090 | 25% | 559 |
| **EE** | 241 | 383 | 464 | 471 | 494 | 105% | 367 |
| **IE** | 796 | 990 | 1 319 | 1 583 | 1 662 | 109% | 395 |
| **EL** | 1 735 | 2 240 | 3 156 | 4 074 | 4 376 | 152% | 393 |
| **ES** | 11 996 | 14 212 | 17 449 | 19 542 | 20 250 | 69% | 463 |
| **FR** | 27 072 | 27 872 | 29 808 | 30 537 | 30 497 | 13% | 500 |
| **IT** | 27 416 | 30 301 | 32 584 | 33 973 | 34 667 | 26% | 590 |
| **CY** | 179 | 219 | 268 | 336 | 355 | 99% | 463 |
| **LV** | 283 | 332 | 557 | 686 | 742 | 162% | 324 |
| **LT** | 493 | 718 | 1 172 | 1 316 | 1 455 | 195% | 428 |
| **LU** | 183 | 229 | 273 | 300 | 307 | 68% | 669 |
| **HU** | 1 944 | 2 245 | 2 365 | 2 828 | 2 889 | 49% | 287 |
| **MT** | : | 181 | 189 | 211 | 213 | : | 526 |
| **NL** | 5 509 | 5 633 | 6 539 | 6 992 | 7 092 | 29% | 434 |
| **AT** | 2 991 | 3 594 | 4 097 | 4 109 | 4 157 | 39% | 503 |
| **PL** | 5 261 | 7 512 | 9 991 | 11 975 | 12 339 | 135% | 323 |
| **PT** | *1 700* | 2 560 | 3 443 | 4 100 | 4 200 | 147% | 397 |
| **RO** | 1 292 | 2 197 | 2 778 | 3 225 | : | : | 149* |
| **SI** | 578 | 698 | 848 | 911 | 944 | 63% | 471 |
| **SK** | 880 | 1 016 | 1 274 | 1 197 | 1 304 | 48% | 242 |
| **FI** | 1 939 | 1 901 | 2 135 | 2 347 | 2 430 | 25% | 462 |
| **SE** | 3 601 | 3 631 | 3 999 | 4 113 | 4 154 | 15% | 459 |
| **UK** | 20 722 | 21 951 | 25 067 | 27 806 | 28 326 | 37% | 469 |
| **HR** | : | 711 | 1 125 | 1 338 | 1 385 | : | 312 |
| **TR** | : | 3 059 | 4 422 | 5 401 | 5 773 | : | 80 |
| **IS** | 120 | 119 | 159 | 175 | 187 | 57% | 625 |
| **LI** | : | : | : | 24 | 24 | : | 705 |
| **NO** | *1 613* | 1 685 | 1 852 | 1 978 | 2 029 | 26% | 437 |
| **CH** | 2 985 | 3 229 | 3 545 | 3 811 | 3 864 | 29% | 518 |
| **US** | 181 975 | 194 125 | 222 857 | 228 276 | : | : | 777* |
| **JP** | 32 436 | 39 103 | 42 365 | 42 776 | 42 747 | 32% | 335 |

*Source*: Eurostat, national statistics, DG Energy and Transport, North American Transportation Statistics Database (US), Ministry of Land and Transport (Japan)

*Based on 2003 data.

As shown in Table 3.1, close to 220 million passenger cars were registered in the EU-25 in 2005, meaning a very significant 37 % growth on 1990 figures. Interestingly, this was five percentage points more than the EU-15 average, which indicates that growth was higher in the Member States that joined in 2004 (data not shown). Indeed, when looking at the individual Member States, the highest 1990-2005 growths in the number of cars registered were in two of the new Member States, Lithuania (195 %) and Latvia (162%).

# Nearly one car per two inhabitants in the EU-25

In terms of car density in the population, in 2005 there were 476 passenger cars for 1000 inhabitants in the EU-25 - equating to about one car for every two inhabitants - compared with a 'motorisation rate' of 364 in 1990 (Table 3.1). This corresponds to a growth of 31 %, which exceeded the 28 % growth rate for Japan, and more especially the 6 % growth rate for the United States (based on 2004 data and against an EU growth of 29 % over the same 1990-2004 period). See Figure 3.1.

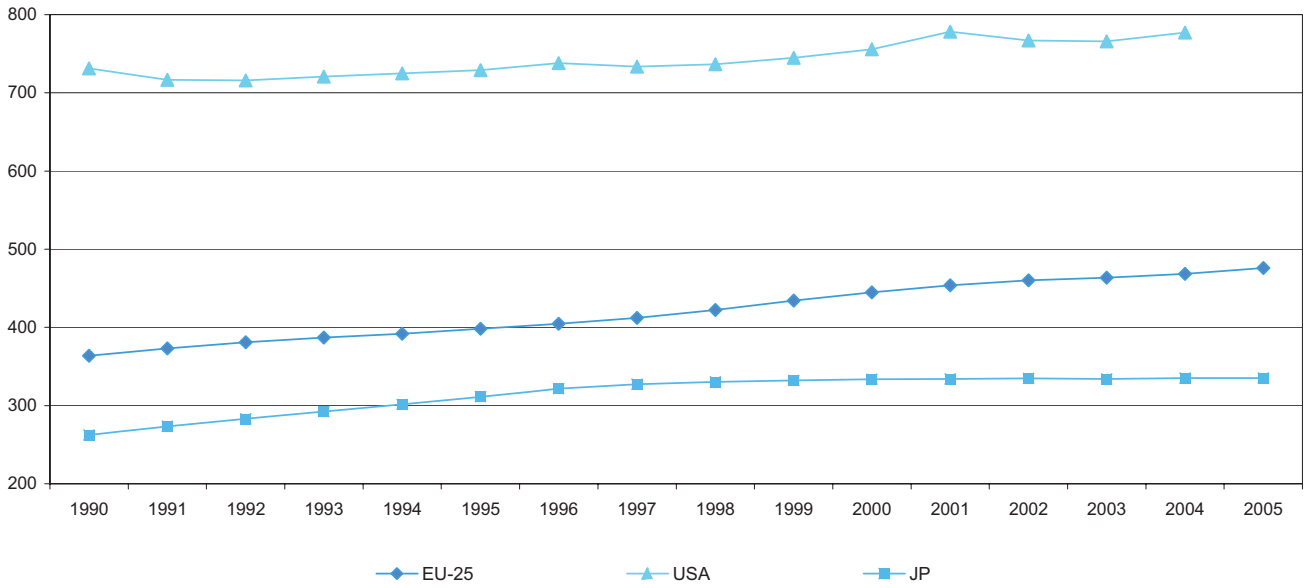
Based on comparable 2004 data, the EU-25 motorisation rate was below that of the United States (777) and, in 2005, significantly larger than that in Japan (335). However, readers should note that the above figures for the United States take into account not only the category 'passenger cars' but also the impressive number of pick-up trucks, light vans and sports utility vehicles very often used for private transportation. In the EU, however, national vehicle registers might consider such vehicles as 'commercial vehicles'. Moreover, the fact that certain countries include vans and pick-ups or classify them under 'passenger cars' makes comparison between Member States difficult.

## Car occupancy varies

The car occupancy rate is important for assessing the efficiency in the use of especially passenger cars, notably with a view to traffic congestion management. The average number of occupants per car varies quite significantly around Europe, according to data from the Urban Audit. Based on available data, an average of 1.1 persons occupied a car in Germany's cities. However, this number rose to as much as 2.6 persons in Cyprus, and to three persons in some of Bulgaria's cities. Pending the availability of other data, this rate could even rise further.

*For more information, visit: http://epp.eurostat.ec.europa.eu/ and http://www.urbanaudit.org/*

**Figure 3.1 Evolution of the motorisation rate (number of passenger cars per 1000 inhabitants) between the EU-25, USA* and Japan, 1990-2005**




*Source*: Eurostat, national statistics, DG Energy and Transport, North American Transportation Statistics Database (US) and Ministry of Land and Transport (Japan)

* US data include also light pick-up trucks.

Looking more closely at the EU-25 average motorisation rate, it is worth noting that 19 of the 25 Member States display rates below this threshold. Indeed, if this average seems quite high, it is because of the high rates in, and relative weights of, some of the largest EU Member States in population terms, such as Germany (559), Italy (590) and, to a lesser extent, France (500): Member States which had the three largest stocks of passenger cars registered, together accounting for 50 % of the EU-25 total (2004 data).

Luxembourg - a Member State with the second smallest car stock - had the very highest rate of 669 cars per 1000 inhabitants, and as such, it came closest to the rate for the United States. But when looking beyond the EU, however, Luxembourg was in fact surpassed by EFTA member Liechtenstein with a rate of 705 cars per 1000 inhabitants.

Of the 19 Member States with below-average rates, half of them were new members that joined the EU in 2004: only Malta exceeded the average (526). The lowest rate could be found in the Slovak Republic (242) in 2005, but in Romania in 2004 (149). Looking beyond the EU, candidate country Turkey recorded the lowest rate of just 80 cars per 1000 inhabitants.

## More goods transport vehicles on the roads

If the transport of goods by road has increased (see Chapter 5), then it comes as no surprise that the number of 'goods vehicles' - lorries, road tractors, and sometimes vans and pick-ups - that carry these goods has also risen.

Estimated data for the EU-25 show an increase in goods vehicles of about 46 % between 1995 and 2004, with the number of these vehicles expanding by around 10 million to an estimated 31.5 million by 2004 (Table 3.2).

Based on comparable data available for 19 Member States between 1995 and 2004, the highest growths were in the Czech Republic (+95 %), Ireland (+89 %) and Poland (+77 %). In the case of Poland, this growth was quite significant, as it had one of the largest vehicle stocks in the EU-25 (8%) in 2004. Looking beyond the EU, these growth rates were in fact overtaken by candidate countries Croatia and Turkey, with rates of respectively 111 % and 165 %.

Looking at the largest shares in vehicle stock, France possessed a fifth (19 %) of the EU-25 total. It was followed by Spain and Italy, with shares of respectively 14 % and 13 %.

**Table 3.2 Evolution of the number of road goods vehicles, 1995-2004 (in 1000)**

| | 1990 | 1995 | 2000 | 2003 | 2004 | % change 1995-2004 |
|---|---|---|---|---|---|---|
| **EU-25** | **:** | ***21 600*** | ***26 900*** | **30 702** | ***31 500*** | ***46%*** |
| **BE** | : | : | 548.4 | 603.5 | 625.5 | : |
| **BG** | 161.6 | 223.2 | 259.4 | 293.5 | 317.7 | 42% |
| **CZ** | : | 203.0 | 298.3 | 365.7 | 396.2 | 95% |
| **DK** | 293.2 | 333.8 | 384.9 | 412.8 | 436.1 | 31% |
| **DE** | : | 2 378.7 | 2 782.0 | 2 765.5 | 2 757.5 | 16% |
| **EE*** | 67.7 | 65.6 | 82.1 | 83.4 | 85.7 | 31% |
| **IE*** | 143.2 | 141.8 | 205.6 | 251.1 | 268.1 | 89% |
| **EL** | 743.2 | 883.8 | 1 043.0 | 1 131.0 | : | : |
| **ES** | 2 332.9 | 2 936.7 | 3 780.2 | 4 188.9 | 4 418.0 | 50% |
| **FR** | 4 670.0 | 4 926.0 | 5 456.0 | 5 986.0 | 6 057.0 | 23% |
| **IT** | 2 349.0 | 2 708.8 | 3 377.6 | 3 933.9 | 4 015.6 | 48% |
| **CY** | 74.3 | 101.2 | 114.7 | 119.6 | 117.8 | 16% |
| **LV*** | : | 68.7 | 97.1 | 104.6 | 107.6 | 57% |
| **LT** | 83.0 | 108.9 | 98.6 | 110.5 | 115.7 | 6% |
| **LU** | : | : | 24.7 | 27.9 | 28.4 | : |
| **HU** | 262.0 | 292.1 | 353.0 | 406.9 | 410.5 | 41% |
| **MT** | : | : | : | 44.7 | 44.6 | : |
| **NL** | 553.0 | 654.0 | 939.0 | 1 009.6 | 1 035.6 | 58% |
| **AT*** | : | : | : | 765.7 | 775.4 | : |
| **PL** | : | 1 354.0 | 1 879.0 | 2 313.4 | 2 393.2 | 77% |
| **PT** | : | 1 203.8 | *1 706.7* | 1 951.8 | : | : |
| **RO** | 258.7 | 343.1 | 427.2 | 463.1 | 482.0 | 40% |
| **SI** | : | 39.4 | 54.5 | 60.1 | 66.2 | 68% |
| **SK** | 92.0 | 102.6 | 114.0 | 151.0 | 151.8 | 48% |
| **FI** | 264.2 | 252.0 | 304.3 | 327.1 | 355.2 | 41% |
| **SE** | 309.5 | 307.7 | 374.2 | 421.6 | 440.0 | 43% |
| **UK** | 2 706.0 | 2 565.0 | 2 861.0 | 3 166.0 | 3 341.0 | 30% |
| **HR** | : | 73.5 | 122.5 | 148.3 | 154.8 | 111% |
| **TR** | : | 719.2 | 1 188.7 | 1 378.5 | 1 907.3 | 165% |
| **IS** | 13.1 | 14.8 | 19.4 | 21.2 | 23.0 | 56% |
| **NO** | 308.3 | 349.5 | 414.3 | 438.3 | 449.8 | 29% |
| **CH** | 252.1 | 262.4 | 278.5 | 292.3 | 298.2 | 14% |

*Source*: Eurostat, national statistics, DG Energy and Transport

Notes: EE, IE, LV, AT: lorries only - PT: includes special vehicles.

## Buses and coaches: growth in the slow lane

Given the increase in cars, reflecting people's preference for greater independence and a typically more direct journey from A to B, one would expect less growth for buses and coaches, if not even a decline. And the figures show this: between 1990 and 2004, the number of buses and coaches - including buses used in urban transport - rose by an estimated 6 % in the EU-25, to reach approximately 722 thousand (Table 3.3). This was some 32 percentage points less than the growth rate for passenger cars (based on the 1990-2004 period).

Also revealing is the comparative growth in buses and coaches recorded for the EU-15 which, at 16 %, was 10 percentage points more than the EU-25 average - the reverse of the situation for car growths (see above). This reflects the numerous country decreases recorded in the larger EU-25 and notably among many new Member States.

Of the 21 Member States, for which data were available, 11 of them posted decreases, and seven of these were Eastern European members that joined in 2004. In Slovakia, this drop was as much as 38 %. The decrease in Germany is also notable as it involved some 14 thousand vehicles, a finding that can be explained too by the relatively large fleet in former Eastern Germany.

### Satisfaction with public transport varies

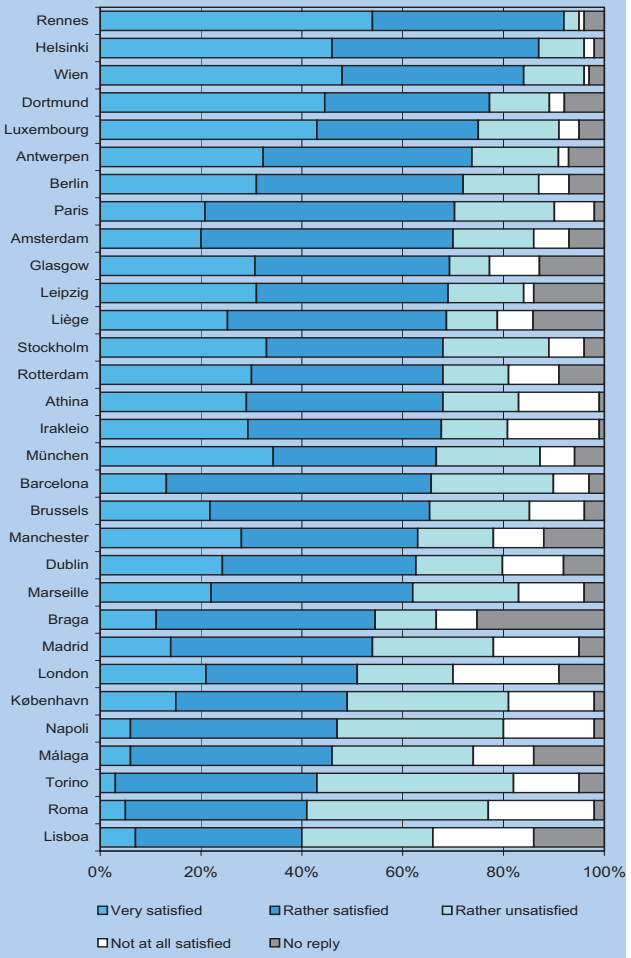
So as to measure citizens' perception of quality of life within 'their' city, Urban Audit also has some perception indicators, resulting from opinion polls carried out in 31 European cities in 2004 among a representative random sample of city inhabitants.

In 2004, an average of two in three city residents were satisfied with the public transport in their city (Figure 3.2). However, this average masks large differences. For instance, while nine out 10 people were satisfied in Rennes, in Lisbon this was the case for only two in five city residents. Moreover, city size is not taken into account: in a metropolis such as Rome - where public transport has a tremendous number of users - only two in five were satisfied.

Among those citizens who were satisfied with their public transport system, only Rennes could boast a rate of over 50 %.

Of course, readers should note that satisfaction can also be influenced by recent events such as the offer of a new fast line or an unwelcome price increase, which can distort results somewhat, especially in the short term.

**Figure 3.2 Europeans' satisfaction with public transport, 2004**




*Source*: Eurostat (Urban Audit) and Flash Eurobarometer 156.

## Getting around the EU not always straightforward

According to a Eurobarometer survey* on passengers' rights carried out in 2005, well over two thirds (69 %) of respondents find it as easy to travel within the EU as within their home country. Among those who do find it difficult, the main deterrents to travelling within the EU were lack of information (44%), high prices (30%), connection problems (26%), difficulties in purchasing tickets (25%), unreliable information (20%) and lack of frequency in transport offered (17%).

Indeed, only one in two European citizens in the EU-25 Member States finds it easy to plan a journey where several transport modes are involved, and even fewer find the purchasing of tickets for such international journeys trouble-free. Furthermore, Europeans are divided on their willingness to purchase services from a transport company established in another European Union country, with just over one in two citizens indicating such willingness.

When it came to knowledge of their rights, 62 % of European citizens were aware that they have a contract with a transport company when they buy a ticket from them. However, only 35% knew about the rights and obligations linked to the contract.

Ratings of the various transport systems were mixed. Air transport has a generally positive image, with a 72% overall satisfaction rating and good perceptions of most elements linked to this service. At the other end of the scale, only 13% of inter-city rail transport passengers would claim to be 'very satisfied' while 9% stated they were 'not at all satisfied' with this mode of transport.

Regarding satisfaction as to how problems are dealt with when they arise, respondents showed the highest level of confidence in airlines (53%) to respond suitably when things do not go as scheduled. This level of satisfaction was lowest for local urban transport (35%).

**Special Eurobarometer 228 / Wave 63.2, entitled 'Passenger rights'. For more information, visit: http://ec.europa.eu/consumers/topics/eurobarometer_passrights_en.pdf*

When read alongside the data on car growths, although the comparison suggests a shift away from buses and coaches to cars, it should be noted that, because public transport was relatively more important in Eastern European countries, their fleets were in any case relatively large in the early nineties. In many cases, decreases probably also reflect fleet renewal and perhaps too the move towards vehicles with extra capacity or towards more efficient services.

Among the other countries registering growths, the highest increase was in Ireland (84 %), followed by Denmark (75 %) and Luxembourg (67 %).

Looking at country shares in the bus and coach total, the United Kingdom accounted for 14 %, followed by Italy (13 %) and France and Germany (each 12 %).

Table 3.3 Evolution of the number of buses and coaches, 1990-2004 (in 1000)

| | 1990 | 1995 | 2000 | 2003 | 2004 | % change 1990-2004 |
|---|---|---|---|---|---|---|
| **EU-25** | ***680.0*** | **669.0** | **692.4** | **702.1** | ***702.6*** | **3%** |
| **BE** | 15.6 | 14.6 | 14.7 | 15.1 | 15.3 | -2% |
| **BG** | 33.8 | 41.0 | 42.3 | 43.7 | 36.0 | 7% |
| **CZ** | 26.0 | 19.7 | 18.9 | 20.6 | 19.9 | -23% |
| **DK** | 8.1 | 13.7 | 14.0 | 14.1 | 14.2 | 75% |
| **DE** | 100.4 | 87.4 | 84.9 | 85.9 | 86.5 | -14% |
| **EE** | 7.9 | 7.0 | 6.1 | 5.4 | 5.3 | -33% |
| **IE** | 4.0 | 5.3 | 7.0 | 7.4 | 7.4 | 84% |
| **EL** | 21.4 | 24.6 | 28.0 | 27.1 | : | : |
| **ES** | 45.8 | 47.4 | 54.7 | 56.0 | 57.0 | 24% |
| **FR** | 70.0 | 81.8 | 85.7 | 87.1 | 88.4 | 26% |
| **IT** | 77.7 | 75.0 | 88.0 | 92.7 | 92.9 | 19% |
| **CY** | 2.3 | 2.7 | 2.9 | 3.3 | 3.2 | 39% |
| **LV** | : | 16.5 | 11.5 | 11.0 | 10.7 | : |
| **LT** | 15.2 | 17.1 | 15.1 | 15.5 | 14.4 | -5% |
| **LU** | 0.8 | 0.9 | 1.1 | 1.2 | 1.3 | 67% |
| **HU** | 26.1 | 20.5 | 17.9 | 17.9 | 17.4 | -33% |
| **MT** | : | 1.0 | 1.1 | 1.2 | 1.2 | : |
| **NL** | 12.1 | 12.0 | 11.4 | 11.3 | 11.2 | -7% |
| **AT** | 9.4 | 9.8 | 9.9 | 9.2 | 9.4 | 0% |
| **PL** | 92.0 | 85.1 | 82.6 | 82.8 | 82.7 | -10% |
| **PT** | 12.1 | 15.0 | 19.8 | 21.7 | : | : |
| **RO** | 28.3 | 42.0 | 40.7 | 41.9 | 43.0 | 52% |
| **SI** | 3.1 | 2.5 | 2.3 | 2.2 | 2.3 | -27% |
| **SK** | 14.3 | 11.8 | 10.9 | 10.6 | 8.9 | -38% |
| **FI** | 9.3 | 8.1 | 9.9 | 10.4 | 10.7 | 15% |
| **SE** | 14.6 | 14.6 | 14.4 | 13.7 | 13.4 | -8% |
| **UK** | 72.4 | 75.1 | 79.7 | 78.8 | 80.1 | 11% |
| **HR** | 5.8 | 3.9 | 4.7 | 4.8 | 4.9 | -16% |
| **TR** | : | 263.2 | 354.3 | 368.9 | 471.3 | : |
| **IS** | 1.3 | 1.3 | 1.7 | 1.7 | 1.8 | 33% |
| **NO** | 21.2 | 32.5 | 36.7 | 32.4 | 30.6 | 44% |
| **CH** | : | 37.0 | 40.3 | 43.6 | 44.8 | : |

*Source*: Eurostat, national statistics, DG Energy and Transport.

DE: 1990 data includes Eastern Germany.

## Railway rolling stock: marked decrease in goods transport wagons

As mentioned in the previous chapter on transport infrastructure, railway transport has generally been losing out in recent years to road and air transport, a phenomenon which will become more obvious in the following chapters. One would therefore expect the stock of vehicles - locomotives, rail cars, passenger and goods vehicles - to either stagnate or decrease. However, this causal link is difficult to establish with available data.

Moreover, readers should note that figures primarily refer to material owned by railway companies that are members of the International Union of Railways (UIC); leased or otherwise outsourced rolling stock can therefore be overlooked by the statistics. This is an important consideration given the tendency in recent years to outsource or lease rail equipment, against the backdrop of railway privatisation. This also explains why national data and, as a result, EU aggregates are not available in a number of cases. It also helps to understand why evolutions can be erratic, when rolling stock changes hands.

This interpretation problem is further compounded by the decommissioning of stock, which is sometimes also replaced by more efficient vehicles and wagons. Although this will have the effect of reducing the total stock, it does not necessarily reflect a decline in the importance and performance of the transport mode.

With these reservations in mind, looking at the different types of rolling stock, the most glaring change seems to have been in the number of 'goods transport wagons'. Available EU-15 data show that between 1990 and 2002, the stock of 'good transport wagons' shrank by 43 % (Table 3.4). Although the phasing-out of obsolete stock is most probably responsible for the largest part of this reduction, the data could partly reflect the shift from haulage by rail to that by road (see Chapter 5).

Of the 17 Member States with data available, only Luxembourg and, to a lesser extent, Ireland saw their stocks grow larger. Among those countries recording decreases, the largest rolling stocks, in Germany and Poland, went down by respectively 52 % and 60 %, together accounting for a cumulative withdraw equal to just over half of the EU-25's estimated stock in 2002.

'Locomotives and railcars' (i.e. vehicles that carry passengers or freight and do not use a separate locomotive) decreased by about 21 % to an estimated 47 944 by 2003 in the EU-25 (Table 3.5). Of the 21 Member States with data available, the evolution in Germany was the most impressive in volume terms, with over a third of its 14 700 units in 1990 withdrawn by 2003, while the largest percentage decrease could be found in Latvia, its stock almost halving. Increases were only registered in five countries, of which the largest were in Ireland (+61 %) and Luxembourg (+45 %).

**Table 3.4 Evolution of the number of goods transport wagons*, 1990-2003 (in 1000)**

| | 1990 | 2000 | 2002 | 2003 | % change 1990-2003 |
|---|---|---|---|---|---|
| **EU-25** | **:** | **:** | ***694*** | **:** | **:** |
| **EU-15** | **825** | **:** | ***472*** | **:** | **:** |
| **BE** | 30.3 | 18.8 | 20.3 | 20.1 | -34% |
| **BG** | 42.5 | 29.7 | 17.5 | 17.3 | -59% |
| **CZ** | : | 58.5 | 46.8 | 45.5 | : |
| **DK** | 4.6 | 2.2 | *2.2* | : | : |
| **DE** | 366.7 | 189.6 | *179.0* | 176.8 | -52% |
| **EE** | : | 5.9 | 7.5 | 17.4 | : |
| **IE** | 1.8 | 1.9 | 1.9 | 1.6 | -12% |
| **EL** | 11.0 | 3.5 | 3.5 | 3.5 | -68% |
| **ES** | 37.7 | 26.5 | 26.2 | 25.4 | -33% |
| **FR** | 148.1 | 94.8 | 107.0 | 103.8 | -30% |
| **IT** | 99.7 | 70.1 | 56.9 | 56.2 | -44% |
| **LV** | 11.1 | 9.1 | 7.9 | 8.0 | -28% |
| **LT** | *12.9* | 13.2 | 12.4 | 12.1 | *-6%* |
| **LU** | 2.7 | 2.6 | 3.1 | 3.3 | 22% |
| **HU** | : | 23.5 | 21.8 | 22.2 | : |
| **NL** | 6.7 | 4.7 | 2.1 | *1.8* | *-73%* |
| **AT** | 34.3 | 24.0 | 24.1 | 22.7 | -34% |
| **PL** | 275.6 | 130.1 | 95.4 | 111.0 | -60% |
| **PT** | 4.6 | 4.2 | 4.3 | 4.0 | -13% |
| **RO** | 166.1 | 118.0 | 101.8 | 75.5 | -55% |
| **SI** | 8.7 | 6.3 | 5.8 | 4.8 | -45% |
| **SK** | : | 27.0 | 24.5 | 24.0 | : |
| **FI** | 15.8 | 12.6 | 11.8 | 11.6 | -26% |
| **SE** | 27.5 | 17.6 | 9.9 | 8.5 | -69% |
| **UK** | 34.4 | : | *19.1* | : | : |
| **HR** | 13.7 | 10.0 | 8.8 | 7.9 | -42% |
| **TR** | 21.9 | 17.9 | 17.0 | 16.8 | -23% |
| **CH** | 27.1 | 19.9 | 19.6 | 19.5 | -28% |

*Source*: Eurostat, national statistics, DG Energy and Transport

* Data cover main railways (i.e. UIC members).
DE: 1990 data includes Eastern Germany.
LI: data included in Austrian data.
CY and MT: not applicable.

**Table 3.5 Evolution of the number of locomotives and railcars*, 1990-2003 (in units)**

| | 1990 | 2000 | 2002 | 2003 | % change 1990-2003 |
|---|---|---|---|---|---|
| **EU-25** | ***60 350*** | **:** | **49 099** | ***47 944*** | **-21%** |
| **EU-15** | **43 710** | **:** | **36 628** | ***35 519*** | **-19%** |
| **BE** | 1 727 | 1 670 | 1 678 | 1 522 | -12% |
| **BG** | 1 119 | 762 | 680 | 671 | -40% |
| **CZ** | : | 3 596 | 3 301 | 3 280 | : |
| **DK** | 524 | 415 | 566 | *458* | -13% |
| **DE** | 14 703 | 9 656 | 9 149 | 9 533 | -35% |
| **EE** | *300* | 194 | 236 | 241 | -20% |
| **IE** | 166 | 172 | 225 | 268 | 61% |
| **EL** | 400 | 244 | 278 | 237 | -41% |
| **ES** | 1 922 | 1 693 | 1 931 | 1 911 | -1% |
| **FR** | 7 279 | 7 158 | 7 336 | 7 240 | -1% |
| **IT** | 4 818 | 4 697 | 5 205 | 4 937 | 2% |
| **LV** | 739 | 433 | 392 | 386 | -48% |
| **LT** | *389* | 419 | 390 | 371 | -5% |
| **LU** | 97 | 124 | 131 | 141 | 45% |
| **HU** | 2 040 | 1 453 | 1 363 | 1 458 | -29% |
| **NL** | 2 372 | 1 965 | 2 029 | 2 118 | -11% |
| **AT** | 1 543 | 1 530 | 1 555 | 1 556 | 1% |
| **PL** | 6 801 | 5 293 | 5 028 | 4 975 | -27% |
| **PT** | 530 | 589 | 515 | 506 | -5% |
| **RO** | 4 515 | 3 440 | 3 594 | 2 173 | -52% |
| **SI** | 358 | 300 | 310 | 273 | -24% |
| **SK** | : | 1 570 | 1 451 | 1 441 | : |
| **FI** | 669 | 735 | 731 | 731 | 9% |
| **SE** | 1 350 | 887 | 869 | *773* | -43% |
| **UK** | 5 610 | : | 4 430 | 3 588 | -36% |
| **HR** | 563 | 480 | 396 | 393 | -30% |
| **TR** | 897 | 849 | 819 | 755 | -16% |
| **NO** | 502 | 299 | 269 | 266 | -47% |
| **CH** | 1 254 | 1 528 | 2 008 | 2 164 | 73% |

*Source*: Eurostat, national statistics, DG Energy and Transport

* Data cover main railways (i.e. UIC members).
DE: 1990 data includes Eastern Germany.
LI: data included in Austrian data.
CY and MT: not applicable.

Based on available data, 'passenger transport vehicles' - covering coaches, railcars (some of which, it should be noted, are already counted under 'locomotives and railcars') and trailers - also seem to have decreased significantly, to an estimated 107 thousand by 2002 (Table 3.6).

Declines in stock were recorded in at least 14 Member States between 1990 and 2003, including Germany, Italy and Poland which each saw their stock decrease by well over 3 000 units. However, in at least six others, stock actually expanded, especially in Spain and the Netherlands.

**Table 3.6 Evolution of the number of passenger transport vehicles (coaches, railcars and trailers)*, 1990-2003 (in units)**

| | 1990 | 2000 | 2002 | 2003 | % change 1990-2003 |
|---|---|---|---|---|---|
| **EU-25** | : | : | **106 785** | : | : |
| **BE** | 3 286 | 3 494 | 3 413 | 3 358 | 2% |
| **BG** | 2 386 | 2 099 | 1 655 | 1 705 | -29% |
| **CZ** | : | 5 252 | 5 103 | 5 085 | : |
| **DK** | 1 594 | 1 590 | 1 704 | 1 538 | : |
| **DE** | 24 139 | 21 097 | 21 728 | 20 992 | -13% |
| **EE** | *596* | 241 | 203 | 251 | -58% |
| **IE** | 314 | 421 | 419 | 405 | 29% |
| **EL** | 810 | 475 | 660 | 457 | -44% |
| **ES** | 3 839 | 3 765 | 4 345 | 4 408 | 15% |
| **FR** | 15 748 | 15 656 | 15 685 | 15 553 | -1% |
| **IT** | 14 025 | 11 914 | 11 007 | 10 813 | -23% |
| **LV** | 1 226 | 702 | 597 | 579 | : |
| **LT** | *664* | 563 | 509 | 480 | -28% |
| **LU** | 114 | 149 | 150 | 150 | 32% |
| **HU** | 4 385 | 3 232 | 3 376 | 3 015 | -31% |
| **NL** | 2 268 | 2 742 | 2 693 | 2 758 | : |
| **AT** | 3 689 | 3 468 | 3 320 | 3 175 | -14% |
| **PL** | 11 928 | 9 761 | 8 965 | 8 818 | -26% |
| **PT** | 1 232 | 1 303 | : | 1 203 | -2% |
| **RO** | 6 352 | 6 234 | 5 467 | *3 629* | -43% |
| **SI** | 606 | 461 | 482 | 432 | -29% |
| **SK** | : | 2 273 | 2 189 | 1 984 | : |
| **FI** | 957 | 1 003 | 1 030 | 1 060 | : |
| **SE** | 1 747 | 1 000 | 912 | 1 251 | -28% |
| **UK** | : | : | 16 982 | : | : |
| **HR** | 1 052 | 720 | 681 | 640 | -39% |
| **TR** | 1 443 | 1 415 | 1 356 | 1 294 | -10% |
| **NO** | 900 | 918 | 930 | : | - |
| **CH** | 4 136 | 3 333 | 4 020 | 4 076 | -1% |

*Source*: Eurostat, national statistics, DG Energy and Transport

* Data cover main railways (i.e. UIC members).
DE: 1990 data includes Eastern Germany.
LI: data included in Austrian data.
CY and MT: not applicable.

## Aircraft numbers climb higher

Look up in the sky and there are more jet trails criss-crossing one another than there were in 1990. In effect, between 1990 and 2005, the EU-25's civil commercial fleet climbed by 72 %, rising from 2 891 to 4 970 aircraft. Although the numbers are relatively small, this increase was greater than that recorded for any other of the main transport modes.

Table 3.7 shows the fleet 'by operating country'. Nearly all aircraft operated in the country are also registered in that country, but some of these could however carry a foreign registration. This is, for instance, the case if aircraft are temporary leased out to a different company. The last category 'various' denotes multi-national ownership, as is the case, for example, with SAS (Scandinavian Airlines).

In 2005, the EU-25 possessed a fleet of 4 970 aircraft for civil use (Table 3.7), Interestingly, the 10 new Member States only accounted for around 250 of these planes, or just 6 % of the EU-25 total.

**Table 3.7 Breakdown of EU-25 civil air fleet, 2005* (in units)**

| Type | EU-25 | BE | CZ | DK | DE | EE | IE | EL | ES | FR | IT | CY | LV | LT | LU | HU | MT | NL | AT | PL | PT | SI | SK | FI | SE | UK | Various |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Business / Corporate / Executive | 527 | 14 | 4 | 22 | 97 | 1 | 6 | 6 | 44 | 43 | 48 | : | 1 | 2 | 1 | : | 1 | 14 | 51 | : | 95 | : | : | 8 | 3 | 66 | : |
| Freight / Cargo under 100 000 lbs mtow | 182 | 12 | 2 | : | 14 | 6 | 15 | 7 | 35 | 6 | 11 | : | 6 | 6 | 6 | 9 | : | : | 1 | 5 | 1 | 2 | : | : | 16 | 22 | : |
| Freight / Cargo over 100 000 lbs mtow | 170 | 34 | : | 8 | 21 | : | 4 | : | 8 | 16 | 6 | : | 1 | : | 15 | 1 | : | 11 | 1 | : | : | 1 | : | : | : | 38 | 5 |
| Quick-Change/Convertible (Passenger/Cargo) | 75 | 1 | : | 7 | 5 | : | : | : | 8 | 18 | | : | : | 2 | : | 1 | : | 3 | | 2 | 5 | : | : | 1 | 6 | 16 | : |
| Special purpose / Ambulance | 16 | 1 | : | : | 2 | 1 | : | : | : | : | 1 | : | : | : | : | 1 | : | : | 3 | : | 1 | : | : | 2 | 2 | 2 | : |
| Passenger 50 seats or less | 774 | 14 | 13 | 35 | 130 | 7 | 5 | 16 | 49 | 111 | 30 | : | 12 | 13 | 11 | 8 | 7 | 24 | 47 | 24 | 16 | 8 | 7 | 10 | 53 | 123 | 1 |
| Passenger 51 to 150 seats | 1 529 | 42 | 31 | 28 | 258 | 13 | 26 | 37 | 168 | 116 | 128 | 2 | 10 | 8 | 5 | 23 | 7 | 74 | 44 | 32 | 27 | : | 11 | 40 | 17 | 277 | 105 |
| Passenger 151 to 250 seats | 1 242 | 15 | 17 | 18 | 171 | : | 122 | 7 | 151 | 146 | 143 | 13 | : | : | : | 14 | 5 | 42 | 21 | 8 | 34 | 3 | 1 | 19 | 22 | 249 | 21 |
| Passenger more than 250 seats | 455 | 4 | : | 3 | 89 | : | 7 | 5 | 35 | 61 | 22 | 3 | 1 | : | : | | : | 37 | 16 | | 10 | : | : | 6 | 1 | 144 | 11 |
| Total | 4 970 | 137 | 67 | 121 | 787 | 28 | 185 | 78 | 498 | 517 | 389 | 18 | 31 | 31 | 38 | 57 | 20 | 205 | 184 | 71 | 189 | 14 | 19 | 86 | 120 | 937 | 143 |

*Source*: Airclaims (CASE database)

*Data as at 31/12/2005

## 'Business only': over tenth of the fleet

Some 80 % of the EU-25 fleet was accounted for by passenger aircraft in the four different passenger aircraft categories, from 50 persons or less through to 251 persons or more. The largest of these shares was aircraft with 51 to 150 seats (31 %) and aircraft with 151-250 seats (25 %). Second to passenger aircraft came the 'business/ corporate/executive' category (11 %), which covers privately- or company-owned planes but also air-taxis, the vast majority of which have a seating capacity of less than 20.

Of the remaining shares, cargo-only aircraft represented a share of over 7 %, which was made up of aircraft designed to carry cargo both under 100 000 lbs maximum take-off weight (mtow) (4%) and over this threshold (3 %). The cargo version of a propeller driven Fokker F50, for instance, has an mtow of 45 000 lbs, an Airbus A300 (version B4-100F) 348 000 lbs and a Boeing 747 (version 400F) 875 000 lbs.

Accounting for a proportion of 2 %, 'quick-change convertible (passenger/cargo)' aircraft are also important when considering cargo. Designed to allow a quick change of configuration from passenger to cargo and vice versa, these include both small (with a seating capacity of 10 to 20 passengers) and large aircraft (such as Boeing 747 with more than 500 seats). Such aircraft types are often used for night-time postal flights and day-time passenger flights.

The 'special purpose/ambulance' category represented under only 0.5 % of the total. 'Special purpose' includes aircraft used for training, geo-survey and mapping, weather and atmospheric surveys as well as surveillance and patrol.

Finally, it should perhaps not be overlooked that there are also at least 30 000 small planes registered in the EU-25, used for private use. Although these are small aircraft that have limited impact on airspace congestion, their number is at least six times as large as the EU's civil aircraft fleet.

### EU's Airbus A380 spreads its wings

Not since the Americans introduced the Boeing 747 in the late 1960s has the aeronautics sector taken such an enormous leap with Airbus' super-sized A380 liner. In fact, the massive twin-deck A380 will eclipse the Boeing 747 that has dominated the commercial skies for decades.

The 555-seat plane has a range of up to 15 000km, allowing it to fly non-stop between Europe and Asia, while the three-deck long-range freighter version, the A380F, will be able to carry up to 152 tonnes of cargo on standard pallets over distances of up to 10 400km. Using advanced technologies, it will be the most fuel-efficient and environmentally friendly airliner ever built. It has a maximum take-off weight of over 560 tonnes.

Airbus also attracts superlatives in cargo aircraft as well, with its 'Beluga'. A highly modified version of the A300-600 - with the widest fuselage cross-section of any civil or military aircraft - the Beluga offers the most voluminous cargo hold today. It has an mtow of 155 tonnes.

*For more information, visit: http://ec.europa.eu/research/aeronautics/index_en.html and http://www.airbus.com.*

## Largest aircraft fleets in Germany and the UK

Taking a closer look behind the EU figures, the UK cumulated the highest total with 937 planes, ahead of Germany (787) and France (517). Among various other interesting features, it should be noted that the UK's fleet of passenger aircraft seating 251 persons or more (totalling 144) was almost as much as the combined numbers for Germany and France, most likely pointing to the UK's importance for long-haul flights (see Chapter 5).

Also, although the UK had the highest number of cargo aircraft (including quick-change convertibles), Spain had the highest number under the 100 000 lbs mtow threshold (35), most probably reflecting the extent of air cargo services between the mainland and islands.

### No pie in the sky when it comes to air passenger rights

According to a Eurobarometer survey on passenger rights*, although most Europeans are generally highly satisfied with air transport, when it comes to compensation schemes offered in case of service failures, they show far less satisfaction.

However, this situation should change thanks to a new EU Regulation**, which entered into force in 2005, air passengers are better protected in the event of particularly denied boarding, flight cancellation, long delays, lost luggage and accidents.

The regulation should help bring about a dramatic reduction in the frequency of denied boarding, for which airlines will have to pay compensation as a deterrent (€250 for flights of less than 1 500 km, €400 for flights of between 1 500 and 3 500 km and €600 for flights of more than 3 500 km). Passengers will be compensated for late cancellation and will receive assistance in the event of long delays. However, there is no right to compensation for cancellation if the airline can provide evidence of extraordinary circumstances which could not have been avoided.

The Regulation applies to all flights, including charters, operated by European airlines from or to a European airport and to any flight departing from the European Union. The European Commission is certain that the application of these new rights will considerably improve the quality of service that European airlines provide to their customers, and at the same time make those airlines more competitive.

**Special Eurobarometer 228 / Wave 63.2, entitled 'Passenger rights'.*
***Regulation (EC) No 261/2004 of 11 February 2004 establishing common rules on compensation and assistance to passengers in the event of denied boarding and of cancellation or long delay of flights.*
*For more information, visit: http://ec.europa.eu/transport/air_portal and http://ec.europa.eu/consumers/topics/eurobarometer_passrights_en.pdf*

# Waterway goods vessels drift down

Table 3.8 Evolution of inland waterway transport equipment, 1990-2003 (in units)

| | Self propelled goods vessels | | | | | | | | Dumb and pushed barges | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 1990 | 1995 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
| **EU-25** | : | : | ***13 450*** | ***13 300*** | : | : | : | : | : | : | ***7 300*** | ***7 250*** | : | : | : | : |
| **BE** | 1 611 | 1 388 | 1 191 | 1 115 | 1 363 | 1 330 | 1 300 | : | 167 | 173 | 153 | 153 | 158 | 169 | 177 | : |
| **CZ** | : | 80 | 79 | 76 | 67 | 69 | 76 | 71 | : | 292 | 294 | 291 | 176 | 158 | 224 | 216 |
| **DE** | 2 207 | 3 122 | 2 804 | 2 663 | : | : | : | : | 516 | 1 290 | 1 230 | 1 197 | : | : | : | : |
| **EE** | 3 | 4 | : | : | : | 1 | 1 | : | 2 | - | : | : | : | 3 | 3 | : |
| **FR** | 2 300 | 1 485 | 1 246 | 1 211 | 1 190 | 1 194 | 1 218 | 1 000 | 768 | 749 | 695 | 679 | 681 | 700 | 682 | 530 |
| **IT** | : | 2 973 | 3 089 | 3 101 | 3 102 | 3 104 | 3 102 | : | : | 431 | 474 | 437 | 434 | 431 | 432 | : |
| **LV** | 12 | - | - | - | : | : | : | : | 41 | - | - | - | : | : | : | : |
| **LT** | 10 | 12 | 11 | 10 | 11 | 10 | 25 | 31 | 18 | 16 | 13 | 11 | 11 | 8 | 29 | 29 |
| **LU** | 21 | : | 3 | 4 | 5 | : | : | | : | : | 4 | 5 | 5 | : | : | : |
| **HU** | : | 275 | 143 | 225 | 237 | 235 | 230 | 230 | 192 | 150 | 173 | 391 | 394 | 385 | 391 | 391 |
| **NL** | 5 772 | : | 4 369 | 4 413 | 4 480 | 4 171 | : | : | 3 783 | : | 3 020 | 2 913 | 2 862 | 3 170 | : | : |
| **AT** | 39 | 22 | 29 | 34 | 32 | 34 | 15 | : | 171 | 126 | 141 | 146 | 139 | 137 | 128 | : |
| **PL** | 319 | 172 | 155 | 113 | 105 | 98 | 92 | 95 | 1 018 | 565 | 512 | 443 | 387 | 500 | 490 | 495 |
| **SK** | 8 | 9 | 9 | 9 | 12 | 11 | 26 | 27 | 255 | 233 | 226 | 194 | 202 | 191 | 206 | 195 |
| **FI** | 109 | 132 | 135 | 138 | 138 | 135 | 135 | 136 | 23 | 19 | 28 | 27 | 28 | 30 | 30 | 31 |
| **UK** | : | 186 | 186 | 186 | 186 | 186 | 151 | 151 | : | 361 | 361 | 361 | 361 | 361 | 339 | 339 |
| **CH** | 129 | 89 | : | : | : | : | : | : | 40 | 7 | : | : | : | : | : | : |

*Source*: Eurostat

As can be gleaned from Table 3.8, inland waterway transport equipment - self-propelled goods vessels and dumb and pushed barges - have generally been declining on the EU's waterways (see Chapter 2), apart from notably Germany and Hungary. Various scrapping schemes in individual Member States have no doubt contributed to this important decrease, as well as a remarkable increase in transport efficiency, through larger and faster vessels.

Based on available data for the EU, there were probably around 13 000 self-propelled vessels and around 7 000 dumb and pushed barges by 2003. In terms of change, Poland seems to show at least one of the largest decreases over the 1990-2003 period, with its fleet of self-propelled goods in 2003 being only a third of what it was in 1990, and its fleet of dumb and pushed barges being half as large.

# EU sea-going merchant fleet

The EU's sea-going merchant fleet - essentially ships carrying dry or liquid cargo - was made up of some 9 425 vessels in 2004 (Table 3.9). This represented a cumulative total of 290 million dwt (deadweight tonnes: the total weight that a ship can carry including cargo etc.).

This fleet total concerns however the 'controlled' number, signifying that the owner or operator of a vessel is registered in an EU country and controls its day-to-day operations. However, the vessel itself need not be registered in the country of the owner or operator, nor in another Member State. Indeed, in 2004, 66 % of these vessels were operated under a flag other than that of the Member State, under so-called 'flags of convenience'.

For readers' information, 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, which ranged in 2004 from as little as 12.5 % in Malta to as much as 100 % in Slovenia.

Of the EU's total fleet, Greece had by far the largest one, which with 3 089 vessels represented close to 33 %. After second-place Germany (26 %), the next largest shares were substantially smaller, at between 6 % and 7 % for the Netherlands, the UK, Italy and Denmark. France and Spain had comparatively small fleets. Interestingly, looking beyond the EU, Norway had the third largest fleet, i.e. after Germany.

Table 3.9 EU Merchant Fleet: ships of 1000 grt (gross tonnage) and over, 2004* (in number and deadweight tonnes (dwt))

| | Total fleet controlled | | National flag | | Foreign flag | | Share of foreign flag in total fleet | |
|---|---|---|---|---|---|---|---|---|
| | Number | mio dwt | Number | mio dwt | Number | mio dwt | % of number | % of mio dwt |
| **EU-25** | **9 425** | **290** | **3 238** | **95** | **6 187** | **196** | **65.6** | **67.4** |
| **BE** | 122 | 5.86 | 21 | 0.92 | 101 | 4.94 | 82.8 | 84.3 |
| **BG** | 92 | 1.49 | 59 | 1.01 | 33 | 0.48 | 35.9 | 32.3 |
| **DK**** | 561 | 16.37 | 263 | 8.40 | 298 | 7.98 | 53.1 | 48.7 |
| **DE** | 2 425 | 48.34 | 288 | 6.85 | 2 137 | 41.48 | 88.1 | 85.8 |
| **EE** | 79 | 0.28 | 42 | 0.16 | 37 | 0.13 | 46.8 | 44.3 |
| **IE** | 44 | 0.19 | 25 | 0.12 | 19 | 0.07 | 43.2 | 34.7 |
| **EL** | 3 089 | 156.39 | 746 | 48.98 | 2 343 | 107.41 | 75.8 | 68.7 |
| **ES** | 240 | 4.76 | 156 | 2.10 | 84 | 2.66 | 35.0 | 56.0 |
| **FR** | 190 | 4.64 | 101 | 2.49 | 89 | 2.15 | 46.8 | 46.4 |
| **IT** | 581 | 11.94 | 472 | 8.72 | 109 | 3.23 | 18.8 | 27.0 |
| **CY** | 103 | 3.47 | 37 | 0.93 | 66 | 2.54 | 64.1 | 73.1 |
| **LV** | 88 | 1.58 | 4 | 0.01 | 84 | 1.57 | 95.5 | 99.4 |
| **LT** | 52 | 0.32 | 43 | 0.28 | 9 | 0.04 | 17.3 | 12.9 |
| **HU** | 3 | 0.01 | 2 | 0.01 | 1 | 0.00 | 33.3 | 23.1 |
| **MT** | 16 | 0.05 | 14 | 0.05 | 2 | 0.01 | 12.5 | 9.8 |
| **NL** | 627 | 5.05 | 481 | 3.26 | 146 | 1.79 | 23.3 | 35.4 |
| **AT** | 27 | 0.98 | 6 | 0.04 | 21 | 0.95 | 77.8 | 96.1 |
| **PL** | 96 | 1.77 | 10 | 0.21 | 86 | 1.55 | 89.6 | 87.9 |
| **PT** | 49 | 1.63 | 31 | 0.43 | 18 | 1.20 | 36.7 | 73.4 |
| **RO** | 65 | 1.11 | 32 | 0.46 | 33 | 0.65 | 50.8 | 58.4 |
| **SI** | 22 | 0.54 | : | : | 22 | 0.54 | 100.0 | 100.0 |
| **FI** | 118 | 1.66 | 76 | 0.62 | 42 | 1.04 | 35.6 | 62.7 |
| **SE** | 292 | 5.73 | 148 | 1.38 | 144 | 4.35 | 49.3 | 75.9 |
| **UK** | 601 | 18.64 | 272 | 8.71 | 329 | 9.93 | 54.7 | 53.3 |
| **HR** | 91 | 2.31 | 59 | 0.99 | 32 | 1.32 | 35.2 | 57.0 |
| **TR** | 571 | 8.72 | 408 | 6.56 | 163 | 2.16 | 28.5 | 24.8 |
| **IS** | 25 | 0.21 | 2 | 0.01 | 23 | 0.20 | 92.0 | 96.6 |
| **NO** | 1 285 | 50.79 | 609 | 22.65 | 676 | 28.14 | 52.6 | 55.4 |
| **CH** | 265 | 8.08 | 14 | 0.77 | 251 | 7.31 | 94.7 | 90.5 |

*Source*: DG Energy and Transport

* Data as at January 1st, 2004.
** Data also based on international registers such as the Danish International Ship Register and including vessels registered in territorial dependencies.

## Powered two-wheelers

Snaking their way through traffic queues, 'powered two-wheelers', covering both motorbikes and, for the most part, mopeds, amounted to at least 25.5 million in 2004. This equals about 12 % of the car stock for the same year. This is without counting mopeds and scooters that are not registered in some Member States; a problem which unfortunately makes comparisons less than accurate.

Italians were clearly the fondest of this way of getting from A to B: with around 9 million powered two-wheelers, Italy accounted for close to 36 % of the EU total in 2003. It was followed by Germany (22 %) and France (10 %) in 2003. Among the major contributors, the UK showed the steepest growth between 1995 and 2004 of 71 %. Based on data available for 20 Member States, only five of these displayed decreases. Interestingly, the 10 new Member States accounted for only 1.9 million of the 25.5 million total.

**Table 3.10 Evolution of the number of powered two-wheelers*, 1995-2004 (in 1000)**

| | 1995 | 2000 | 2003 | 2004 | % change 1995-2004 |
|---|---|---|---|---|---|
| **EU-25** | : | : | **25 025** | ***25 500*** | : |
| **EU-15** | : | : | **23 125** | ***23 600*** | : |
| **BE** | : | 277.8 | 319.5 | 322.8 | : |
| **BG** | 519.3 | 522.4 | 535.7 | : | : |
| **CZ** | 915.2 | 748.1 | 751.6 | 756.6 | -17% |
| **DK** | 58.0 | 138.3 | 155.7 | 162.1 | 179% |
| **DE** | 4184.1 | 4987.4 | 5356.2 | 5529.5 | 32% |
| **EE** | 3.3 | 6.7 | 8.1 | 9.1 | 176% |
| **IE** | 23.5 | 30.6 | 35.1 | 34.9 | 49% |
| **EL** | : | : | 969.9 | : | : |
| **ES** | 1 301.2 | 1 445.6 | 1 513.5 | 1 612.1 | 24% |
| **FR** | 2289.0 | 2410.0 | 2448.0 | 2462.0 | 8% |
| **IT** | 6228.3 | 7826.9 | 8962.4 | : | : |
| **CY** | 50.4 | 43.3 | 41.5 | 41.4 | -18% |
| **LV** | 15.8 | 20.7 | 22.9 | 24.0 | 52% |
| **LT** | 20.0 | 19.8 | 21.9 | 22.9 | 14% |
| **LU** | *28.4* | 32.8 | 36.0 | 36.9 | 30% |
| **HU** | : | : | 103.5 | 114.0 | : |
| **MT** | 17.4 | 12.4 | 13.7 | 12.9 | -26% |
| **NL** | 308.0 | 437.8 | 516.6 | 536.9 | 74% |
| **AT** | 546.4 | 632.7 | 606.9 | 612.2 | 12% |
| **PL** | 929.0 | 803.0 | 845.5 | 835.8 | -10% |
| **PT** | 216.3 | 345.9 | 402.8 | 418.7 | 94% |
| **RO** | 327.7 | 239.2 | 235.9 | 235.0 | -28% |
| **SI** | : | 11.3 | 42.5 | 40.4 | : |
| **SK** | 81.8 | 45.6 | 48.7 | 52.0 | -36% |
| **FI** | 159.5 | 193.4 | 245.4 | 271.7 | 70% |
| **SE** | 264.2 | 310.1 | 395.6 | 403.3 | 53% |
| **UK** | 714.0 | 971.0 | 1162.0 | 1218.0 | 71% |
| **HR** | 9.9 | 21.9 | 33.9 | 39.3 | 296% |
| **TR** | 819.9 | 1011.3 | 1073.4 | 1218.7 | 49% |
| **IS** | 1.9 | 2.3 | 2.7 | 3.1 | 65% |
| **NO** | 158.6 | 201.6 | 239.6 | 248.6 | 57% |
| **CH** | 370.7 | 493.8 | 567.4 | 583.0 | 57% |

*Source*: DG Energy and Transport
*National vehicle stock data do not always include all lower powered two-wheelers.
SI: includes mopeds only from 2002 onwards.

### "Walk. Cycle. Go by bus. Car share. Change."

So ran the slogan for European Mobility Week 2006. Based on the success and lessons learnt from the International Car Free Day ('In town without my car!') initiated in France in 1998, the European Mobility Week has become an important annual event since its launch in 2002 by the Commission, together with other stakeholders, to encourage the adoption of transport alternatives to the car. These include walking, cycling, using public transport and car-sharing.

Every year, the European Mobility Week generally selects a central theme, and past years have pushed forward accessibility for those with reduced mobility, safe streets for children, sustainable commuting for adults and schoolchildren. In focusing on climate change, European Mobility Week 2006 supported the Commission's EU-wide 'You control climate change' public awareness campaign launched earlier in the year. The campaign slogan has been adapted for European Mobility Week to "Walk. Cycle. Go by bus. Car share. Change." A highlight of the week was a Car-Free Day in which cities and towns could participate independently.

As well as raising general awareness of the importance of sustainable transport, European Mobility Week promotes a lasting shift towards sustainable mobility as participating towns and cities have to introduce permanent measures, such as new cycle lanes or public transport services. Every year the number of participating cities and towns grows, and in 2006, over 1 300 participated in either European Mobility Week or/and the Car-Free Day, concerning well over 200 million EU citizens.

*For more information, visit: http://www.mobilityweek-europe.org*

*See also Chapter 7 on the environment.*

## Popularity of different transport modes in European cities

According to the Urban Audit, Budapest (HU), Miskolc (HU), Ostrava (CZ) and Brno (CZ) have the highest proportion of working population using rail, metro, bus or tram for daily commuting. Cycling as the normal means of commuting was most characteristic of Dutch, Danish and Swedish cities. In Groningen (NL), Enschede (NL) and Umeå (SE), more than 30 % of residents cycle to work.

Walking is typical in Spanish and Portuguese cities: more than 25 % of workers go to work on foot in Logroño (ES), Oviedo (ES), Vitoria/Gasteiz (ES) and Braga (PT). Driving a car to work is most common in the United Kingdom. Almost 90 % of jobholders travel by car in Wrexham (UK), Stevenage (UK), Worcester (UK) and Gravesham (UK) for instance.

## Good lord, that bus is taking a long time…

Although the British are renowned for forming perhaps the straightest bus queues in Europe, they are not necessarily waiting the longest for a bus. Among the other variables available in the Urban Audit is the average waiting time for a bus in the rush hour. Based on data available for about 80 cities, bus commuters in under a quarter of them had to wait 15 minutes or more for a bus, with bus commuters in the Polish city of Nowy Sacz having to wait an average of 45 minutes for a bus. Bus waiting times were however around five minutes or less in over 30 cities.

*For more information, visit: http://epp.eurostat.ec.europa.eu/ and http://www.urbanaudit.org*

## Bicycles: sales generally up

As mentioned in Chapter 2, despite increasing efforts to integrate cycling as a real daily transport alternative, this mode is somewhat of a bad dream for statisticians. Unlike cars and other vehicles, bicycles are not registered, and have a longer life and perhaps even sentimental value before they are… taken off the cycle path! In light of these considerations, the total stock could in fact be enormous.

For the purposes of policy-making, however, and especially interpreting bicycle use, sales of bicycles offer some indication of access and popularity. Based on BOVAG-RAI figures for the EU-15 between 1998 and 2003, sales rose by approximately 13 % to reach an estimated 16.5 million by 2003, a total that was however lower than that for 2000 (16.7 million). Among the EU-15, sales rose most in France, by 57 % to reach close to 3.3 million, far more than the sales totals in similarly-populated countries Italy and the United Kingdom.

**Table 3.11** Sales of bicycles in the EU-15, 1998-2003 (in 1000)

| | 1998 | 2000 | 2001 | 2002 | 2003 | % change 1998-2003 |
|---|---|---|---|---|---|---|
| **EU-15** | **14 666** | **16 702** | **15 006** | ***15 100*** | ***16 500*** | **13%** |
| **BE*** | 415 | 440 | 370 | 477 | 450 | 8% |
| **DK** | 430 | 380 | 365 | 425 | 425 | -1% |
| **DE** | 4 500 | 5 260 | 4 510 | 4 650 | 4 900 | 9% |
| **EL** | 210 | 190 | 161 | : | : | : |
| **ES** | 620 | 790 | 470 | 586 | 739 | 19% |
| **FR** | 2 076 | 2 660 | 2 280 | 2 422 | 3 258 | 57% |
| **IE** | 120 | 95 | 80 | : | : | : |
| **IT** | 1 350 | 1 720 | 1 680 | 1 384 | 1 432 | 6% |
| **LU*** | - | - | - | - | - | : |
| **NL** | 1 350 | 1 517 | 1 365 | 1 324 | 1 219 | -10% |
| **AT** | 430 | 470 | 400 | 372 | 393 | -9% |
| **PT** | 350 | 350 | 295 | 300 | 300 | -14% |
| **FI** | 225 | 210 | 265 | 214 | 275 | 22% |
| **SE** | 440 | 430 | 365 | : | : | : |
| **UK** | 2 150 | 2 190 | 2 400 | 2 300 | 2 500 | 16% |

*Source*: BOVAG-RAI (NL)

# 4. Enterprises, employment and economic performance

# 4. ENTERPRISES, EMPLOYMENT AND ECONOMIC PERFORMANCE

## Transport services: An economic player

Freight, coach, railway, airline, ship companies… When one looks at the figures, transport services (NACE Divisions 60-63[1]) emerge as a true industry, which not only ensures that people and goods move around but generates wealth and provides jobs too.

Based on Structural Business Statistics[2], enterprises - with transport services as their main activity - employed 8.2 million persons and generated EUR 363 billion value added in 2004, accounting for an estimated 6.9 % and 7.3 % respectively of the EU's total non-financial business economy (NACE Divisions C-K excl. J).

But the true wealth created by transport services is clearly much more than these figures indicate, when one includes for instance enterprises whose main activity is not transport services but whose activities nevertheless necessitate transport, and road freight in particular. A prime example is retailing where goods are often transported in-house between the factory or depot and the outlet. Then there is the industrial sector of transport equipment manufacturing (see box) or even the more catalytic impact of transport as a facilitator of international trade, tourism, social development, among others.

Indeed, there is a strong connection between the transport sector and other sectors of the economy: the other sectors generally need an efficient transport sector to develop and the transport sector is in turn dependent on development in other economic sectors. This is not to say however that transport will inevitably grow in line with the economy.

In this chapter, transport services cover road, rail, air, maritime, inland waterway and pipeline transport, but also auxiliary and supporting services including the operation of infrastructure and terminals (roads, railways, air and sea ports, inland waterways, etc.), navigational services (air traffic control and waterway navigation), berthing, parking and towing services, cargo handling, storage, warehousing (NACE 60-63). Because of their key role in organising and selling transport, travel operators and agents (NACE 63.3) have also been included.

Readers should note that enterprises managing infrastructure and terminals are considered as supporting transport activities and are therefore classified under NACE 63 (notably 63.2), and not as one might think under the individual transport activities (NACE 60, 61 or 62). Of course, there may well be some instances where operation and management of the infrastructure will be looked after by the same enterprise. These considerations are important to bear in mind when looking at individual transport activities, particularly in a context of liberalisation.

Finally, it is important to note that pipeline transport here covers more commodities than oil, as is the case elsewhere in the Panorama. It includes the transport of gases, liquids, water, slurry and other commodities via pipelines. It excludes however the distribution of natural or manufactured gas, water or steam.

1 The transport sector covered here corresponds to the following four NACE Rev. 1.1 Divisions: land transport (i.e. railway, road and pipeline) (60), water transport (maritime and inland waterway (61), air transport (62), and supporting and auxiliary transport activities (63).

2 For more information on Structural Business Statistics, visit Eurostat's website and the dedicated section on European Business located under theme 'Industry, trade and services': http://ec.europa.eu/eurostat.

### The wider or catalytic impact of transport services

When one goes beyond the confines of transport services covered by NACE Divisions 60-63, the true impact of transport on the economy is far greater than the figures can possibly portray in this chapter.

The manufacturing of transport equipment is the most obvious domain where the impact of transport services is tangibly felt, for without the need for transport services, cars, lorries, buses, trains, aeroplanes and ships would not need to be manufactured.

In 2004, transport equipment manufacturing (NACE Subsection DM) employed about 3 million persons, while generating a value added of EUR 176 billion. As such, it was one of the largest manufacturing sectors, accounting for 9 % of the EU-25's manufacturing workforce and for 11% of manufacturing value added.

Moreover, based on the industrial production index (showing the evolution of value added at factor cost, at constant prices), transport equipment manufacturing grew fastest between 1995 and 2005, by 47 %, against a manufacturing average of 20 %.

Unsurprisingly, and reflecting the modal shares indicated elsewhere in this Panorama, the EU-25's transport equipment sector is dominated by the manufacture of motor vehicles; trailers and semi-trailers (NACE Division 34), as this activity represented over two thirds of transport equipment employment and value added in 2004, or 6.7 % of the manufacturing workforce and 8.4 % of manufacturing value added.

Of course, one could cast the net wider to include, for example, construction (to build transport infrastructure), and providers of building materials (concrete for roads, steel and iron for rails…), energy (to power equipment and infrastructure)… One could also look at the more catalytic effects in terms of, for instance, tourism and trade. Altogether, the jobs and the wealth stemming directly and indirectly from transport services runs into many more millions and billions than presented here.

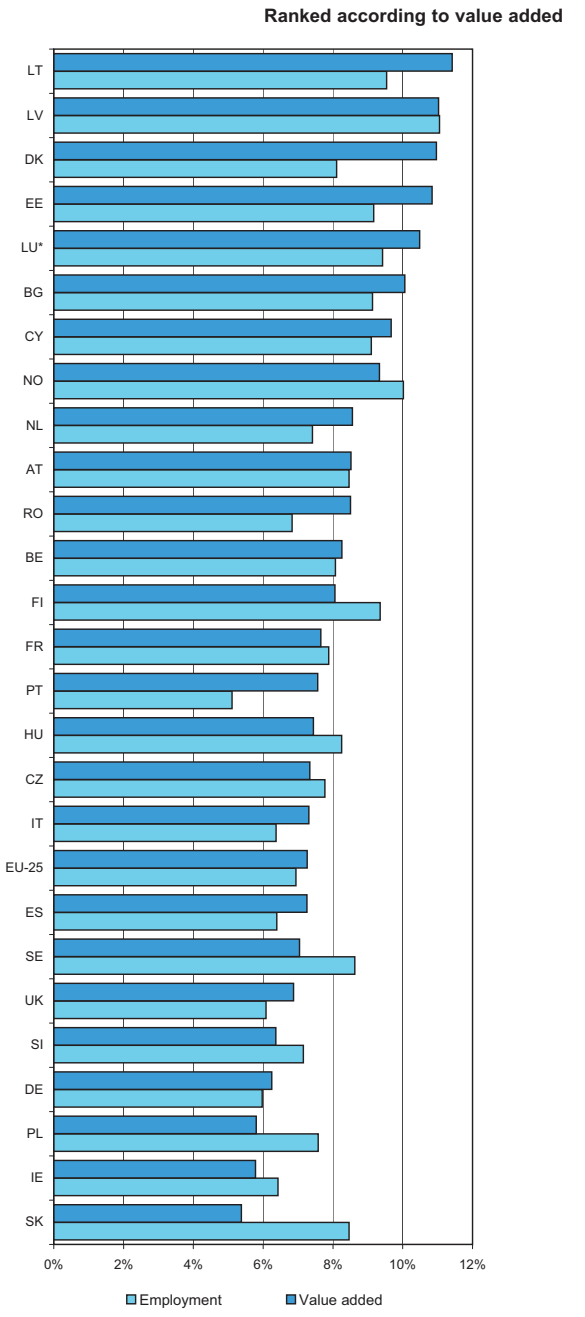
*For more information on Structural Business Statistics, visit Eurostat's website and the dedicated section on European Business located under theme 'Industry, trade and services': http://ec.europa.eu/eurostat*

# Transport services most important in Latvia and Lithuania

In the majority of Member States, the sector of transport services was more important than on average in the EU-25 (Figure 4.1). Seen from the perspective of value added, the Member State in which the weight of transport services was highest was Lithuania, where the sector generated nearly 11.5 % of value added in its non-financial business economy (NACE C-K excl. J). It was followed by Latvia (11 %), the Member State in which the weight of transport services in employment was highest (also 11 %).

The importance of transport services in Member States' economies was greater in terms of value added than for employment in 16 of the 25 Member States (for which data were available, including Bulgaria and Romania, but excluding Greece and Malta), indicating relatively high apparent labour productivity when compared with the non-financial business economy average. This was especially the case in Portugal where the value-added share was 1.5 times that for employment. By contrast, the weight of employment exceeded that of value added most in Slovakia (by a factor of 1.6).

**Figure 4.1** **Importance of transport services (NACE 60-63), in the non-financial business economy (NACE C-K excl. J), based on employment and value added, 2004 (in %)**




*Source*: Eurostat (SBS)

*2003 data.
EL and MT: not available.

Table 4.1 Top ten contributors to transport services in the EU-25, 2004

| Number of persons employed | | | Number of enterprises | | | Value added (at factor cost) | | | Turnover | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | (1000s) | % share | Country | (1000s) | % share | Country | (EUR billion) | % share | Country | (EUR billion) | % share |
| **EU-25** | **8 186.3** | **100%** | **EU-25** | **1 078.0** | **100%** | **EU-25** | **363.2** | **100%** | **EU-25** | **1 024.3** | **100%** |
| Germany | 1 238.0 | 15% | Spain | 218.7 | 20% | Germany | 66.8 | 18% | United Kingdom | 194.4 | 19% |
| France | 1 125.5 | 14% | Italy | 153.7 | 14% | United Kingdom | 64.9 | 18% | Germany | 166.6 | 16% |
| United Kingdom | 1 091.9 | 13% | Poland | 138.9 | 13% | France | 54.9 | 15% | France | 147.9 | 14% |
| Italy | 935.7 | 11% | France | 94.6 | 9% | Italy | 41.4 | 11% | Italy | 119.4 | 12% |
| Spain | 820.2 | 10% | Germany | 83.4 | 8% | Spain | 33.3 | 9% | Spain | 88.8 | 9% |
| Poland | 566.8 | 7% | United Kingdom | 64.3 | 6% | Netherlands | 20.0 | 5% | Netherlands | 54.2 | 5% |
| Netherlands | 341.6 | 4% | Czech Republic | 45.9 | 4% | Belgium | 11.5 | 3% | Sweden | 39.2 | 4% |
| Czech Republic | 277.6 | 3% | Hungary | 35.9 | 3% | Denmark | 11.2 | 3% | Belgium | 37.2 | 4% |
| Sweden | 222.5 | 3% | Sweden | 31.0 | 3% | Austria | 10.5 | 3% | Denmark | 33.8 | 3% |
| Hungary | 212.3 | 3% | Portugal | 25.7 | 3% | Sweden | 10.4 | 3% | Austria | 29.3 | 3% |

*Source*: Eurostat (SBS)

EL: not available.

## Spain, Italy and Poland together accounted for 47 % of enterprises

While the EU's largest Member States were generally the largest contributors to transport services, their ranking varied according to indicator (Table 4.1). Whereas Germany was, albeit marginally, the top contributor to employment and value added, accounting for 15 % and 18 % of the transport services totals respectively, Spain was the largest in terms of number of enterprises (20 %), and the United Kingdom in terms of turnover (19 %). Interestingly, Poland, similar in size to Spain based on population, was only in the top ten for persons employed and number of enterprises.

Spain, Italy and Poland together accounted for 47% of the total number of enterprises in transport services, while they represented just 28 % of persons employed, proportionally much less. Interestingly, there was a high degree of unpaid workers (for example, working owners and/or unpaid family workers) among the persons employed in the transport services of these Member States, together with Bulgaria (Table 4.2). At the other end of the scale came Slovakia where this group was clearly the exception to the rule (making up for just 0.2 % of persons employed).

Table 4.2 Share of unpaid workers (e.g. entrepreneurs/unpaid family workers) in transport services (NACE 60-63), 2004 (in % of total persons employed)

| | % share |
|---|---|
| **SK** | 0.2 |
| **EE** | 1.7 |
| **RO** | 1.7 |
| **LV** | 2.5 |
| **LU*** | 2.6 |
| **PT** | 4.0 |
| **LT** | 4.1 |
| **FR** | 4.3 |
| **UK** | 5.1 |
| **AT** | 6.1 |
| **DE** | 6.7 |
| **BE** | 7.0 |
| **DK** | 7.3 |
| **NL** | 8.4 |
| **IE** | 9.0 |
| **NO** | 11.1 |
| **HU** | 12.3 |
| **EU-25** | **12.5** |
| **FI** | 14.1 |
| **SE** | 14.9 |
| **CY** | 14.9 |
| **SI** | 15.9 |
| **CZ** | 16.1 |
| **IT** | 21.5 |
| **ES** | 24.0 |
| **PL** | 26.5 |
| **BG** | 28.2 |

*Source*: Eurostat (SBS)

*2003 **2002

EL and MT: not available.

## Labour costs highest in Ireland

Average labour costs in transport services were EUR 31 700 per employee in the EU-25 in 2004 (Table 4.3), which were 19 % higher than the services average (NACE G, H, I and K). However, readers should note that these higher costs can be partly explained by the higher share of full-time workers in transport services (see page 63.

Looking behind the EU average, transport services employees in Ireland were clearly the most expensive, costing their employers EUR 56 700 a head. They were followed by their counterparts in Luxembourg, Belgium and Denmark, with rates of between EUR 44 000 and EUR 46 000 per employee.

**Table 4.3** Selected cost, productivity, profitability and investment indicators in transport services (NACE 60-63), by country, 2004

| | Labour cost per employee (EUR 1000) | Apparent labour productivity (EUR 1000) | Wage adjusted labour productivity (in %) | Gross operating rate (in %) | Investment rate (in %) |
|---|---|---|---|---|---|
| **EU-25** | **31.7** | **44.4** | **140.0** | **13.3** | **29.9** |
| **BE** | 45.3 | 59.7 | 131.8 | 9.1 | 22.7 |
| **BG** | 3.7 | 5.2 | 139.4 | 12.5 | 51.7 |
| **CZ** | 9.5 | 13.9 | 146.7 | 11.7 | 29.0 |
| **DK** | 44.0 | 83.3 | 189.4 | 16.9 | 33.9 |
| **DE** | 32.9 | 53.9 | 164.1 | 17.3 | 24.5 |
| **EE** | 7.9 | 15.6 | 198.1 | 10.1 | 63.0 |
| **IE** | 56.7 | 73.4 | 129.3 | 11.5 | 32.7 |
| **ES** | 29.5 | 40.6 | 137.7 | 16.8 | 29.7 |
| **FR** | 38.5 | 48.8 | 126.8 | 9.1 | 31.1 |
| **IT** | 35.7 | 44.3 | 124.2 | 12.8 | 35.1 |
| **CY** | 28.1 | 32.6 | 116.0 | 13.5 | 7.3 |
| **LV** | 4.7 | 9.0 | 191.0 | 13.5 | 66.5 |
| **LT** | 5.4 | 10.5 | 195.7 | 17.2 | 35.7 |
| **LU*** | 45.9 | 63.3 | 138.0 | 11.0 | 12.1 |
| **HU** | 9.8 | 12.7 | 129.0 | 9.1 | 74.3 |
| **NL** | 40.9 | 58.6 | 143.2 | 13.3 | 19.3 |
| **AT** | 38.4 | 52.5 | 136.9 | 11.2 | 49.4 |
| **PL** | 7.0 | 10.7 | 152.6 | 15.5 | 24.5 |
| **PT** | 22.2 | 32.4 | 146.0 | 11.7 | 71.6 |
| **RO** | 3.4 | 6.7 | 198.7 | 16.6 | 95.2 |
| **SI** | 17.2 | 21.2 | 123.1 | 9.2 | 26.3 |
| **SK** | 7.4 | 9.4 | 126.6 | 6.7 | 87.1 |
| **FI** | 39.2 | 51.6 | 131.7 | 12.4 | 28.1 |
| **SE** | 40.4 | 46.9 | 116.1 | 7.1 | 28.7 |
| **UK** | 37.0 | 59.5 | 160.8 | 13.7 | 27.0 |
| **NO** | 46.1 | 88.7 | 192.5 | 18.6 | 43.2 |

*Source*: Eurostat (SBS)

*2003 **2002
EL and MT: not available.

# Labour productivity highest in Romania, the Baltics and Denmark

Wage adjusted labour productivity in transport services in 2004 was 140 % in the EU-25. Wage adjusted labour productivity, which indicates the degree to which average personnel costs are compensated by value added per person employed, can be measured as the ratio between value added and personnel costs (once the latter has been adjusted for the ratio of paid employees to persons employed). Reflecting the higher average labour costs in transport services, productivity was nine percentage points lower than the services average.

In five Member States (Denmark, Estonia, Latvia, Lithuania and Romania), wage adjusted labour productivity was 189 % and above, reaching as much as almost 199 % in Romania. These high ratios were mostly the result of high wage adjusted labour productivity in particular transport services of economic importance. For instance, in Denmark this ratio was as much as 544 % in sea and coastal transport, an activity which accounted for 35 % of transport services value added. In Latvia, the ratio was 386 % in road freight services, an activity which generated over a fifth of transport services value added.

**Table 4.4** **Selected economic indicators in transport services, by transport service, EU-25, 2004**

| | Number of persons employed | | Number of enterprises | | Value added at factor cost | | Turnover | |
|---|---|---|---|---|---|---|---|---|
| | (1000s) | % share | Units | % share | (EUR billion) | % share | (EUR billion) | % share |
| **Total transport services (NACE 60-63)** | **8 186.3** | **100%** | **1 078 043** | **100%** | **363.2** | **100%** | **1 024.3** | **100%** |
| **Land transport; transport via pipelines (60)** | **5 209.4** | **63.6%** | **890 370** | **82.6%** | **172.2** | **47.4%** | **384.9** | **37.6%** |
| Railway transport (60.1) | 900.9 | 11.0% | 640 | 0.1% | 34.2 | 9.4% | 61.0 | 6.0% |
| Road and other land transport (NACE 60.2: 'Other land transport') | 4 299.3 | 52.5% | 889 612 | 82.5% | 134.6 | 37.0% | 318.0 | 31.0% |
| Other scheduled passenger land transport; taxi operation; other land passenger transport (60.21-23) | *1 700.0* | *20.8%* | *300 000* | *27.8%* | *50.0* | *13.8%* | *80.0* | *7.8%* |
| Freight transport by road (60.24) | *2 600.0* | *31.8%* | *600 000* | *55.7%* | *90.0* | *24.8%* | *240.0* | *23.4%* |
| Transport via pipelines (60.3) | 9.2 | 0.1% | 118 | 0.01% | 3.5 | 1.0% | 5.9 | 0.6% |
| **Water transport (61)** | ***180.0*** | ***2.2%*** | ***16 000*** | ***1.5%*** | ***22.0*** | ***6.1%*** | ***80.0*** | ***7.8%*** |
| Sea and coastal water transport (61.1) | 146.8 | 1.8% | *7 500* | *0.7%* | *20.0* | *5.5%* | 72.1 | 7.0% |
| Inland water transport (61.2) | *35.0* | *0.4%* | 8 447 | 0.8% | 1.8 | 0.5% | *5.0* | *0.5%* |
| **Air transport (62)** | **400.3** | **4.9%** | ***3 200*** | ***0.3%*** | ***30.0*** | ***8.3%*** | **100.1** | **9.8%** |
| **Supporting/auxiliary transport activities incl. travel agencies (63)** | ***2 400.0*** | ***29.3%*** | ***170 000*** | ***15.8%*** | ***140.0*** | ***38.5%*** | ***460.0*** | ***44.9%*** |
| Cargo handling and storage; other supporting transport activities (63.1, 63.2 and 63.4) | 1 919.5 | 23.4% | 99 615 | 9.2% | 119.6 | 32.9% | 318.3 | 31.1% |
| Travel agencies/tour operators; tourist assistance n.e.c.(63.3) | *470.0* | *5.7%* | *70 000* | *6.5%* | *21.0* | *5.8%* | *140.0* | *13.7%* |

*Source*: Eurostat (SBS)

Note: Figures and shares in italics are rounded estimates based on non-confidential data: note difference between aggregates and sub-components due to rounding.

# Road transport largest employer

Of the 8.2 million persons employed in transport services, 'road and other land transport' accounted for over half (52.5 %) of employment, making it the largest single employer by far (Table 4.4 and Figure 4.2).

'Road and other land transport' (NACE 60.2) consists of 'road freight' (NACE 60.24) and 'other passenger road and land transport' (NACE 60.21 to 60.23) which covers mainly services such as taxi, bus and coach services. While most of this coverage is road transport, readers should note that the latter category also includes other types of land transport such as metros, tramways, elevated and funicular railways, and which are not included in rail transport. While the overall impact of these will be quite small, data therefore need to be interpreted with caution.

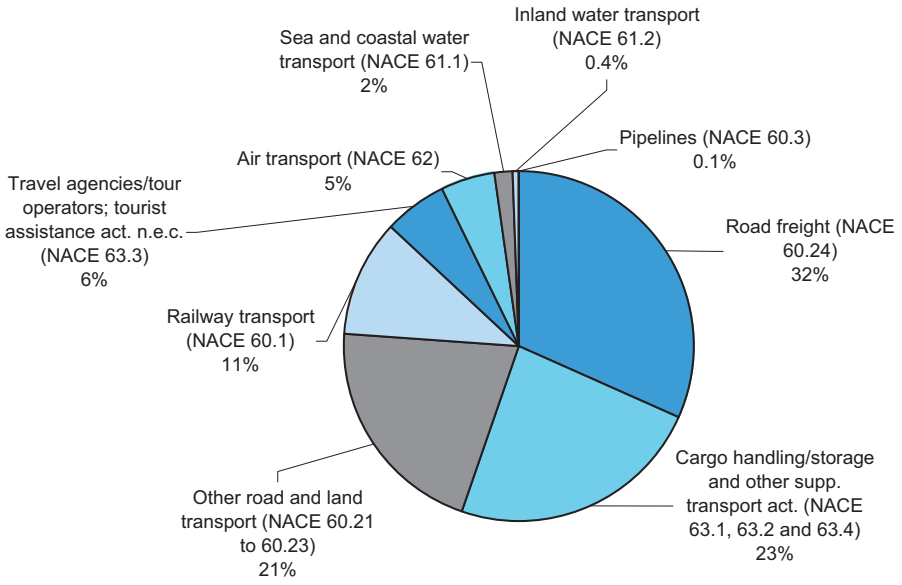
**Table 4.5 Persons employed in transport services, by transport service, 2004 (in %)**

| | Total persons employed in transport services (1000s) | Land transport (60) | | | | Water transport (61) | | Air transport (62) | Supporting and auxiliary activities (63) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Railway transport (60.1) | Road and other land | | Pipeline transport (60.3) | Sea and coastal water transport (61.1) | Inland waterway transport (61.2) | | Cargo handling/storage; other supp. transport act. (63.1, 63.2 and 63.4) | Travel agencies, tour operators and tourist assistance n.e.c. (63.3) |
| | | | Other passenger road and land transport' (60.21-23) | Road freight (60.24) | | | | | | |
| **EU-25** | **8 186.3** | **11.0** | **20.8** | **31.8** | **0.1** | **1.8** | **0.4** | **4.9** | **23.4** | **5.7** |
| **BE** | 192.4 | : | 17.1 | 32.8 | : | 0.3 | 0.4 | 2.6 | 21.7 | 4.1 |
| **BG** | 161.8 | : | 28.9 | : | : | : | : | 1.3 | 21.6 | 3.4 |
| **CZ** | 277.6 | : | 17.2 | 37.0 | : | : | : | : | 10.3 | 4.8 |
| **DK** | 134.6 | 6.4 | : | 29.0 | : | 9.6 | 0.1 | 8.7 | 18.8 | 4.3 |
| **DE** | 1 238.0 | 6.7 | 23.3 | 23.0 | 0.0 | 1.4 | 0.7 | 4.3 | 35.6 | 5.0 |
| **EE** | 35.2 | : | : | 35.8 | - | : | : | 1.8 | 26.1 | 4.8 |
| **IE** | 62.6 | : | 14.6 | 25.8 | : | : | : | : | 24.1 | : |
| **ES** | 820.2 | 4.4 | 20.1 | 44.5 | - | 0.9 | 0.0 | 4.4 | 19.5 | 6.2 |
| **FR** | 1 125.5 | : | 19.0 | 30.7 | : | 1.2 | 0.3 | 6.4 | 22.9 | 3.7 |
| **IT** | 935.7 | 7.4 | 15.4 | 35.4 | 0.3 | 2.3 | 0.3 | 2.6 | 31.5 | 4.6 |
| **CY** | 18.2 | - | 11.7 | 14.0 | - | 19.2 | : | 13.9 | 27.0 | 14.2 |
| **LV** | 65.5 | 23.5 | 23.2 | 21.6 | 0.6 | 1.0 | 0.0 | 1.1 | 26.4 | 2.5 |
| **LT** | 75.8 | : | 25.6 | 36.6 | : | 2.2 | 0.2 | 1.3 | 15.8 | 2.6 |
| **LU*** | 18.7 | 17.0 | 11.8 | 39.5 | : | 0.2 | 0.2 | 17.3 | 10.4 | 3.6 |
| **HU** | 212.3 | 24.9 | 25.9 | 32.5 | 0.3 | 0.0 | 0.6 | 1.9 | 11.0 | 2.8 |
| **NL** | 341.6 | : | : | 34.9 | 0.0 | : | 3.6 | : | 20.2 | 6.6 |
| **AT** | 199.2 | 23.6 | 22.1 | 29.4 | 0.1 | 0.0 | 0.2 | 4.2 | 14.4 | 6.1 |
| **PL** | 566.8 | 21.9 | 26.4 | 35.2 | 0.2 | 0.3 | 0.2 | 0.9 | 11.5 | 3.3 |
| **PT** | 150.4 | 3.3 | : | 38.9 | : | 0.5 | 0.6 | 5.9 | 20.8 | 5.5 |
| **RO** | 273.3 | : | 28.5 | 23.4 | : | : | 1.5 | : | 13.0 | 2.3 |
| **SI** | 40.6 | 20.3 | 12.0 | 44.0 | - | : | : | 1.5 | 16.0 | 5.7 |
| **SK** | 75.7 | : | 21.7 | 12.7 | : | : | : | 0.9 | 8.8 | 2.8 |
| **FI** | 113.5 | 7.4 | 21.3 | 34.1 | - | 7.0 | 0.2 | 6.5 | 19.2 | 4.4 |
| **SE** | 222.5 | 3.8 | 25.7 | 30.2 | - | 7.2 | 0.5 | 6.4 | 20.7 | 5.4 |
| **UK** | 1 091.9 | 5.2 | 19.6 | 27.4 | 0.0 | 1.5 | 0.1 | 7.9 | 26.1 | 12.3 |
| **NO** | 125.6 | 4.0 | 26.1 | 21.1 | 0.5 | 17.9 | 0.0 | 8.2 | 17.3 | 4.7 |

*Source*: Eurostat (SBS)

Note: EU-25 shares in italics are estimates based on non-confidential data: note difference between aggregates and sub-components due to rounding.
EL and MT: not available.
*2003 data.

**Figure 4.2 Share of persons employed in transport services, by transport service, EU-25*, 2004 (in %)**



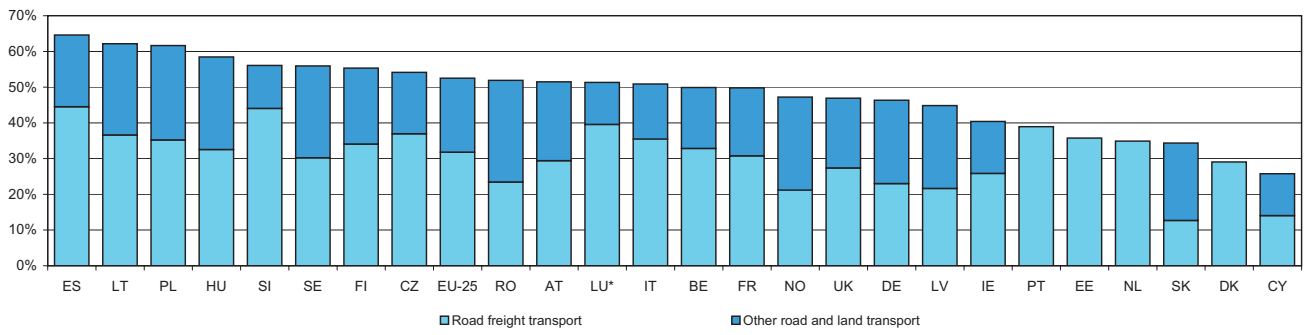

*Source*: Eurostat (SBS)

*Distribution calculated using rounded estimates for certain components based on non-confidential data. (Read in conjunction with Table 4.5.)

Looking at data available for the vast majority of Member States (Table 4.5), the share of 'road and other land transport' reached around two thirds of employment in at least three of them: Spain (65 %), Lithuania and Poland (62 % each). Reflecting the lesser importance of road transport in Cyprus, the share was lowest in this Member State (26 %).

Within 'road and other land transport', 'road freight' accounted for nearly 32% of employment in the EU-25, making it the largest single sub-sector in transport services (Figure 4.2). Shares reached as much as 44 % in Spain and Slovenia, and around 39 % in Luxembourg and Portugal (Figure 4.3).

**Figure 4.3 Importance of 'road and other land transport' (NACE 60.2) in transport services employment, by country, 2004 (in %)**




*Source*: Eurostat (SBS)

*2003 data. Not available: EL, BG and MT. Data for 'other road and land transport' not available for PT, EE NL and DK.

## Most enterprises in road transport...

In 2004, well over 1 million enterprises were active in transport services, as illustrated in Table 4.4 (page 55). The largest number of enterprises - close to 890 thousand (or 82.5 % of the total) - were active in 'road and other land transport', mainly due to the importance of 'road freight' (55.7 % of total enterprises in transport services). Similar to the case for employment, it was followed by 'supporting and auxiliary transport activities' (15.8 %).

Enterprises in inland waterways and maritime transport were the third most numerous enterprises (with shares of 0.8 % and 0.7 % respectively), ahead of those in air transport (0.3 %).

Looking at national data, the share of 'road and other land transport' enterprises reached as much as between 88 % and 90 % in several Member States (Spain, Poland, Slovenia, and Finland), with the share of 'road freight' enterprises accounting for as much as 79 % of total transport enterprises in Slovenia (data not shown).

**Table 4.6** Share of persons employed in SMEs, by transport service, 2004 (in %)

| | Transport services average (60-63) | Railways (60.1) | Road and other land transport (60.2) | | Maritime water transport (61.1) | Air transport (62) | Supporting and auxiliary transport activities (63) | |
|---|---|---|---|---|---|---|---|---|
| | | | Other passenger road and land transport (60.21-60.23) | Road freight (60.24) | | | Cargo handling, storage; other supp. transport act. (63.1, 63.2 and 63.4) | Travel agencies, tour operators and tourist assistance n.e.c. (63.3) |
| **EU-25*** | ***58.0*** | ***:*** | ***:*** | ***:*** | ***:*** | ***8.1*** | ***:*** | ***:*** |
| **BE** | 56.6 | : | : | 95.0 | : | 15.3 | 64.9 | 67.7 |
| **BG** | 61.4 | : | 74.8 | : | : | : | 31.3 | 100.0 |
| **CZ** | 50.2 | : | : | 89.0 | : | : | 64.5 | : |
| **DK** | 61.2 | 3.8 | : | : | : | : | 62.6 | 84.3 |
| **DE** | 61.4 | 7.0 | 67.5 | 92.5 | : | 5.7 | 50.1 | 81.1 |
| **ES** | 75.8 | : | 76.3 | : | 43.9 | 4.1 | 66.9 | 68.4 |
| **FR** | 49.2 | : | 54.4 | : | : | 4.3 | 39.4 | 72.2 |
| **IT** | 66.0 | 1.2 | : | : | : | 16.1 | 59.0 | 91.3 |
| **LV** | 55.8 | 2.0 | 38.8 | 98.2 | : | 49.5 | 79.5 | 100.0 |
| **LT** | : | : | 70.9 | 95.1 | 6.4 | : | 70.1 | 100.0 |
| **HU** | : | : | 24.9 | 90.5 | : | : | 73.5 | : |
| **NL** | 62.6 | : | : | 84.8 | : | : | 57.0 | : |
| **AT** | : | : | 65.3 | : | : | : | : | : |
| **PL** | 60.8 | : | 59.7 | 96.2 | : | : | 59.9 | 91.6 |
| **PT** | 67.0 | 0.3 | : | 90.4 | : | : | : | : |
| **RO** | 46.2 | : | : | 88.4 | : | : | 51.5 | 100.0 |
| **FI** | 63.0 | : | : | 90.1 | 28.6 | 6.4 | 55.6 | 61.5 |
| **SE** | 62.6 | : | 55.9 | : | 33.0 | 11.2 | 53.7 | 70.2 |
| **UK** | 42.0 | 1.7 | 42.4 | 61.0 | 49.2 | 11.1 | 36.4 | 45.6 |
| **NO** | 59.2 | 2.7 | 63.1 | 99.0 | 37.1 | 7.6 | 60.0 | 83.4 |

*Source*: Eurostat (SBS)

*2003 data.
Data insufficient for pipeline transport and inland waterway transport.
EL not available. Insufficient data available for CY, EE, LU, MT and SK.

## … where SMEs were also very important

Number reflects enterprise size of course: based on data available for many Member States, 'road and other land transport' enterprises displayed some of the highest shares of persons working in SMEs (small and medium sized enterprises employing between 1 and 249 persons), compared with the transport services average (Table 4.6). This was particularly the case for enterprises in 'road freight', in which the share of SMEs in employment reached 90 % and above in several Member States, while the average for transport services was between 20 and 40 percentage points lower.

High shares of employment in SMEs were also recorded in the two supporting transport activities of 'cargo handling/storage; other supporting transport activities' and 'travel agencies, tour operators and tourist assistance n.e.c.'. This stands in stark contrast with the situation in railways and air transport which tend to have fewer but larger companies.

Moreover, 'road and other land transport' is also characterised by a high degree of micro and small enterprises (employing between 1-9 persons and 10-49 persons respectively), as well as entrepreneurs working for their own account. For example, this transport activity displayed in 2004 a high share of unpaid workers (23 %). This contrasts with a transport services average of 13 %, and, at the other extreme, zero in pipelines. Shares were lowest in rail and air transport (0.1 % and 0.9 % respectively).

The greater importance of SMEs reflects a number of features in the different transport modes, such as market demand, infrastructure costs, and volumes or passenger numbers transported, and the scope for setting up a transport business. Road transport, such as road freight, taxi operation and coach services, can respond more quickly to fluctuations in demand for point-to-point transport. For road freight, this greater flexibility and rapidity can be vital for just-in-time manufacturing and delivery times.

## 'Supporting and auxiliary transport activities': largest generator of wealth

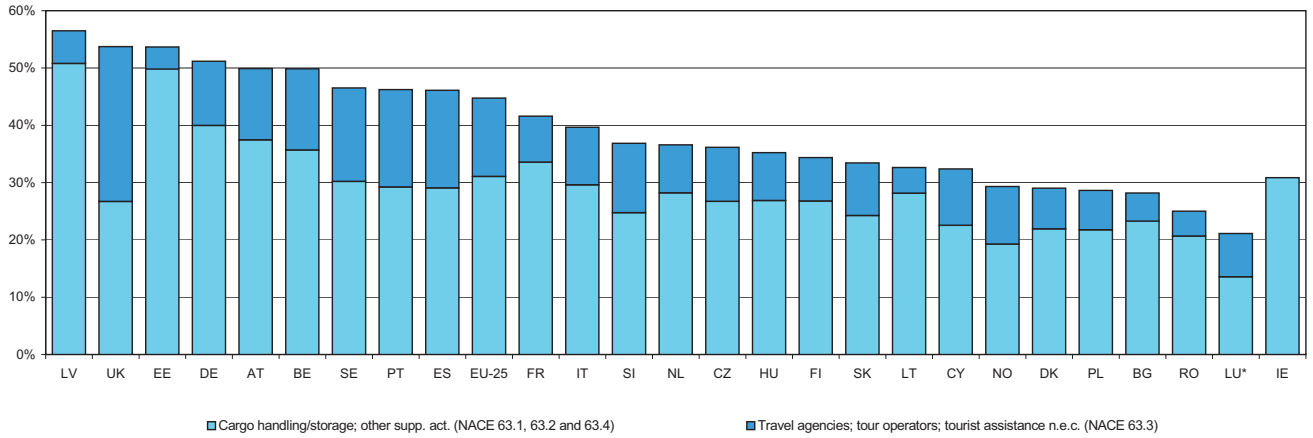
Although the weight of 'road and other land transport' was very important, 'supporting and auxiliary transport activities' contributed most to the wealth generated by transport services, particularly in terms of turnover. In 2004, this activity was responsible for close to 45 % of transport services turnover and for 38.4 % of value added. By comparison, 'road and other land transport' generated 31 % and almost 37 % respectively (Table 4.4 on page 55).

'Supporting and auxiliary transport activities' include the operation of infrastructure and terminals (roads, railways, airports, inland waterways, and so on), navigational services (air traffic control and waterway navigation), berthing, parking and towing services, cargo handling, storage, warehousing and tourist operators. This diversity of activities needs to be borne in mind also when looking at data for each of the transport modes. For example, the wealth generated and the number of persons employed by road infrastructure are generally covered by this NACE Division (63), and not, as one might think, by road and other land transport. In the context of rail liberalisation, this distinction also needs to be considered for rail transport.

Within 'supporting and auxiliary transport activities', 'cargo handling and storage and other supporting transport activities' (NACE 63.1, 63.2 and 63.4) were by far the largest sub-activities, accounting for over 31 % of transport services turnover, against close to 13.7 % for 'travel agencies, tour operators and tourist assistance n.e.c.' (NACE 63.3).

Looking at Member States, 'supporting and auxiliary transport activities' accounted for upwards of 50 % in transport services turnover in several Member States, the United Kingdom, Germany, Estonia and, notably in Latvia, where the share reached 56 % (Figure 4.4). In Latvia and Estonia, and to a lesser degree, Germany, these high shares can be explained because of the importance of 'cargo handling/storage and other supporting transport activities'. However, in the United Kingdom half of the share was generated by 'travel agencies, tour operators and tourist assistance n.e.c.' (i.e. 27 %); also the highest share among the EU Member States.

**Figure 4.4** Importance of 'supporting and auxiliary transport activities' (NACE 63) turnover in transport services turnover, by country, 2004 (in %)




*Source*: Eurostat (SBS)

*2003 data. Not available: EL and MT. IE: data for NACE 63.3 not available.

**Table 4.7** Selected cost, productivity, profitability and investment indicators, by transport service, EU-25, 2004

| | Labour cost per employee (EUR 1000) | Apparent labour productivity (EUR 1000) | Wage adjusted labour productivity (in %) | Gross operating rate (in %) | Investment rate (in %) |
|---|---|---|---|---|---|
| **Total transport services (NACE 60-63)** | **31.7** | **44.4** | **140.0** | **13.3** | **29.9** |
| **Land transport; transport via pipelines (60)** | **27.6** | **33.1** | **119.8** | **13.6** | ***26.4*** |
| Railway transport (60.1) | 30.7 | 38.0 | 123.6 | 10.8 | *41.0* |
| Road and other land transport (NACE 60.2: 'Other land transport') | 26.7 | 31.3 | 117.1 | 13.4 | 22.8 |
| Other scheduled passenger land transport; taxi operation; other land passenger transport (60.21-23) | c | c | *100.0* | *13.0* | c |
| Freight transport by road (60.24) | *26.9* | *33.6* | *125.0* | *13.0* | *18.0* |
| Transport via pipelines (60.3) | 42.1 | 374.8 | 890.0 | 51.6 | 27.8 |
| **Water transport (61)** | **c** | **120.0** | **c** | ***19.5*** | ***40.0*** |
| Sea and coastal water transport (61.1) | 47.5 | c | *300.0* | 20.0 | *40.0* |
| Inland water transport (61.2) | c | 50.0 | 150.0 | 19.2 | 42.8 |
| **Air transport (62)** | **60.0** | **70.0** | **120.0** | **4.4** | ***23.0*** |
| **Supporting/auxiliary transport activities incl. travel agencies (63)** | ***34.0*** | ***60.0*** | ***170.0*** | ***14.0*** | ***34.0*** |
| Cargo handling and storage; other supporting transport activities (63.1, 63.2 and 63.4) | 35.2 | 62.3 | 177.2 | 17.3 | 38.5 |
| Travel agencies/tour operators; tourist assistance n.e.c.(63.3) | *26.5* | *44.0* | *170.0* | *7.0* | *6.0* |

*Source*: Eurostat (SBS)

Note: Figures in italics are rounded estimates based on non-confidential data.

## Pipelines most productive and profitable

Although clearly the smallest transport mode, 'transport via pipelines' was the most productive and profitable in 2004, reflecting the capital intensive nature of this activity (Table 4.7). Wage adjusted labour productivity - the ratio between value added and personnel after adjusting the latter for the ratio of paid employees to persons employed - was an impressive 890 %, well over 6 times the transport services average of 140 %. It was followed by 'sea and coastal water transport', with a productivity of a third as much (300 %), 'cargo handling/storage and other supporting activities' (177 %) and 'travel agencies, tour operators and tourist assistance n.e.c.'(170 %).

Used as an indicator of profitability, the gross operating rate was also highest in transport via pipelines. The gross operating rate is defined as the gross operating surplus (value added at factor cost less personnel costs) divided by turnover and is expressed as a percentage (see Background Information). With a rate of 51.6 %, 'transport via pipelines' was nearly four times as profitable as the transport services average (13.3 %). This is perhaps not surprising: the gross operating surplus will generally be higher for capital-intensive activities and lower for those activities where personnel costs account for a higher proportion of costs.

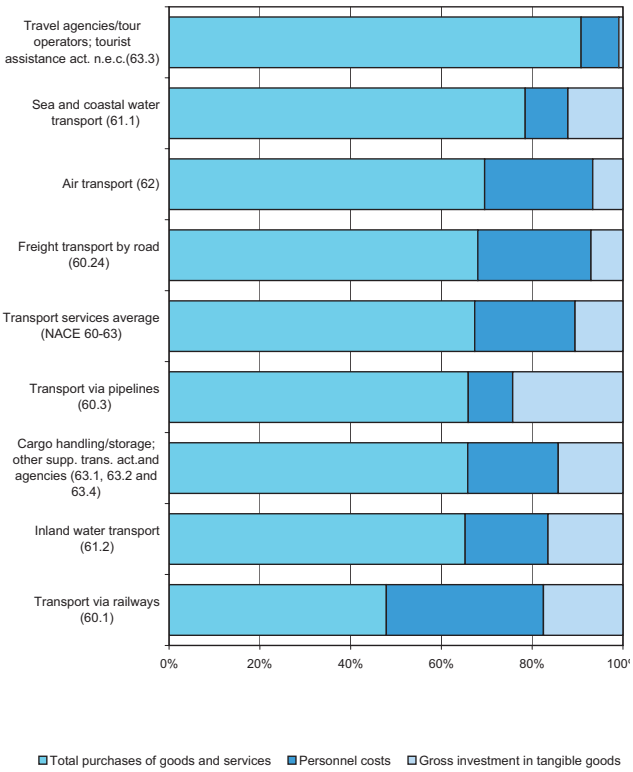
## Labour costs highest in air transport

Against a transport services average of EUR 31 700 per employee, labour costs per employee were highest in air transport; at EUR 60 000, they were almost twice the average. Higher apparent labour productivity (EUR 70 000 per person employed) only partly offset these higher average personnel costs: wage adjusted labour productivity was only 120 %, a total of 20 percentage points lower than the services average. Moreover, air transport was also the least profitable activity with a gross operating rate of just 4.4 %, a third of the average transport services rate.

'Sea and coastal water transport' personnel were the second most expensive, commanding average personnel costs of EUR 47 500 per employee. Interestingly, those personnel engaged in 'road and other land transport' - the largest employer - were only costing a little more than their counterparts in the cheapest activity of 'travel agencies, tour operators and tourist assistance n.e.c.', i.e. EUR 26 700.

Although average personnel costs were highest in air transport, it was not the activity that displayed the highest share of personnel costs when seen against total expenditure. Excluding one activity (see Figure 4.5), shares of personnel were highest in rail transport, where they represented almost 35 % of total expenditure. This was also the activity where the weight of purchases of goods and services was lightest (48 %). Interestingly too, the share of personnel costs in 'inland waterway transport' was twice as large as that in 'sea and coastal water transport'.

**Figure 4.5 Breakdown of total expenditure in transport services (NACE 60-63)*, EU-25, 2004**




*Source*: Eurostat (SBS)

*Excluding 'other scheduled passenger land transport; taxi operation; other land passenger transport' (NACE 60.21-23) because of confidential data.

## Highest investment rates in water and railway transport

Investment in the transport sector is quite diverse: in road and water transport, it will mainly involve the acquisition of transport equipment. In rail transport, it will also include investment in infrastructure (tracks, railway stations). Since supporting and auxiliary transport services include, among others, cargo handling, storage and warehousing, investment in infrastructure will not be negligible. In air transport, it will include runways and terminals.

When comparing the degree of investment between transport modes and activities, readers should recall that infrastructure-related activities (railway tracks, stations, ports and airports etc.) are generally classified as supporting transport activities under NACE 63 (notably under 63.2). Meanwhile, investment in transport equipment, office premises, office equipment etc., will generally be covered in the respective transport activity. Of course, there may well be some instances where operation and management of the infrastructure will be looked after by the same enterprise.

With this in mind, the investment rate - the share of gross investment in tangible goods over value added - was highest in rail and water transport in 2004, and notably inland waterways, where investment represented close to 43 % of value added, 13 percentage points more than the transport services average (30 %). In rail transport the rate was 41 % (data not shown). Recalling the points made above, these rates probably reflect investment mainly in transport equipment, but could also include some infrastructure.

However, when looking at the weight of investment in total expenditure - i.e. operating expenditure (purchases of goods and services and personnel costs) and capital expenditure (gross investment in tangible goods) - a different picture emerges whereby the share of investment in expenditure was actually highest in pipelines, where it accounted for 24 % of total expenditure (Figure 4.5). Rail transport and inland waterways followed with weights of around 17 %.

## Travel agents and tourist operators: sellers of transport

'Travel agents, tourist operators and tourist assistance n.e.c.' (NACE 63.3) displayed the highest share of purchases of goods and services (91 %) and the lowest shares of personnel costs (8 %) and investment (below 1 %) in the EU-25 in 2004, a cost structure which is more typical of the distributive trades, whose business is built essentially on the resale of goods purchased. It was also the activity to display the lowest investment rate, at 6 % (Table 4.7).

Acting as retailers of transport services and also accommodation or leisure activities, travel agents sell travel services or packaged trips from the supplier to the customer, which is why they generally do not possess any stock. Tourist guides and tourist information services play a supporting role, offering information and services, while tour operators act as wholesalers to travel agents or sell directly to customers over the Internet.

## Highest share of women in air transport

Based on the Labour Force Survey, 21 % of the labour force in transport services in 2005 were women, 23 percentage points lower than the 44 % average for services (Table 4.8). This difference was even larger in a number of Member States, and notably many of those that joined the EU in 2004: Slovenia displayed the highest gender gap of almost 30 percentage points. The smallest difference could be found in Malta (barely 10 points).

As illustrated in Table 4.9, the share of women was almost double the average for transport services in air transport (40 %), reflecting most likely the high shares of women among air cabin crew and ground staff. The lowest share seems to have been in total land transport (14 %), which was mostly dominated by road and other land transport, i.e. lorry, bus and taxi drivers, among others, professions traditionally dominated by men. It was followed by water transport (data not shown).

## Share of part-timers lower than average

Part-time work seems to be less commonplace in transport services, when compared with the average for services. In 2005, the share of part-time workers in transport services was 9 %, which was 12 points lower than the services average (NACE G, H, I and K). This difference was much larger in some Member States, attaining as much as between 15 and 18 points in the Netherlands - also the Member State to show the highest part-time share (28 %) - as well as the United Kingdom, Austria, Germany and Denmark.

The share of part-timers was highest in air transport (16 %), and lowest in land transport (7 %) and probably also water transport (data not shown).

**Table 4.8** Share of women and part-time employment in transport services (NACE 60-63), compared with the services average (NACE G, H, I and K), 2005 (in %)

| | Share of women employed | | Share of part-time persons employed | |
|---|---|---|---|---|
| | Transport services | Services (NACE G, H, I and K) | Transport services | Services (NACE G, H, I and K) |
| **EU-25** | **21.1** | **44.0** | **9.2** | **20.8** |
| **BE** | 21.1 | 41.1 | 12.0 | 21.9 |
| **CZ** | 20.8 | 45.4 | 1.5 | 6.0 |
| **DK** | 23.6 | 40.5 | 10.6 | 26.0 |
| **DE** | 24.1 | 47.1 | 13.4 | 28.6 |
| **EE** | 23.2 | 49.1 | 3.3 | 8.4 |
| **IE** | 20.0 | 45.8 | : | : |
| **EL** | 16.2 | 39.0 | 1.2 | 4.4 |
| **ES** | 17.3 | 44.9 | 6.6 | 14.9 |
| **FR** | 23.7 | 43.1 | 7.9 | 16.2 |
| **IT** | 17.3 | 40.0 | 6.2 | 16.3 |
| **CY** | 30.7 | 45.8 | 7.5 | 9.2 |
| **LV** | 22.9 | 52.2 | 2.0 | 5.9 |
| **LT** | 18.6 | 47.7 | : | 5.9 |
| **LU** | 17.2 | 42.1 | : | 15.0 |
| **HU** | 17.9 | 46.2 | 1.4 | 4.9 |
| **MT** | 20.3 | 29.9 | 5.6 | 13.4 |
| **NL** | 22.9 | 41.9 | 27.8 | 46.2 |
| **AT** | 23.6 | 50.1 | 10.7 | 26.2 |
| **PL** | 16.5 | 44.6 | 2.9 | 10.4 |
| **PT** | 20.4 | 44.7 | 3.1 | 7.3 |
| **SI** | 16.4 | 46.0 | 4.8 | 8.7 |
| **SK** | 18.9 | 47.1 | : | 2.9 |
| **FI** | 21.7 | 45.1 | 9.3 | 18.6 |
| **SE** | 23.4 | 39.2 | 13.3 | 23.2 |
| **UK** | 23.3 | 43.7 | 12.9 | 29.6 |

*Source*: Eurostat (LFS)

**Table 4.9** Share of women and part-time employment in transport services (NACE 60-63), by NACE Division, EU-25, 2005 (in %)

| | Women | Part Time |
|---|---|---|
| **Total transport (NACE 60-63)** | **21.1** | **9.2** |
| **Total land transport - incl. Pipelines (NACE 60)** | 13.9 | 7.4 |
| **Water transport (NACE 61)** | : | : |
| **Air transport (NACE 62)** | 40.2 | 16.1 |
| **Supporting/auxiliary transport act. (NACE 63)** | 32.6 | 11.8 |

*Source*: Eurostat (LFS)

# Employment up 10 %, value added up 23 %

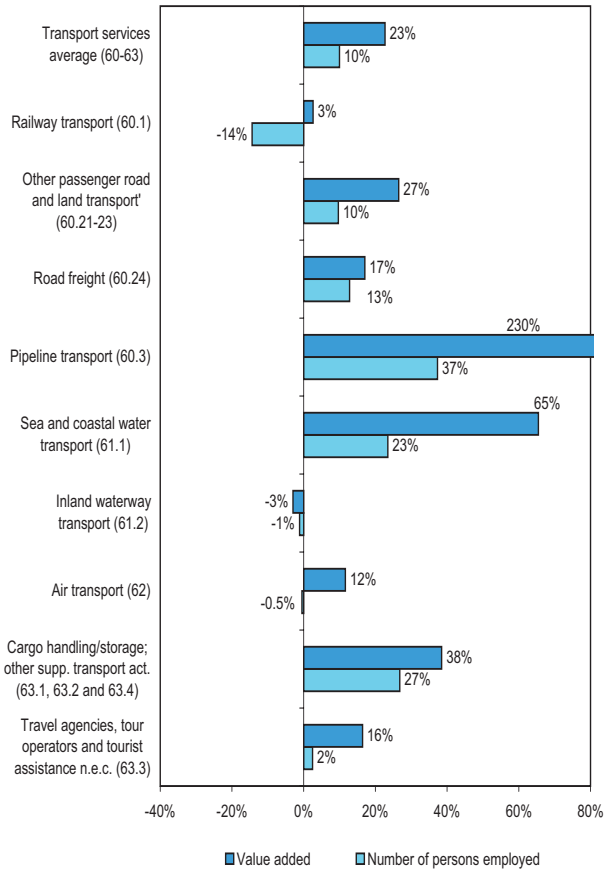
Based on available data covering the 2000-2004 period only, employment in transport services went up by 10 %, a growth which was not however as much as that in value added (23 %).

As illustrated in Figure 4.6, the highest employment and value added growths were recorded in the smallest transport services sector, pipeline transport: 37 % and 230 % respectively. It was followed by 'cargo handling/storage and other supporting transport activities' for employment growth (27 %) and by 'sea and coastal water transport' for growth in value added (65 %).

Not all transport services recorded growths, however. Railways registered an employment contraction of 14 % (at the same time as 3 % growth in value added). Inland waterway transport contracted both in employment and value added terms, by 1 % and 3 % respectively. Finally, in air transport, against an increase in value added of 12 %, employment declined by 0.5 %.

Differences in growths in employment and value added indicates changes in labour productivity. As suggested by the very different growths for pipeline transport, productivity climbed fastest in this particular transport mode, at a growth rate of 240 % (data not shown). The next fastest growth in productivity was in sea and coastal water transport (134 %).

**Figure 4.6** **Evolution of value added and employment in transport services activities, EU-25, 2000-2004 (in %)**




*Source*: Eurostat (SBS)

## Working week one of the longest

According to the Labour Force Survey (2005, spring results), the average usual weekly working week for full-time employees with their main job in 'transport, storage and communication' in the EU-25 was almost 42 hours in 2005. This compares with an average of 40.4 hours for all NACE branches, and an average of 40.2 hours for services. Full-time employees in the sector 'hotels and restaurants' worked however longest (almost 43 hours), followed by those in 'mining and quarrying' and 'agriculture, hunting, forestry and fishing'.

*For more information, see 'Employment in Europe, 2006' at:*
*http://ec.europa.eu/employment_social/employment_analysis/eie/eie2006_chap1_en.pdf*

# Employment growth highest in Hungary, value added growth highest in Ireland

Comparing employment growths in the Member States (including Bulgaria and Romania), percentage changes went up to as much as 39 % in Hungary and 25 % in Ireland (Figure 4.7). Among the main contributors to employment (see Table 4.1, page 53), Germany and Spain recorded growths of 18 % and 15 % respectively, significantly more than France (7 %), Italy (6 %) or the United Kingdom (4 %). When it comes to growth in value added, Ireland, Lithuania and Hungary displayed increases of 70 % and above.

## Job vacancies: seafarers wanted aboard

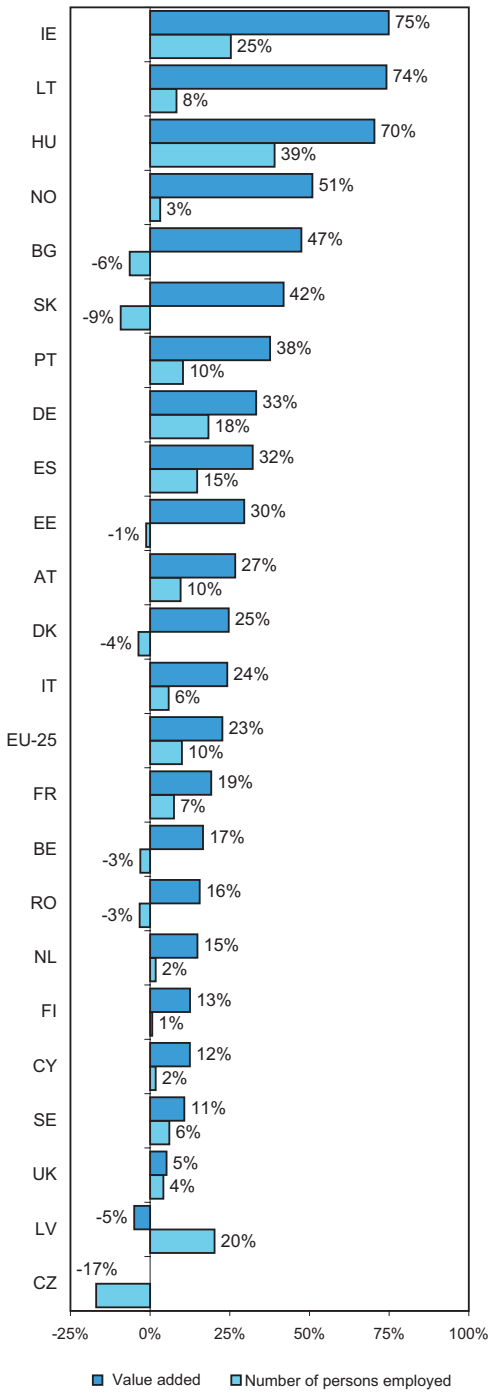
Well-trained, motivated seafarers are essential for the operation of the EU merchant fleet. Without good quality personnel, ship operations simply cannot be run safely and efficiently. While demand is increasing, there has been an acute shortage of European seafarers - mostly merchant marine officers - in most European countries since the early 1980s. According to the Commission, this shortfall is expected to rise considerably if no corrective measures are taken.

Based on data for 2002, the EU fleet had a shortfall of around 30 000 trained officers - a deficit of about 30 %. The context for the downward trend in the numbers of European seafarers is in fact at precisely the moment when demand for shipping is booming, driven by the growth in world trade. This paradoxical situation is undoubtedly threatening the maritime industry in Europe.

The Commission has highlighted the growing decline of European seafarers, and recommended actions to reverse the trend. In particular, it encourages national maritime training systems to share best practice and includes measures to raise awareness about seafaring careers. More recently, in response to conclusions adopted by the Council in 2003 on 'Improving the image of Community shipping and attracting young people to the seafaring professions'*, the Commission presented a working document on the main components of its action in the field of maritime employment**.

* *Conclusions adopted on 5 June 2003, during the Greek Presidency*
** *SEC(2005)1400/2, 11.11.2005*
*For more information, visit:*
*http://ec.europa.eu/transport/maritime*

**Figure 4.7** Evolution of employment in transport services (NACE 60-63), 2000-2004 (in %)




*Source*: Eurostat (SBS)

# 5. Traffic and transport quantities and performances

# 5. TRAFFIC AND TRANSPORT QUANTITIES AND PERFORMANCES

## Freight and passengers in numbers

## Introduction

How important are the different transport modes in freight and passenger transport? How fast have they grown? How do freight volumes and passenger numbers compare across the EU? What are the major ports and airports in freight and passenger transport? This chapter attempts to answer these questions and many others, first by looking at the transport of goods, and then that of passengers.

Readers should note however that comparisons over time are only possible up to a point. A number of legal changes in the statistical data that Member States are required to provide to Eurostat in various transport modes have meant much improved, reliable data have become available. The downside to this however is that comparisons with data covering years prior to this legislation become problematic. This problem of comparison is further compounded with EU enlargement, which makes EU aggregates impossible in some cases, particularly over time.

### Rail performs much more in the United States

**Table 5.1** **Comparative transport performance of the EU-25 and the United States by inland mode, 2003**

| | United States | | EU-25 | |
|---|---|---|---|---|
| | billion tkm | % modal share | billion tkm | % modal share |
| **Road** | 1 845* | 33.4% | 1 573 | 72.0% |
| **Rail** | 2 341 | 42.4% | 364 | 16.7% |
| **Inland waterways** | 476 | 8.6% | 119 | 5.4% |
| **Oil pipelines** | 861 | 15.6% | 128 | 5.9% |
| **Total** | 5 523 | 100% | 2 184 | 100% |

*Source:* US Department of Transport and DG Energy and Transport

*Inter-city truck traffic only.

Measured by tonne-kilometres, the EU-25 performs less transport (restricted to inland modes) than the United States. Based on comparable data for 2003, the EU-25 performed 2 184 billion tonne-kilometres, which was about 40 % of the volume performed by the United States (5 523 billion tonne-kilometres). Lesser performance held for every inland transport mode and most remarkably for rail, inland waterways and oil pipelines.

Comparing transport modal splits, the inland modal share of road freight was much higher in the EU-25: a 72 % share that was 39 percentage points larger than that in the United States (33 %). This was principally because of very different rail performances. Whereas 2 341 billion tkm were performed by rail in the United States (giving a modal share of well over 42 %), the total was only 364 billion tkm in the EU-25 (a modal share of close to 17 %).

# 5.1 TRANSPORT OF GOODS

## 5.1.1 General development

## Highest increase in road freight

In the EU-25 the performance of freight moved in road, rail, inland waterways, oil pipelines, intra-EU maritime transport and air transport went up by 31 % between 1995 and 2005 from nearly 3 thousand billion tkm to reach 3 903 billion tkm, measured as tonnes carried multiplied by kilometres travelled (tkm). This equates to moving a tonne of goods over about 23 km a day per EU inhabitant.

The 31 % rise was largely attributable to road and sea transport, which accounted for 44 % and 39 % respectively of the total freight moved in 2005, and which displayed growths of around 38 % and 35 % respectively (Table 5.2 and Figure 5.1).

Although the smallest contributor to total tkm, the third fastest growth between 1995 and 2005 was clearly in air transport (31 %). It was followed by pipeline transport (17.5 %). The smallest rises were recorded in (other small contributing modes) rail transport, where freight moved increased by just 9 %, and inland waterways (10 %).

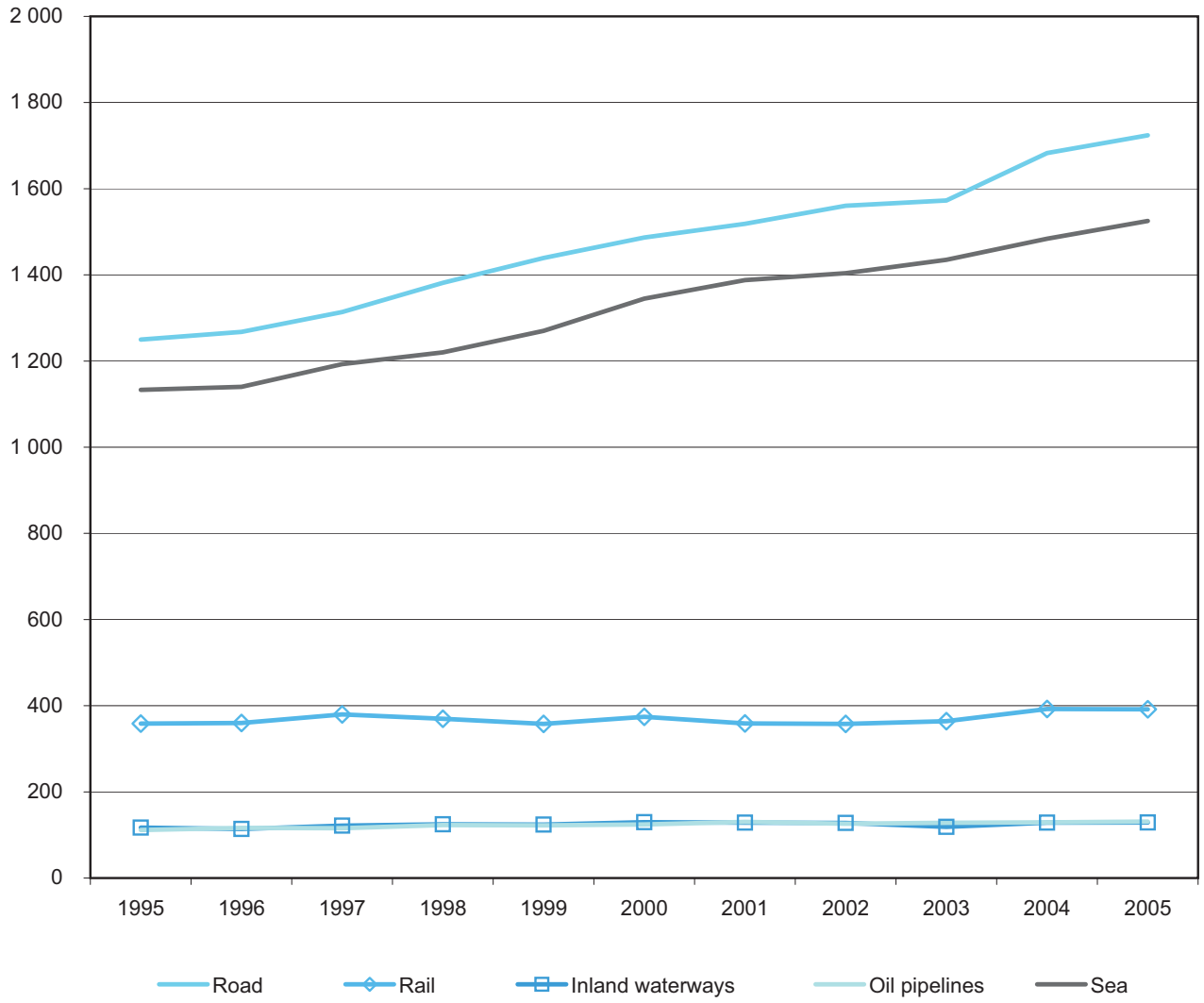
**Table 5.2** **Freight transport performance*, by transport mode, EU-25, 1995-2005 (in billion tonne-kilometres)**

| | Road | Rail | Inland waterways | Oil pipelines | Sea | Air | Total |
|---|---|---|---|---|---|---|---|
| **2005** | *1 724* | 392 | 129 | *131* | *1 525* | *2* | ***3 903*** |
| **2004** | *1 683* | 392 | 129 | *129* | *1 484* | *3* | ***3 819*** |
| **2000** | *1 487* | 374 | *130* | *124* | *1 345* | *2* | ***3 462*** |
| **1995** | *1 250* | 358 | *117* | *112* | *1 133* | *2* | ***2 972*** |
| **% change 1995 -2005** | 37.9% | 9.2% | 10.2% | 17.5% | 34.6% | 31.1% | **31.3%** |
| **% annual change** | 3.3% | 0.9% | 1.0% | 1.6% | 3.0% | 2.7% | **2.8%** |
| **% change 2004-2005** | 2.5% | -0.2% | 0.3% | 1.5% | 2.8% | -0.4% | **2.2%** |

*Source:* DG Energy and Transport

*Road: national and international haulage by vehicles registered in the EU-25. Air and sea: data for tkm and pkm only include intra-EU traffic and are estimates by the Commission services based on port-to-port data collected under Council Directive 95/64/EC and on airport-to-airport data collected under Regulation (EC) 437/2003.

**Figure 5.1 Freight transport performance*, by transport mode, EU-25, 1995-2005 (in billion tonne-kilometres)**




*Source:* DG Energy and Transport

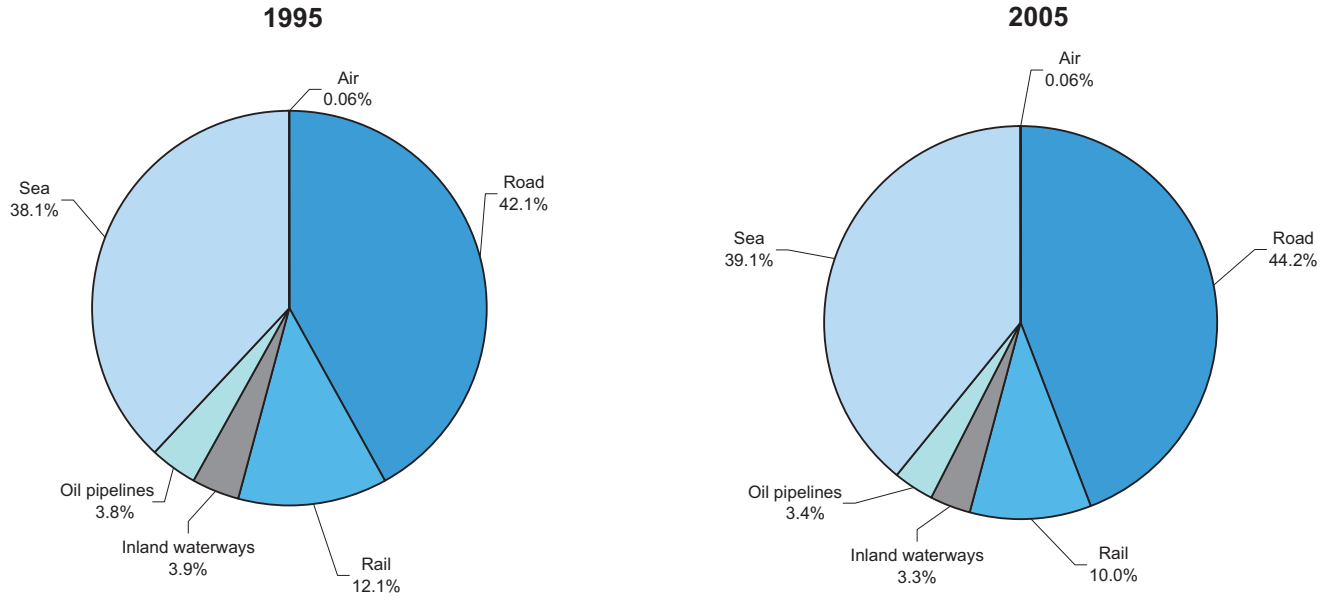
*Road: national and international haulage by vehicles registered in the EU-25. Sea: data for tkm and pkm only include intra-EU traffic and are estimates by the Commission services based on port-to-port data collected under Council Directive 95/64/EC. Note that air transport is not shown in this Figure due to low volumes; see Table 5.2.

## Road freight: modal share up 2 percentage points on 1990

These increases led to changes in the modal split, i.e. the share of each transport mode in total freight transport. The progression of road freight between 1990 and 2005 is particularly notable in this respect: its 38 % increase translated into a modal share that was 2 percentage points larger by 2005 (Figure 5.2).

The only other transport modes to increase their share were maritime transport (up 1 percentage point) and air transport (up by a tiny fraction). The increases in road freight and maritime transport, because of their relative importance, had the effect of reducing the modal shares of the other transport modes (rail, inland waterways and pipelines), despite the increases in freight volumes. Rail freight displayed the largest drop in its modal share: 2 percentage points.

**Figure 5.2** **Modal split of freight transport performance*, EU-25, 1995-2005 (based on tonne-kilometres)**




*Source:* DG Energy and Transport

## Table 5.3 Intra-EU goods transport by country pairs and transport mode, 2004 (in 1000 tonnes)

| Country of unloading | Country of loading | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EU-25 | BE | CZ | DK | DE | EE | EL | ES | FR | IE | IT | CY | LV |
| | 1 100 993 | 42 057 | 57 571 | 2 888 | 241 436 | 23 310 | 1 172 | 26 507 | 90 060 | 2 136 | 44 928 | : | 8 117 |
| EU-25 | 15 083 719 | 354 874 | 451 024 | 186 772 | 2 791 194 | 24 201 | 442 465 | 2 000 526 | 2 108 384 | 270 638 | 1 426 111 | 43 151 | 44 757 |
| | 472 483 | 75 803 | 965 | 10 | 100 050 | : | 2 | 58 | 41 782 | : | 3 | : | 6 |
| | 35 548 | 23 372 | 80 | 2 | 2 165 | : | : | 180 | 4 913 | : | 1 959 | : | : |
| BE | 344 949 | 267 175 | 428 | 241 | 19 825 | : | 65 | 1 438 | 23 532 | : | 1 660 | : | 47 |
| | 101 815 | 35 716 | 16 | : | 14 931 | : | : | : | 4 048 | : | : | : | : |
| | 52 759 | 43 | 39 765 | 2 | 3 292 | : | 2 | 10 | 29 | : | 56 | : | 1 |
| CZ | 447 925 | 717 | 428 241 | 129 | 8 418 | : | 41 | 446 | 981 | : | 872 | : | 53 |
| | 924 | 2 | 621 | : | 278 | : | : | : | 2 | : | : | : | : |
| | 3 918 | 33 | 13 | 2 010 | 944 | : | 2 | 1 | 101 | : | 229 | : | : |
| DK | 188 330 | 593 | 139 | 174 485 | 6 471 | : | 24 | 340 | 799 | : | 503 | : | 60 |
| | 250 218 | 4 699 | 3 895 | 390 | 200 102 | : | 15 | 673 | 2 399 | : | 4 576 | : | : |
| DE | 2 777 788 | 18 549 | 9 572 | 6 280 | 2 625 489 | 353 | 641 | 6 200 | 22 669 | 166 | 13 540 | 1 | 388 |
| | 159 392 | 11 851 | 248 | 5 | 55 209 | : | 1 | 58 | 5 249 | : | 3 | : | 6 |
| | 23 815 | : | : | : | : | 22 835 | : | : | : | : | : | : | 248 |
| EE | 24 195 | 29 | 11 | 6 | 210 | 22 845 | : | : | : | : | : | : | 342 |
| | 1 570 | : | 3 | 2 | 65 | : | 997 | : | : | : | 31 | : | : |
| EL | 442 709 | 40 | : | : | 664 | : | 440 280 | 124 | 333 | : | 749 | 4 | : |
| | 26 621 | 191 | 9 | 3 | 744 | : | : | 24 511 | 374 | : | 31 | : | : |
| ES | 2 000 046 | 1 947 | 401 | 263 | 5 999 | : | 45 | 1 952 042 | 19 880 | 83 | 4 598 | : | 55 |
| | 90 648 | 5 617 | 24 | 30 | 4 698 | : | : | 432 | 74 377 | : | 1 813 | : | : |
| FR | 2 116 987 | 31 182 | 949 | 671 | 25 017 | : | 187 | 17 854 | 2 006 689 | 183 | 12 259 | : | 67 |
| | 41 827 | 5 175 | : | : | 2 288 | : | : | : | 27 500 | : | : | : | : |
| | 2 136 | : | : | : | : | : | : | : | : | 2 136 | : | : | : |
| IE | 276 287 | 40 | : | : | 166 | : | : | 65 | 177 | 263 040 | 70 | : | : |
| | 62 771 | 3 249 | 195 | 350 | 11 326 | : | : | 35 | 5 746 | : | 33 337 | : | : |
| IT | 1 430 051 | 2 300 | 1 046 | 492 | 13 606 | 82 | 727 | 4 580 | 12 894 | 78 | 1 378 026 | : | 137 |
| CY | 43 142 | : | : | : | 0 | : | 5 | : | : | : | 1 | 43 135 | : |
| | 8 981 | : | : | : | : | 340 | : | : | : | : | : | : | 7 271 |
| LV | 44 695 | : | 53 | 21 | 266 | 362 | : | 26 | 23 | : | 71 | : | 42 847 |
| | 12 333 | : | 1 | : | 12 | 135 | : | : | : | : | : | : | 246 |
| LT | 47 492 | 58 | 130 | 39 | 685 | 175 | : | 77 | 105 | : | 130 | : | 364 |
| | 6 972 | 1 936 | 3 | : | 1 567 | : | : | 13 | 974 | : | 43 | : | : |
| LU | 36 978 | 3 773 | : | 28 | 3 906 | : | 12 | 94 | 2 307 | : | 214 | : | : |
| | 1 228 | 282 | : | : | 413 | : | : | : | 133 | : | : | : | : |
| | 22 786 | 39 | 1 403 | : | 1 338 | : | 152 | 13 | 9 | : | 225 | : | 2 |
| HU | 213 338 | 243 | 834 | 65 | 2 130 | : | 78 | 216 | 303 | : | 731 | : | 35 |
| | 1 279 | 50 | 2 | : | 305 | : | : | : | 6 | : | : | : | : |
| | 11 134 | 1 764 | 229 | 4 | 2 257 | : | : | 9 | 361 | : | 728 | : | : |
| NL | 551 348 | 22 907 | 738 | 850 | 41 555 | 84 | 89 | 1 891 | 6 590 | 143 | 1 638 | 0 | 109 |
| | 156 417 | 22 673 | 78 | 5 | 25 424 | : | 1 | : | 4 844 | : | : | : | : |
| | 53 674 | 767 | 5 145 | 1 | 8 834 | : | 1 | 15 | 247 | : | 1 141 | : | : |
| AT | 274 788 | 653 | 2 624 | 109 | 19 135 | : | 45 | 425 | 931 | : | 4 655 | : | 36 |
| | 3 943 | 52 | : | : | 765 | : | : | : | : | : | : | : | : |
| | 236 570 | 87 | 2 246 | : | 2 002 | : | : | 7 | 134 | : | 326 | : | 342 |
| PL | 709 970 | 929 | 1 863 | 307 | 9 011 | : | 70 | 647 | 1 265 | : | 1 167 | : | 141 |
| | 5 395 | 1 | : | : | 380 | : | : | : | : | : | : | : | : |
| | 9 109 | 1 | : | : | 12 | : | : | 585 | 12 | : | : | : | : |
| PT | 313 989 | 205 | : | 55 | 824 | : | 33 | 10 989 | 1 150 | : | 586 | : | : |
| | 7 736 | 24 | 549 | 1 | 331 | : | 3 | 6 | 127 | : | 183 | : | : |
| SI | 68 818 | 104 | 196 | : | 766 | : | : | 107 | 242 | : | 1 502 | : | : |
| | 15 476 | 1 | 3 962 | : | 401 | : | : | 16 | 7 | : | 12 | : | 6 |
| | 171 085 | 165 | 2 873 | 68 | 1 272 | : | : | 194 | 107 | : | 453 | : | : |
| SK | 263 | 1 | : | : | 57 | : | : | : | : | : | : | : | : |
| | 26 607 | 2 | 3 | 9 | 68 | : | : | : | 14 | : | 40 | : | 1 |
| FI | 395 205 | 33 | : | 124 | 151 | 231 | : | 55 | 31 | : | 41 | : | : |
| | 39 467 | 232 | 46 | 84 | 1 278 | : | : | 1 | 236 | : | 198 | : | : |
| SE | 328 959 | 207 | 350 | 2 309 | 1 935 | 69 | 59 | 250 | 165 | : | 240 | : | 76 |
| | 100 144 | c | : | : | c | : | : | c | c | : | c | : | : |
| UK | 1 834 645 | 3 025 | 576 | 230 | 3 693 | : | 64 | 2 466 | 7 211 | 6 945 | 2 405 | 11 | : |

Railways** Road* Inland waterways**

*Source:* Eurostat (Transport)

* International road transport includes cross-trade. Road cabotage is excluded because no data are available in tonnes concerning the country where cabotage is performed. Total weight of cabotage was 68 million tonnes in 2004 in the EU-25.
** Data on rail and inland waterways are based on declarations by the unloading countries.

**Table 5.3** Intra-EU goods transport by country pairs and transport mode, 2004 (in 1000 tonnes) (continued)

| Country of unloading | Country of loading | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LT | LU | HU | NL | AT | PL | PT | SI | SK | FI | SE | UK |
| | **14 743** | **4 822** | **21 609** | **23 649** | **40 963** | **250 881** | **9 044** | **8 532** | **18 449** | **26 635** | **40 530** | **100 954** |
| EU-25 | **47 242** | **34 817** | **212 852** | **557 242** | **270 376** | **710 090** | **312 245** | **67 768** | **171 864** | **395 996** | **327 991** | **1 831 139** |
| | **24** | **264** | **1 212** | **241 282** | **1 370** | **6 832** | **6** | **1** | **2 171** | **:** | **82** | **560** |
| | : | 792 | 27 | 1 260 | 295 | 153 | : | 1 | 9 | : | 257 | 83 |
| BE | 85 | 1 878 | 141 | 24 491 | 477 | 844 | 166 | 42 | 179 | 65 | 149 | 2 021 |
| | : | 15 | 3 | 46 983 | 17 | 18 | : | 1 | 16 | : | 49 | 2 |
| | 9 | 10 | 191 | 312 | 355 | 4 752 | : | 41 | 3 832 | 2 | 54 | 1 |
| CZ | 79 | : | 644 | 797 | 1 233 | 1 756 | : | 152 | 2 763 | : | 257 | 346 |
| | : | : | : | 21 | : | : | : | : | : | : | : | : |
| DK | : | 15 | 6 | 21 | 31 | 37 | : | 6 | 19 | : | 450 | : |
| | 66 | 38 | 41 | 1 257 | 133 | 474 | : | : | 87 | 159 | 2 557 | 104 |
| | 43 | 389 | 914 | 13 484 | 6 174 | 9 676 | 3 | 66 | 908 | : | 1 783 | 29 |
| DE | 525 | 2 913 | 1 694 | 38 981 | 13 222 | 9 219 | 713 | 714 | 1 557 | 140 | 1 709 | 2 553 |
| | 24 | 177 | 937 | 82 320 | 473 | 1 784 | 4 | : | 487 | : | 8 | 548 |
| EE | 684 | : | 22 | : | : | 19 | : | : | 4 | 3 | : | : |
| | 131 | : | : | : | : | 160 | : | : | : | 358 | 103 | : |
| EL | : | : | 198 | : | 233 | : | : | 39 | 2 | : | : | : |
| | : | : | 40 | 208 | 73 | 34 | : | : | : | : | 53 | 107 |
| ES | : | 10 | 14 | 9 | 15 | 6 | 541 | 6 | 44 | : | : | 113 |
| | 78 | 132 | 143 | 2 291 | 391 | 361 | 9 653 | 76 | 101 | 43 | 123 | 1 341 |
| | : | 981 | 18 | 1 044 | 304 | 420 | 1 | 105 | 112 | 1 | 336 | 335 |
| FR | 110 | 2 826 | 358 | 9 789 | 984 | 1 193 | 1 116 | 270 | 332 | : | 229 | 4 722 |
| | : | 9 | 6 | 6 838 | 8 | 3 | : | : | : | : | : | : |
| IE | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | 9 | 184 | : | : | : | : | : | : | : | 12 536 |
| IT | 3 | 196 | 471 | 1 318 | 4 417 | 459 | : | 746 | 165 | : | 512 | 246 |
| CY | 157 | 261 | 961 | 2 236 | 7 475 | 947 | 510 | 1 407 | 631 | 33 | 133 | 1 332 |
| | : | : | : | 1 | : | : | : | : | : | : | : | 0 |
| LV | 1 370 | : | : | : | : | : | : | : | : | : | : | : |
| | 535 | : | 32 | 62 | : | 302 | : | : | : | 25 | 70 | : |
| LT | **11 807** | : | 19 | : | 1 | 106 | : | 1 | 5 | : | : | : |
| | **44 743** | : | 40 | 113 | 24 | 601 | : | : | 31 | 58 | 52 | 67 |
| | : | **2 314** | 61 | 1 | 27 | 30 | : | : | 2 | : | 1 | : |
| LU | : | **25 936** | 7 | 557 | 34 | : | : | : | : | : | : | 110 |
| | : | : | : | 400 | : | : | : | : | : | : | : | : |
| | 35 | 5 | **15 217** | 131 | 2 003 | 760 | : | 466 | 984 | : | 4 | : |
| HU | 37 | 26 | **204 472** | 326 | 1 048 | 788 | 19 | 228 | 1 483 | 34 | 94 | 148 |
| | : | : | **39** | 337 | 518 | : | : | : | 22 | : | : | : |
| | : | 31 | 13 | **5 473** | 83 | 106 | : | : | 17 | : | 58 | 1 |
| NL | 90 | 551 | 252 | **468 737** | 774 | 1 143 | 179 | 61 | 168 | 73 | 717 | 2 009 |
| | : | 63 | 199 | **102 924** | 152 | 17 | 2 | : | : | : | 25 | 10 |
| | : | 22 | 2 896 | 246 | **24 408** | 3 690 | : | 3 242 | 2 775 | : | 242 | 2 |
| AT | 26 | 59 | 1 099 | 1 061 | **241 722** | 318 | 22 | 699 | 641 | : | 223 | 305 |
| | : | : | : | 1 395 | **191** | : | : | : | 1 540 | : | : | : |
| | 790 | 7 | 228 | 118 | 417 | **228 298** | : | 63 | 1 433 | : | 72 | : |
| PL | 453 | : | 698 | 1 354 | 381 | **689 538** | : | 122 | 798 | : | 825 | 401 |
| | : | : | : | 4 | : | **5 010** | : | : | : | : | : | : |
| PT | : | : | : | : | : | : | **8 499** | : | : | : | : | : |
| | : | : | 12 | 259 | 64 | : | **299 586** | : | : | : | : | 226 |
| SI | : | : | 804 | 2 | 1 849 | 115 | : | **3 508** | 228 | : | 6 | : |
| | : | : | 608 | 134 | 1 026 | 105 | : | **63 859** | 119 | : | : | 50 |
| | 2 | : | 500 | 157 | 209 | 2 100 | : | 236 | **7 860** | : | 7 | : |
| SK | 20 | : | 1 290 | 210 | 750 | 727 | : | 61 | **162 768** | : | 58 | 69 |
| | : | : | 28 | 60 | 11 | : | : | : | **106** | : | : | : |
| FI | : | 12 | : | 5 | 1 | 1 | : | 1 | : | **26 255** | 195 | : |
| | : | : | 33 | 150 | : | : | : | : | 25 | **392 347** | 1 984 | : |
| SE | : | 38 | 10 | 68 | 141 | 153 | : | 5 | 50 | 374 | **36 553** | : |
| | 45 | : | 65 | 815 | 194 | 805 | : | : | 54 | 2 661 | **318 642** | 18 |
| UK | : | : | : | c | c | : | : | : | : | : | : | **100 144** |
| | 62 | 197 | 213 | 3 229 | 371 | 775 | 281 | 77 | 127 | : | 13 | **1 802 674** |

Railways** Road* Inland waterways**

*Source:* Eurostat (Transport)

* International road transport includes cross-trade. Road cabotage is excluded because no data are available in tonnes concerning the country where cabotage is performed. Total weight of cabotage was 68 million tonnes in 2004 in the EU-25.
** Data on rail and inland waterways are based on declarations by the unloading countries.

### Getting more on the rails

When it comes to rail freight, the lack of quality assurance for freight services, particularly for international services involving several railway undertakings on the same route, has a negative impact on the attractiveness of rail transport. This includes poor interoperability, lack of mutual recognition of rolling stock and products, weak coordination of infrastructure and interconnection of IT systems, and the problem of single wagon loads.

According to the Commission, these problems explain why rail's market share has been steadily declining. In effect, between 1995 and 2005, rail freight increased by 9 % (see Table 5.2), which was much slower than average transport growth of 31 %. It was even slightly lower than freight development in inland waterways (10 %). According to the Commission, this aversion to rail transport is due above all to reliability and quality problems.

Significant progress has been made in recent years in revitalising the railways generally. Many of the obstacles in the way of an integrated European railway area have been gradually removed, with for instance the high-speed networks of Thalys and Eurostar, or the creation of corridors for freight services, such as the one between Rotterdam and Genoa.

However, European railways still face considerable challenges if they are to maintain their current share of total traffic volume and increase it in the medium term. The opening of rail freight markets, based either on Community legislation or national initiatives, has resulted in increased market entry in recent years, although at a very modest scale. However, in the area of rail passenger transport the opening up of the market is still far from a reality. In the long term, competition should force an improvement in quality, but the actual process of opening up the European rail freight market is, says the Commission, too slow. New entrants represent only a fraction of the market and in some Member States there are none.

With the 'Third railway package', the Commission intends to step up the quality of freight services, by introducing minimum quality clauses in contracts between railway undertakings and their customers, already considered good practice within the industry. While the exact content of the quality commitments is up to contracting parties, the Commission intends to lay down guarantees ensuring that quality factors are systematically discussed and taken into account in contracts.

The package also intends to open up international rail passenger services to competition within the European Union, improving the rights of passengers using international services. It thus seeks to complete the integration of the European railway area.

*For more information, visit: http://ec.europa.eu/transport*

## Some partners more important than others

Going one step further in the modal breakdown, Table 5.3 is a matrix providing a survey of all possible intra-EU transport relations (expressed in tonnes) for the three land modes of rail, road and inland waterways for 2004, based on data available. When interpreting data, readers should note that for road transport, for instance, the 717 000 tonnes loaded in Belgium and unloaded in the Czech Republic reflect the transport of:

- goods loaded in Belgium by Belgian hauliers and carried to the Czech Republic (declaring country: Belgium);
- goods loaded in Belgium by Czech hauliers and carried to the Czech Republic (declaring country: Czech Republic);
- goods loaded in Belgium and unloaded in the Czech Republic by any EU-registered haulier other than Belgian or Czech (otherwise known as cross-trade transport, implying up to 23 declaring countries of the EU-25, i.e. except Belgium and the Czech Republic).

Among the details that the table highlights is for example the high degree of goods transported via inland waterways between the Netherlands, Germany and Belgium - Member States having the highest share of this particular mode. In the case of goods loaded in the Netherlands and unloaded in Belgium and Germany, for example, the modal share (based on tonnes forwarded) was 65 % and 61 % respectively (percentages not shown). Based on data available, of these three Member States, the table also highlights that inland waterways were more often important for the Netherlands in its relations with others (39 % of the goods unloaded in France, 42 % in Luxembourg, 52 % in Austria, among others).

## 5.1.2 National goods transport

The amount of national transport largely depends on the industrial and commercial development of the countries concerned. Disregarding pipelines (restricted to liquid oil products), significant differences emerge between Member States, when looking at the relative importance of transport modes.

## Most national haulage goes by road…

As illustrated in Table 5.4, road haulage was clearly the dominant transport mode in the modal share (restricted to road, rail and inland waterways). In 2005, road haulage accounted for 14.9 billion tonnes of national transport in the EU. By contrast, rail transport amounted to just 901 million tonnes, equating to over 6 % of the volume forwarded by road.

**Table 5.4 National transport of goods by country and mode, 1990-2005* (in 1000 tonnes)**

| | 1990 | | | 2000 | | | 2004 | | | 2005 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Road | Rail | Inland waterways | Road | Rail | Inland waterways | Road | Rail | Inland waterways | Road | Rail | Inland waterways |
| **EU-25** | : | : | : | : | : | : | **14 359 318** | **901 049** | **227 316**** | **14 857 112** | **901 111** | **218 679**** |
| **BE** | 276 869 | 30 228 | 21 134 | 315 830 | 23 902 | 25 448 | 267 175 | 23 372 | 35 716 | 265 086 | 24 810 | 35 409 |
| **BG** | : | : | : | : | : | : | : | : | 904 | : | : | 1 875 |
| **CZ** | : | : | : | 361 337 | : | 635 | 428 237 | 39 765 | 621 | 423 582 | 39 263 | 685 |
| **DK** | 194 452 | 2 902 | : | 206 907 | 2 443 | : | 174 485 | 2 010 | : | 189 871 | 1 792 | : |
| **DE** | 2 715 148 | 217 187 | 62 600 | 3 058 994 | 193 626 | 60 859 | 2 625 489 | 200 102 | 55 209 | 2 613 100 | 201 725 | 56 662 |
| **EE** | : | : | : | : | : | : | 22 845 | 22 835 | : | 25 902 | 26 992 | : |
| **IE** | 78 952 | 3 277 | : | 175 413 | : | : | 263 040 | 2 136 | : | 285 136 | 1 820 | : |
| **EL** | 176 594 | 898 | : | : | 386 | : | 440 280 | 997 | : | 434 607 | 691 | : |
| **ES** | 973 707 | 22 428 | : | 907 734 | 20 734 | : | 1 952 048 | 24 511 | : | 2 147 883 | 25 488 | : |
| **FR** | 1 404 050 | 98 502 | 32 873 | 1 843 606 | 91 111 | 26 704 | 2 006 689 | 74 377 | 27 500 | 1 997 239 | 69 319 | 28 936 |
| **IT** | 889 064 | 21 084 | 739 | 1 176 437 | 31 548 | : | 1 378 026 | 33 337 | : | 1 460 039 | 34 617 | : |
| **CY** | : | - | : | : | - | : | 43 135 | - | : | 53 706 | - | : |
| **LV** | : | : | : | : | : | : | 42 847 | 7 271 | : | 47 357 | 7 840 | : |
| **LT** | : | : | : | : | : | : | 44 743 | 11 807 | : | 45 836 | 14 364 | : |
| **LU** | : | 2 816 | 40 | 19 448 | 2 709 | 12 | 25 936 | 2 314 | : | 22 888 | 1 910 | : |
| **HU** | : | : | : | : | : | : | 204 472 | 15 217 | 39 | 216 332 | 13 440 | 54 |
| **MT** | : | - | : | : | - | : | : | - | : | : | - | : |
| **NL** | 386 936 | 4 972 | 84 030 | 464 660 | 5 219 | 100 682 | 468 737 | 5 473 | 102 924 | 471 636 | 5 481 | 92 007 |
| **AT** | : | : | : | 241 239 | 20 239 | 1 146 | 241 722 | 24 408 | 191 | 248 475 | 27 517 | 356 |
| **PL** | : | : | : | : | : | : | 689 538 | 228 298 | 5 010 | 810 845 | 219 821 | 4 466 |
| **PT** | 237 946 | 5 389 | : | 276 059 | 8 069 | : | 299 586 | 8 499 | : | 305 857 | 8 699 | : |
| **RO** | : | : | : | : | : | : | : | : | 24 717 | : | : | 27 335 |
| **SI** | : | : | : | : | : | : | 63 859 | 3 508 | : | 70 431 | 3 381 | : |
| **SK** | : | : | : | : | : | : | 162 768 | 7 860 | 106 | 174 936 | 7 881 | 103 |
| **FI** | : | : | : | 415 611 | 24 071 | : | 392 347 | 26 255 | : | 392 368 | 23 479 | : |
| **SE** | : | : | : | 325 063 | : | : | 318 642 | 36 553 | : | 348 943 | 38 738 | : |
| **UK** | 1 686 998 | 137 622 | : | 1 628 099 | : | : | 1 802 674 | 100 144 | : | 1 805 057 | 102 043 | : |
| **NO** | : | : | : | 218 120 | : | : | 240 309 | 6 446 | : | 240 734 | 7 195 | : |

*Source:* Eurostat (Transport)

* With regard particularly to road data, data may not be comparable due to differences in data collection following a change in legislation (Directives until 1998, Regulation since 1999).
** EU aggregate excludes some Member States (notably UK).

## …but importance of rail freight is greater in tonne-kilometres

However, if the performance of road versus rail freight is measured in tonne-kilometres (Table 5.5), a different balance emerges in which the importance of rail freight was equal to about 16 % of the performance of road freight. This is about 10 percentage points more than when measured in absolute volumes alone: rail transport was responsible for over 187 billion tkm, and road freight for 1 199 billion tkm of national transport.

**Table 5.5 National transport of goods by country and mode, 1990-2005* (in million tonne-kilometres)**

| | 1990 | | | 2000 | | | 2004 | | | 2005 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Road | Rail | Inland waterways | Road | Rail | Inland waterways | Road | Rail | Inland waterways | Road | Rail | Inland waterways |
| **EU-25** | : | : | : | : | : | : | **1 178 776** | **194 018** | **31 415**** | **1 198 805** | **187 228** | **30 085**** |
| **BE** | 12 616 | 2 629 | 1 697 | 23 067 | 2 031 | 2 391 | 19 416 | 2 113 | 3 056 | 19 283 | 2 353 | 3 060 |
| **BG** | : | : | : | : | : | : | : | : | 40 | : | : | 67 |
| **CZ** | : | : | : | 14 212 | : | 37 | 16 046 | 6 122 | 26 | 15 518 | 6 202 | 30 |
| **DK** | 9 353 | 678 | : | 11 001 | 488 | : | 10 538 | 498 | : | 11 058 | 420 | : |
| **DE** | 120 167 | 33 092 | 14 111 | 217 048 | 35 039 | 13 351 | 232 303 | 39 932 | 11 296 | 237 617 | 44 412 | 11 695 |
| **EE** | : | : | : | : | : | : | 1 478 | 690 | : | 1 847 | 747 | : |
| **IE** | 3 876 | 589 | : | 8 321 | : | : | 13 216 | 398 | : | 13 983 | 303 | : |
| **EL** | 12 485 | 222 | : | : | : | : | *20 000* | 255 | : | 19 816 | 149 | : |
| **ES** | 97 259 | 8 750 | : | 106 933 | 9 587 | : | 155 014 | 9 287 | : | 166 386 | 9 060 | : |
| **FR** | 98 020 | 33 482 | 4 268 | 163 176 | : | 4 141 | 179 183 | 26 658 | 4 163 | 177 331 | 24 558 | 4 640 |
| **IT** | 115 784 | 9 089 | 118 | 158 246 | 11 789 | : | 158 172 | 11 616 | : | 171 587 | 12 021 | : |
| **CY** | : | - | : | : | - | : | : | - | : | : | - | : |
| **LV** | : | : | : | : | : | : | 2 380 | 2 221 | : | 2 734 | 2 367 | : |
| **LT** | : | : | : | : | : | : | 2 213 | 2 820 | : | 2 137 | 3 424 | : |
| **LU** | : | 113 | 1 | 415 | : | 0 | 549 | 79 | : | 494 | 68 | : |
| **HU** | : | : | : | : | : | : | 10 977 | 1 700 | 4 | 11 394 | 1 562 | 6 |
| **MT** | : | - | : | : | - | : | : | - | : | : | - | : |
| **NL** | 22 578 | 1 020 | 6 895 | 31 514 | 944 | 9 629 | 33 938 | 1 145 | 12 589 | 31 827 | 1 067 | 10 426 |
| **AT** | : | : | : | 9 686 | 3 888 | 117 | 12 376 | 4 206 | 33 | 12 514 | 4 085 | 37 |
| **PL** | : | : | : | : | : | : | 58 825 | 32 406 | 243 | 60 940 | 29 870 | 185 |
| **PT** | 10 978 | 1 283 | : | 14 131 | : | : | 17 435 | 1 931 | : | 17 445 | 2 131 | : |
| **RO** | : | : | : | : | : | : | : | : | 4 409 | : | : | 5 316 |
| **SI** | : | : | : | : | : | : | 2 267 | 642 | : | 2 361 | 620 | : |
| **SK** | : | : | : | : | : | : | 5 422 | 1 321 | 5 | 5 621 | 1 281 | 6 |
| **FI** | : | : | : | 27 718 | 6 802 | : | 27 331 | 7 197 | : | 27 815 | 6 607 | : |
| **SE** | : | : | : | 27 920 | : | : | 32 691 | 13 190 | : | 34 701 | 14 124 | : |
| **UK** | 132 967 | 16 078 | : | 191 892 | : | : | 154 157 | 21 239 | : | 154 396 | 19 964 | : |
| **NO** | : | : | : | 10 440 | : | : | 14 453 | 2 017 | : | 15 352 | 2 215 | : |

*Source:* Eurostat (Transport)

* With regard particularly to road data, data may not be comparable due to differences in data collection following a change in legislation (Directives until 1998, Regulation since 1999).
** EU aggregate excludes some Member States (notably UK).

### Cabotage: international or national?

Apart from '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 movement 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 but operating 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 section.*

## Rail overtakes road in Estonia and Lithuania

When looking at the situation in the Member States, the modal shares varied, depending on the measurement used. Estonia displayed a rail share that was actually 4 % larger than the road share, when based on tonnage alone, which was in contrast to the low share in tkm, thus suggesting shorter rail distances for goods carried. The only other Member State to show a larger role for rail was Lithuania, in which the rail share was 60 % higher than the road share, when measured in tkm. Latvia followed with a rail share equivalent to 87 % of the road share.

Apart from these exceptional cases, if national rail transport is to be promoted within the framework of 'intermodality', it will mainly be appropriate for larger Member States. This is suggested by the high rail shares (still compared with national road haulage in tkm) in, for example, Poland (49 %), the Czech Republic and Sweden (around 40 %), Austria (33 %), or even Germany (19 %).

## Inland waterway transport: the Netherlands highest volumes but Germany highest tonne-kilometres

Only four Member States have a substantial amount of inland waterway transport: Belgium, Germany, France and the Netherlands. This situation is of course strongly determined by geographical position: the Rhine and its delta can be regarded as the most important inland waterway network in the world, connecting important industrial areas and seaports. In France, the importance of inland waterway transport is more limited and restricted to some separate networks.

The Netherlands displayed the highest volumes carried in 2005 (92 million tonnes), which was about 17 times the share accounted for by rail and represented a share equivalent to about a fifth of road transport, a share that rose to 33 % when measured in tonne-kilometres. This importance reflects the role played by the port of Rotterdam, acting as a redistribution point for Europe.

When it comes to tonne-kilometre performance, Germany displayed the highest (11.7 billion tkm), which can be explained by the size of its waterway network occupying the core arteries of the EU's waterway network, the Rhine and Danube axes.

## Country growths generally larger in road transport

Looking at growths of the three land transport modes, there was a mixed picture throughout the EU, based on data available in tonne-kilometres. Looking at growths between 1990 and 2004/2005, which excludes the new Member States and some former EU-15 Member States, Ireland showed perhaps the highest growth (258 %) between 1990 and 2005 in road transport. It was followed by growth rates of almost half that rate of hauliers based in Germany (91 %), France (81 %) and Belgium (80 %). Among those Member States available, not one showed a decrease.

When it came to rail transport however, percentage changes between 1990 and 2005 were generally smaller and not always positive. Portugal showed the steepest rise (66 %), followed by Germany (34 %) and Italy (32 %) and the UK (24 %). The largest drops in tonne-kilometres were in Ireland (-49 %) and Luxembourg (-40 %).

Belgium displayed the largest increase in inland waterways between 1990 and 2005 (80 %). It was followed by the Netherlands (51 %). Germany - the largest forwarder in 2005 - however recorded a decline of 17 %.

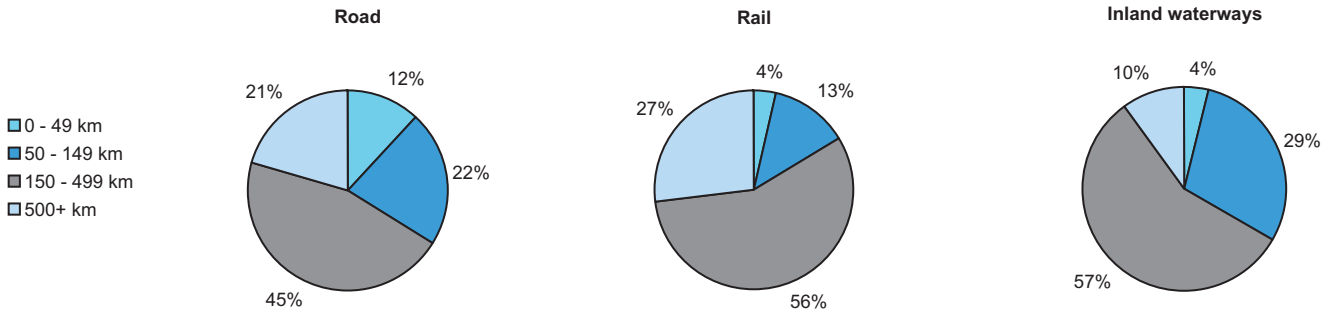
## Rail gains upper hand for longer distances

When comparing average distances travelled by goods in road, rail and inland waterways transport, clear differences emerge. Drawing comparisons between available datasets (Figure 5.3), longer distances (in excess of 150 km) were significantly more important in rail transport, accounting for 83 % of the volume forwarded in rail transport (2001 data), compared with 66 % in road transport and 67 % in inland waterways.

The greater importance of longer distances in rail transport most probably reflects the transport of certain goods such as heavy raw materials in large countries, such as Germany and Finland, with large railway networks.

It is also interesting to note that, as one might expect, the share of the 0-49 kilometre distance class was largest in road transport, reflecting the appropriateness of this transport mode for short distances generally more easily covered by road. See Section 5.1.4.

**Figure 5.3 National goods transport by distance class and transport mode, on the basis of tonne-kilometres forwarded in available countries***




*Source:* Eurostat (Transport)

*Available datasets used for aggregates: 2004 road data (includes all Member States except BG, EL, MT and RO); 2001 rail data (BE, DK, DE, NL, AT and FI) and 2004 inland waterway data (BE, CZ, DE, FR, HU,NL, AT, PL and SK). It should however be noted that a number of Member States (Ireland and the Benelux countries, among others) are not able to perform national journeys of more than 500 km.

### Improving freight through intermodal logistics

For some journeys, one transport mode can be most sufficient, but for others combined options, marrying for example road with rail, or inland waterways with short-sea shipping, are better, particularly in terms of cost and the environment. Enter the concept of 'Intermodal transport'.

Typically, intermodal transport refers to use of intermodal transport units ('ITUs' such as containers, swap-bodies, trailers, semi-trailers or even complete road vehicles). Using ITUs reduces loading and unloading times and thus facilitates co-modality.

The goal of EU policy on intermodal freight transport is to support the efficient door-to-door movement of goods, using two or more modes of transport, in an integrated transport chain. Each mode of transport has its own advantages in terms of capacity, safety, flexibility, energy consumption and environmental impact. Intermodal transport allows each mode to play its role in building transport chains which overall are more efficient, cost effective and sustainable.

Unfortunately for transport statistics, there is no specific EU data collection as yet on intermodal transport chains covering several modes, but the European Commission is working together with industry to establish a system for collecting such data. And certain Member States are spearheading statistical development. Sweden, for example, has carried out Commodity Flow Surveys to follow the development of co-modality.

However, in each legal act on EU freight transport statistics, the transport of ITUs is taken into account and gives an indication of intermodal transport.

*For more information, visit: http://ec.europa.eu/transport/intermodality/index_en.htm*

# Largest volume of domestic freight and mail in French and Spanish skies

Turning next to domestic air transport, in 2005 close to 676 thousand tonnes of domestic freight and mail were flown by air transport in the EU-25. Equal to just 6 % of total (national and international) air freight and mail transport, the small share highlights the use of air transport predominantly for international transport, as well as the competition from other transport modes such as road and rail transport. Compared with the total forwarded in 2004, this meant a decline of 10.4 %, which contrasts with the increase in international transport (see page 89).

As one would expect, the EU's largest Member States generally display the largest volumes in air freight and mail (Table 5.6). But contrary to expectations, volumes of freight and mail forwarded by air do not necessarily increase with country size, reflecting mainly geographical or topographical features, and connections with islands.

For example, based on the set of Member States available, the volume of air freight and mail in Poland (3 469 tonnes) was a third of the volume of that in Ireland (10 516), a Member State with just a quarter of Poland's surface area or a tenth of the latter's population.

Island connections also seem to play a role, such as is in France and Spain. With regard to France, the volume of freight and mail forwarded by air (172 176 tonnes) was in 2005 highest in this Member State, most probably because of the numerous domestic connections with Corsica and the overseas territories such as Martinique, Guadeloupe, the Reunion and French Guyana. The French total was more than those for the United Kingdom and Spain (133 961 and 129 919 tonnes respectively).

**Table 5.6** **Importance of domestic air freight and mail, and main freight airport, 2005 (in tonnes)**

| | Total domestic air freight in tonnes | % share of domestic air freight in total air freight | Main airport in domestic air transport |
|---|---|---|---|
| **BE** | 178 | 0.03% | Brussels-National |
| **CZ** | 1 235 | 2.2% | Ostrava-Mosnov |
| **DK** | 886 | 11.9% | Bornholm-Ronne Airport |
| **DE** | 103 951 | 3.5% | Frankfurt-Main |
| **EL** | 16 389 | 15.5% | Athens |
| **ES** | 129 919 | 24.7% | Madrid-Barajas |
| **FR** | 172 176 | 11.7% | Paris-Charles-De-Gaulle |
| **IE** | 10 516 | 11.8% | Shannon |
| **IT** | 71 581 | 9.5% | Roma-Fiumicino |
| **CY** | 2 | 0.01% | Larnaka |
| **LT** | 2 | 0.02% | Vilnius |
| **AT** | 1 004 | 0.6% | Wien-Schwechat |
| **PL** | 3 469 | 11.1% | Warszawa-Okecie |
| **PT** | 25 514 | 19.7% | Lisboa |
| **SI** | 5 | 0.1% | Ljubljana |
| **SK** | 11 | 0.3% | Unknown - Slovakia |
| **FI** | 4 948 | 4.1% | Helsinki-Vantaa |
| **UK** | 133 961 | 5.5% | Nottingham-East Midlands |

*Source:* Eurostat (Transport)

Note: BG and SE not available. Data for the following Member States are either zero or very small (EE, LV, LU, HU, MT, NL and RO).

# Domestic share in total seaborne transport highest in Greece

In 2004, an estimated 2.8 billion tonnes of goods were transported by sea in the EU-25. Of this total around about 11 % (319 million tonnes) was national transport (Table 5.7). Readers should be aware however that data only cover ports handling 1 million tonnes or above per year, which does not give the complete picture: transport of goods declared by smaller ports, which are mainly involved in national transport, are therefore not covered.

With this in mind, the United Kingdom transported the most, with a gross weight of 97 million tonnes. It was followed by Italy, Spain and Greece.

More interesting is perhaps the share of national transport in total seaborne transport. In Greece, more than a third (33.5 %) of the total transported through Greek ports was national, i.e. in terms of the port of loading and the port of unloading. The UK, Italy, Denmark and Spain followed with shares of between 19 % and 15 %. The geographical features of these countries (islands, either large in number or only a few but important ones, or a country with a long coastline) largely explain the relatively high national share. See international goods transport on page 91.

**Table 5.7** Domestic seaborne transport of goods*, 2003-2004 (in 1000 tonnes)

| | 2003 | 2004 | % share in total seaborne transport (2004) | % change 2003-2004 |
|---|---|---|---|---|
| **EU-25** | : | **319 024** | **11%** | : |
| **BE** | 3 664 | 2 730 | 1% | -25% |
| **BG** | 26 | 1 | 0% | -96% |
| **DK** | 13 844 | 13 026 | 16% | -6% |
| **DE** | 5 021 | 5 099 | 2% | 2% |
| **EE** | 469 | 657 | 1% | 40% |
| **EL** | 37 152 | 35 752 | 33% | -4% |
| **ES** | 48 707 | 49 789 | 15% | 2% |
| **FR** | 19 620 | 20 645 | 7% | 5% |
| **IE** | 986 | 796 | 2% | -19% |
| **IT** | 70 287 | 70 542 | 17% | 0% |
| **CY** | : | 107 | 2% | : |
| **LV** | : | 390 | 1% | : |
| **LT** | : | 35 | 0% | : |
| **NL** | : | : | : | : |
| **PL** | : | 340 | 1% | : |
| **PT** | 5 745 | 5 828 | 11% | 1% |
| **RO** | 170 | 4 | 0% | -98% |
| **SI** | : | : | : | : |
| **FI** | 5 464 | 5 235 | 6% | -4% |
| **SE** | 11 598 | 11 129 | 8% | -4% |
| **UK** | 97 917 | 96 924 | 19% | -1% |
| **NO** | 43 378 | 46 775 | 27% | 8% |

*Source:* Eurostat (Transport)

* Data based on the total of goods transported by sea and declared by 'main ports' (ports handling 1 million tonnes or more per year).

## Putting wind in the sails of short-sea shipping

Short-sea shipping - which covers maritime transport activities between the EU and neighbouring countries (Western Balkans, Magreb & Mashrek countries, Black sea countries, Russia and Norway) - is the only intermodal mode that has kept pace with the fast growth in road transport.

That said, users still do not perceive this mode as being fully integrated into the intermodal supply chain. This problem could be overcome by managing and commercialising logistics chains involving door-to-door short-sea shipping as an integrated service. Customers need a single contact point with responsibility for the whole intermodal chain. This requires efforts from all parties but will also bring benefits to them all.

In partnership with business, and especially since 2003, the Commission has been working towards promoting short-sea shipping by notably making the transport mode more competitive and by helping to streamline administrative and customs procedures. One measure is for example the guidance of 21 business-driven short-sea promotion centres to help raise its profile (http://www.shortsea.info/). The main target groups are the transport buyers including forwarders.

*For more information, visit: http://ec.europa.eu/transport/maritime/doc/maritime_transport_policy_en.pdf*

## Modal share comparison not straightforward in international haulage

When it comes to international goods transport and country comparisons between modal shares of different transport modes, statisticians (and readers) have a hard time. This is particularly because of differences in how freight in the different transport modes is computed.

Rail and inland waterways transport are based on movements on national territory, regardless of the nationality of the vehicle or vessel. However, road transport is based on all movements of vehicles registered in the reporting country. This means, for example, that goods transported by a lorry registered in one country would be recorded in this country and not in the country where the transport was performed. By contrast, for rail and inland waterways, this goods movement would be recorded where the transport was performed.

This presents a problem when deciding which measure to use for comparing performance between modes: tonnes or tonne-kilometres.

## Measurement in tonnes or tonne-kilometres: which is better?

Because total tonne-kilometres (tkm) performed by freight are influenced by distance performed on national territory, measurement using this indicator thus distorts the true picture of international transport. Imagine for instance an international freight journey where 90 % of the distance covered for a delivery is on national territory. This is why performance measurement in tonnes is a better measure for rail and inland waterways.

The production of a modal split is further complicated by other issues. For instance, road freight performed by non-EU registered hauliers on EU soil escapes statistics. There is also the question of rail and inland waterway transit - transport passing through a country without loading or unloading - which would increase the totals. For road transport transit is inherently included, since data are based on vehicles registered in a country.

There are also more country-specific considerations, such as the United Kingdom where international goods transport by rail only became possible with the opening of the Channel Tunnel, or the Republic of Ireland which records rail goods transport to and from Northern Ireland as national traffic, among others.

## 5.1.3 International goods transport

Globalisation and the increasing economic integration of EU Member States have led to considerable growth in freight transport. The territory of the European Union includes several highly industrialised and densely populated areas, both of which generate 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 transhipment in European seaports (like Rotterdam, Antwerp, Marseille, Hamburg or Le Havre), they have to be carried to their destinations within Europe by some mode of inland transport.

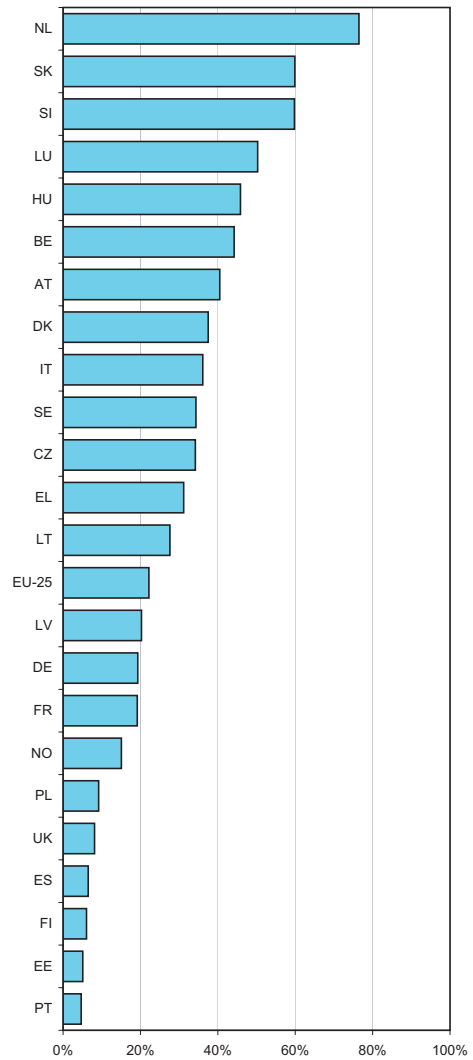
At the same time, an opposite stream flows towards the seaports for export overseas. This stream of transport between the seaports and their hinterland, by road, rail and inland waterways, contribute substantially to inland transport in Europe. There are however considerable differences in the extent of transport between Member States, as well as in the modes used.

## Share of international rail as much as 76 % in the Netherlands

The share of international rail freight transport (excluding transit), based on tonnes loaded, was 22 % in 2005, as shown in Figure 5.4. However, this share was as much as 76 % in the Netherlands. Other Member States to display shares of above 40 % were Slovakia, Slovenia, Luxembourg, Hungary, Austria and Belgium. Reflecting its more remote geographical position, as well as the importance of road transport as an alternative transport mode, Portugal recorded the lowest share (5 %).

Readers should note however that freight volumes loaded outside the EU and unloaded on EU territory are not included in this picture. This is important to keep in mind, since flows of international rail freight can be quite significant from certain non-EU countries, such as Switzerland, Belarus and Ukraine…

**Figure 5.4 Importance of international rail in total rail transport (national and international), based on tonnes loaded, 2005**




*Source:* Eurostat (Transport)

## Rail freight performance highest in Sweden

Although rail transport only accounts for a small share in total international transport at EU level, the importance of this mode seems to be far more important for some Member States, when compared with international road transport (based on tonnes loaded in regular international road freight and cross-trade).

Nowhere was international rail freight as firmly rooted as in Sweden (Table 5.8): international rail freight forwarded close to six times the volume transported by international road transport (with volumes of respectively 20.2 million tonnes and 3.6 million tonnes). The reason for Sweden's performance can most probably be found in the 500 km long, so-called Ore line which runs from Luleå and Riksgränsen and from there to Narvik in Norway, and carries among others long freight trains transporting ore. Hungary followed with international rail freight volumes equivalent to 1.5 times the amount recorded for international road transport. In no other Member State did international rail performance exceed that for road.

Germany, the biggest absolute international rail performer (forwarding over 48 million tonnes), displayed a share equivalent to 59 % of its international road freight.

By contrast, international rail freight was comparatively least important in Portugal and Spain with international rail freight volumes being equivalent to just 3 % and 6 % respectively of these countries' international road freight volumes. Other countries to show comparatively low shares were Denmark (13 %), Luxembourg (15 %), Greece (23 %) and the Netherlands (24 %); the next lowest share being in Finland (49 %).

In the case of Spain, the low figure (1.8 million tonnes) could be a result of transhipment (from one railway wagon to another) between France and Spain, arising from a difference of rail gauges. This has the effect that movements of goods across the border are not included in international transport.

Between 2003 and 2005, international rail transport grew at different paces across the EU-25, even among the EU's most important rail freight forwarders. While growths were recorded in Germany, Sweden and Italy for instance (of 17 %, 13 % and 37 % respectively), decreases were posted in Poland (-7 %), the Czech Republic and France (both -10 %). The largest growth, both in absolute and relative terms, was recorded by the United Kingdom, where the volume of 9 million tonnes loaded in 2005 was 14 times that recorded in 2003. This clearly reflects the growing importance of the Channel Tunnel.

**Table 5.8** International rail transport, based on tonnes loaded, 2003-2005 (in 1000)

| | 2003 | 2004 | 2005 | % change 2003-2005 |
|---|---|---|---|---|
| BE | 19 776 | : | 19 651 | -1% |
| CZ | 22 692 | 20 456 | 20 523 | -10% |
| DK | 1 155 | 1 918 | 1 076 | -7% |
| DE | 41 254 | 46 063 | 48 220 | 17% |
| EE | 1 448 | 1 390 | 1 445 | 0% |
| EL* | : | 281 | 313 | 11% |
| ES | 2 342 | 2 665 | 1 773 | -24% |
| FR | 18 171 | 18 014 | 16 434 | -10% |
| IE | : | : | : | : |
| IT | 14 321 | 15 636 | 19 569 | 37% |
| LV | 2 984 | 2 167 | 1 992 | -33% |
| LT | 7 053 | 5 002 | 5 480 | -22% |
| LU | 2 506 | 3 076 | 1 932 | -23% |
| HU | 9 808 | 11 189 | 11 377 | 16% |
| NL | 17 263 | 18 922 | 17 800 | 3% |
| AT | 18 438 | 18 604 | 18 715 | 2% |
| PL | 23 703 | 23 219 | 22 085 | -7% |
| PT | 392 | 449 | 426 | 9% |
| SI | 4 852 | 4 770 | 5 029 | 4% |
| SK | 13 023 | 12 749 | 11 767 | -10% |
| FI | 1 382 | 1 612 | 1 512 | 9% |
| SE | 17 981 | 19 458 | 20 248 | 13% |
| UK | 656 | 8 859 | 9 023 | 1275% |
| LI | : | 0 | 1 | : |
| NO | 1 481 | 1 131 | 1 275 | -14% |

*Source:* Eurostat (Transport)

* % Change 2004-2005
Note: CY and MT do not have any rail network.

# Regular international road transport largest road freight activity

Turning next to international goods transport by road (including cross-trade and cabotage), about 525 billion tonne-kilometres were performed in 2005 (Table 5.9). Regular international goods transport by road (loaded and unloaded) was by far the largest activity in the EU accounting for 83 % of total international road transport (or 435 billion tkm), leaving 14 % for cross-trade (75 billion tkm), the second largest activity, and 3 % for cabotage (15 billion tkm).

Looking at the level of Member States, readers should note that data show transport performed by hauliers registered in that country, and not the total international transport performed in the country. This applies not only to cross-trade and cabotage, which is transport performed outside the country, but also to a portion of regular international transport. For example, the 3 413 million tonne-kilometres of cross-trade transport and 1 597 mtkm of cabotage transport shown for Belgium only indicate transport performed by hauliers (registered in Belgium) outside the country and not on Belgian territory.

**Table 5.9** **Importance of cross-trade, cabotage and regular international road transport performed by hauliers registered in the reporting Member State, 2005 (in million tonne-kilometres)**

| | Regular international transport* | Cross-trade | Cabotage | Total |
|---|---|---|---|---|
| **EU-25**** | **434 716** | **75 205** | **14 915** | **524 836** |
| **BE** | 19 555 | 3 413 | 1 597 | 24 565 |
| **CZ** | 21 810 | 6 087 | 33 | 27 930 |
| **DK** | 11 643 | 468 | 129 | 12 240 |
| **DE** | 62 545 | 7 685 | 2 257 | 72 487 |
| **EE** | 3 122 | 717 | 138 | 3 977 |
| **IE** | 3 017 | 448 | 462 | 3 927 |
| **EL** | 3 507 | 80 | 4 | 3 591 |
| **ES** | 63 662 | 2 123 | 1 059 | 66 844 |
| **FR** | 26 745 | 788 | 421 | 27 954 |
| **IT** | 37 871 | 1 248 | 1 098 | 40 217 |
| **CY** | 19 | : | : | 19 |
| **LV** | 3 839 | 1 785 | 36 | 5 660 |
| **LT** | 7 700 | 6 021 | 50 | 13 771 |
| **LU** | 2 412 | 3 757 | 2 141 | 8 310 |
| **HU** | 11 237 | 2 420 | 100 | 13 757 |
| **NL** | 40 788 | 8 815 | 2 733 | 52 336 |
| **AT** | 17 802 | 6 155 | 573 | 24 530 |
| **PL** | 39 588 | 10 645 | 653 | 50 886 |
| **PT** | 20 701 | 3 715 | 747 | 25 163 |
| **SI** | 6 400 | 2 123 | 149 | 8 672 |
| **SK** | 11 043 | 5 815 | 87 | 16 945 |
| **FI** | 3 909 | 80 | 54 | 4 043 |
| **SE** | 3 193 | 495 | 186 | 3 874 |
| **UK** | 12 608 | 322 | 207 | 13 137 |
| **LI** | 86 | 282 | 22 | 390 |
| **NO** | 2 852 | 28 | 14 | 2 894 |

*Source:* Eurostat (Transport)

*Road transport between two places (a place of loading/embarkation and a place of unloading/disembarkation) in two different countries. It may involve transit through one or more additional country or countries.

**EU aggregate excludes CY for cross trade and cabotage. MT: no data available.

## International road transport: lifting the fog

Within this chapter, international road transport covers 'regular' international road transport, but also cross-trade and cabotage, which are also forms of international road transport, and which are also used in some other transport modes such as maritime and inland waterways.

'Regular international road transport' refers to international road transport that is loaded or unloaded in the reporting country by hauliers who are registered in their respective country. It is the most commonplace form of haulage. Cross-trade is carried out by vehicles neither registered in the country of loading, nor in the country of unloading. Its principal advantage is that it avoids so called 'empty runs' and as such, it is considered as a more economic and more environmentally friendly solution. Since 1993 cross trade has been possible for journeys between any two Member States for holders of a 'community licence'.

Fully liberalised in 1998, cabotage is transport performed by hauliers registered in their country (which reports the data) but operating on the territory of another country. Thus, even if from the stance of goods, cabotage could be considered as national transport, from the viewpoint of the reporting country however, it is considered as international transport, also because it constitutes an export of services from one country to another.* By 2009 at the latest cabotage will be opened up to the new Member States that joined in 2004.

* *This is in line with the concept that applies to the road transport data collected under Council Regulation (EC) 1172/98.*

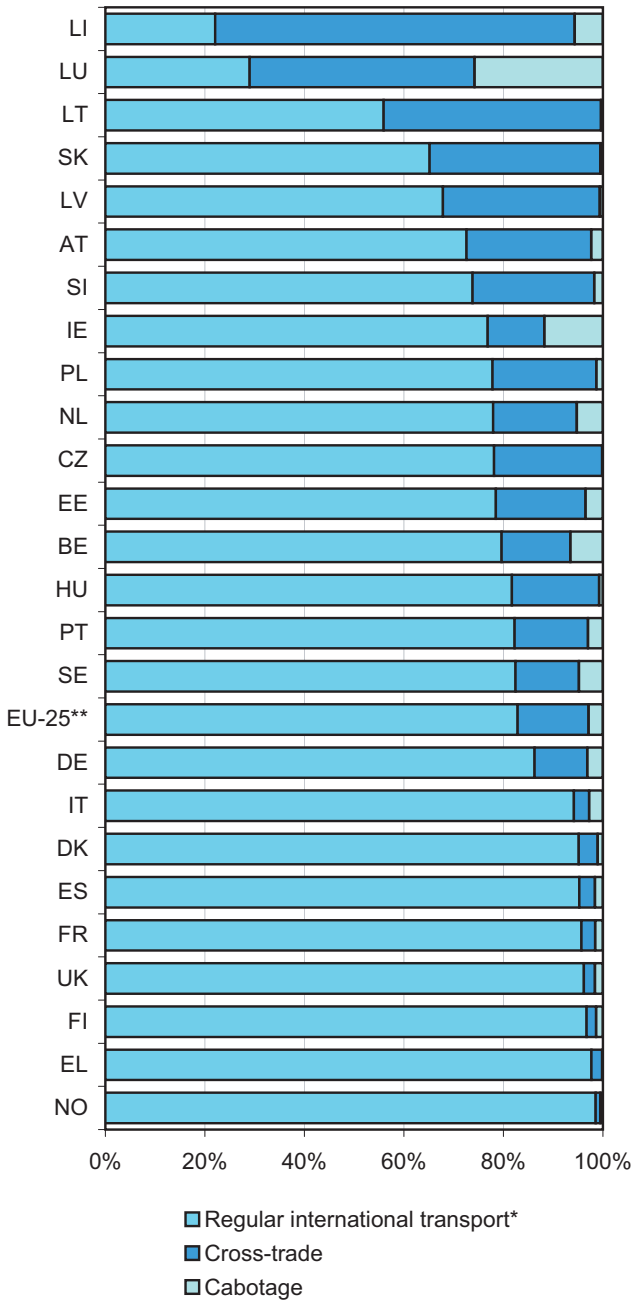
## Cross-trade and cabotage more important in smaller, central Member States

This balance was changeable however when looking at 23 of the EU-25 Member States available (Figure 5.5). While regular international road transport was clearly the largest activity in the overwhelming majority of Member States, Luxembourg and Lithuania stood out somewhat, with cross trade accounting for 45 % and 44 % respectively of total international road freight). In EFTA member Liechtenstein, however, cross-trade represented as much as 72 % of its international road transport. Luxembourg was also exceptional because cabotage was most important in this country (26 %).

Luxembourg's example - compounded by the small size of its home market - typifies the greater importance of cabotage and especially cross-trade in the EU's smaller Member States that are centrally located. Moreover, hauliers from small countries have more incentive to perform cabotage due to their limited national markets and the fact that other national markets are geographically close.

These considerations largely explain the above-average shares for most of the other Member States. Luxembourg, together with the two other Benelux countries (the Netherlands and Belgium), accounted for 44 % of cabotage performed in the EU-25 (Figure 5.6).

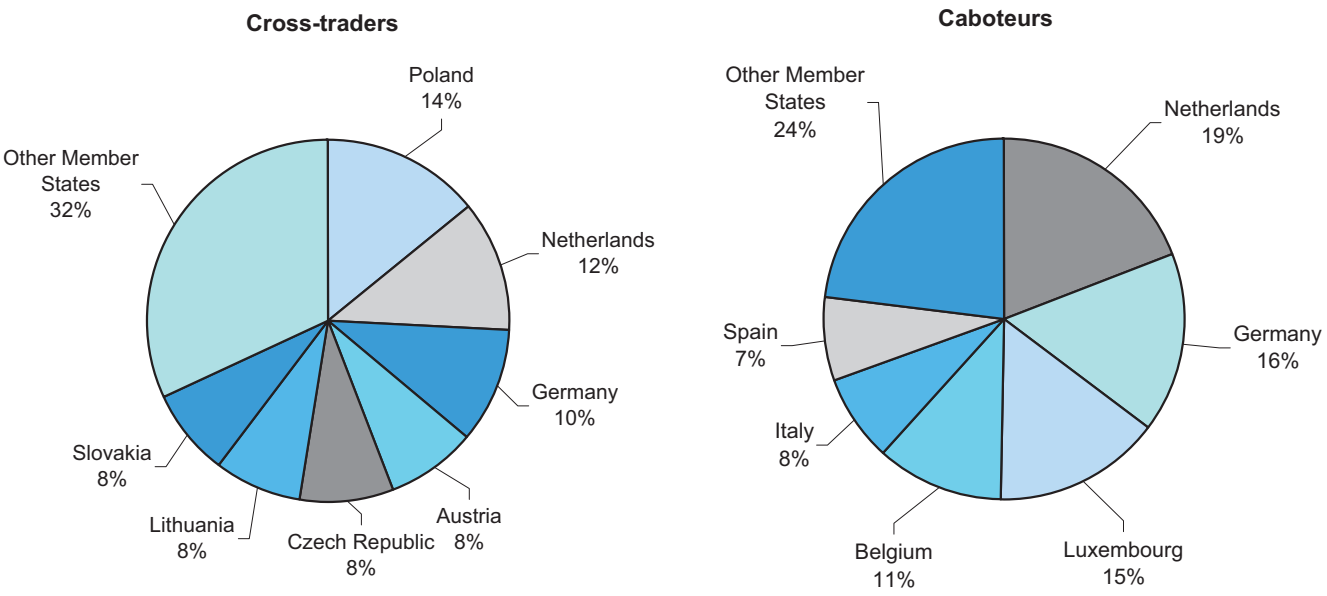
**Figure 5.5** **Importance of cross-trade, cabotage and regular international road transport, based on tonne-kilometres, 2005 (in %)**




*Source:* Eurostat (Transport)

*Road transport between two places (a place of loading/embarkation and a place of unloading/disembarkation) in two different countries. It may involve transit through one or more additional country or countries.
**EU aggregate excludes CY for cross-trade and cabotage. MT: no data available.

Figure 5.6 The most active cross-traders and caboteurs in the EU-25, 2005 (in % of total tonne-kilometres)




*Source:* Eurostat (Transport)

## Poland largest contributor to cross-trade, the Netherlands largest contributor to cabotage

In absolute terms, Poland was the largest contributor to cross-trade (10.6 million tkm) in 2005, replacing the Netherland's top place in 2004. The Netherlands however was the largest contributor to cabotage (2.7 billion tkm), implying shares of 14 % and 19 % respectively of the EU totals (Figure 5.6).

The high transport performance of the Netherlands is also underlined by the fact that it was also the third largest contributor to regular international goods transport, behind Spain and Germany, (with shares of 15 % and 14 % respectively) and just ahead of Poland and Italy (all with shares of around 9 %). The through-puts in the ports of Amsterdam and especially Rotterdam, where goods are unloaded from ships and usually continue their journey by lorry, help to explain the performance of hauliers registered in the Netherlands (see page 93).

## Cabotage grew by around 84 % between 1999 and 2005 in the EU-15

The success of the deregulation and the liberalisation of the road freight market is seen to some extent in Tables 5.10 to 5.13. The volume of cabotage in the former EU-15 - which offers some indication of development in the EU-25 - grew by around 84 % between 1999 and 2005, while that of cross-trade grew by 26 %. This compares with a growth of 23 % for regular international road transport.

Looking at individual Member States of the EU-15 (for which data are available for the 1999-2005 period) growths in cabotage reached as much as 655 % in Portugal, which was also the EU-15 Member State to show the highest growth in regular international road transport (88 %) and cross-trade (440 %). However, with enlargement, cross trade has been growing at some very fast rates in the Member States that joined in 2004, most importantly in top cross-trader Poland (214 % on 2004 figures), but also in smaller Member States such as Estonia (512 %).

Of the few decreases over the 1999-2005 period, it is interesting to note that France posted decreases in all three types of international road transport, and as much as 73 % in cross trade.

**Table 5.10** International road transport (loaded and unloaded), 1999-2005 (in million tonne-kilometres)

| | 1999 | 2004 | 2005 | % change 1999-2005 |
|---|---|---|---|---|
| **EU-25*** | **:** | **441 791** | **434 716** | **:** |
| **EU-15** | **268 110** | **341 220** | **329 958** | **23%** |
| **BE** | 17 250 | 22 113 | 19 555 | 13% |
| **CZ** | : | 25 620 | 21 810 | : |
| **DK** | 12 276 | 11 763 | 11 643 | -5% |
| **DE** | 45 652 | 62 938 | 62 545 | 37% |
| **EE** | : | 3 424 | 3 122 | : |
| **IE** | 1 699 | 3 069 | 3 017 | 78% |
| **EL** | : | 4 924 | 3 507 | : |
| **ES** | 35 066 | 62 707 | 63 662 | 82% |
| **FR** | 41 975 | 31 334 | 26 745 | -36% |
| **IT** | 24 465 | 36 861 | 37 871 | 55% |
| **CY** | : | 17 | 19 | : |
| **LV** | : | 3 809 | 3 839 | : |
| **LT** | : | 6 656 | 7 700 | : |
| **LU** | 1 461 | 2 460 | 2 412 | 65% |
| **HU** | : | 8 210 | 11 237 | : |
| **NL** | 41 005 | 42 138 | 40 788 | -1% |
| **AT** | 15 653 | 19 915 | 17 802 | 14% |
| **PL** | : | 38 495 | 39 588 | : |
| **PT** | 10 990 | 19 278 | 20 701 | 88% |
| **SI** | : | 5 348 | 6 400 | : |
| **SK** | : | 8 994 | 11 043 | : |
| **FI** | 3 712 | 4 806 | 3 909 | 5% |
| **SE** | : | 3 666 | 3 193 | : |
| **UK** | 16 905 | 13 246 | 12 608 | -25% |
| **LI** | - | : | 86 | : |
| **NO** | 3 074 | 2 951 | 2 852 | -7% |

*Source:* Eurostat (Transport)

* EU-25 aggregate excludes MT.

**Table 5.11** Cross-trade road goods transport performed by hauliers registered in the reporting Member State (in million tonne-kilometres), 1990-2005

| | 1999 | 2004 | 2005 | % change 1999-2005 |
|---|---|---|---|---|
| **EU-25*** | **:** | **62 657** | **75 205** | **:** |
| **EU-15** | **31 332** | **42 019** | **39 592** | **26%** |
| **BE** | 3 338 | 4 533 | 3 413 | 2% |
| **CZ** | : | 4 339 | 6 087 | : |
| **DK** | 436 | 558 | 468 | 7% |
| **DE** | 4 355 | 6 566 | 7 685 | 76% |
| **EE** | : | 140 | 717 | : |
| **IE** | 354 | 354 | 448 | 27% |
| **EL** | : | 88 | 80 | : |
| **ES** | 791 | 2 070 | 2 123 | 168% |
| **FR** | 2 957 | 1 059 | 788 | -73% |
| **IT** | 509 | 1 100 | 1 248 | 145% |
| **LV** | : | 1 183 | 1 785 | : |
| **LT** | : | 3 382 | 6 021 | : |
| **LU** | 3 436 | 4 303 | 3 757 | 9% |
| **HU** | : | 1 330 | 2 420 | : |
| **NL** | 8 245 | 10 748 | 8 815 | 7% |
| **AT** | 5 827 | 6 504 | 6 155 | 6% |
| **PL** | : | 4 982 | 10 645 | : |
| **PT** | 688 | 3 398 | 3 715 | 440% |
| **SI** | : | 1 260 | 2 123 | : |
| **SK** | : | 4 022 | 5 815 | : |
| **FI** | 103 | 84 | 80 | -22% |
| **SE** | : | 421 | 495 | : |
| **UK** | 293 | 234 | 322 | 10% |
| **LI** | : | : | 282 | : |
| **NO** | 76 | 44 | 28 | -63% |

*Source:* Eurostat (Transport)

*EU-25 aggregate excludes CY and MT.

**Table 5.12** Evolution of cabotage performed by hauliers registered in the reporting Member State, 1999-2005 (in million tonne-km)

| | 1999 | 2004 | 2005 | % change 1999-2005 |
|---|---|---|---|---|
| **EU-25*** | **:** | **14 631** | **14 915** | **:** |
| **EU-15** | **7 436** | **13 713** | **13 668** | **84%** |
| **BE** | 938 | 1 816 | 1 597 | 70% |
| **CZ** | : | : | 33 | : |
| **DK** | 102 | 254 | 129 | 26% |
| **DE** | 1 533 | 1 944 | 2 257 | 47% |
| **EE** | : | 57 | 138 | : |
| **IE** | 416 | 505 | 462 | 11% |
| **EL** | : | 17 | 4 | : |
| **ES** | 271 | 1 031 | 1 059 | 291% |
| **FR** | 756 | 624 | 421 | -44% |
| **IT** | 350 | 847 | 1 098 | 214% |
| **LV** | : | 10 | 36 | : |
| **LT** | : | 28 | 50 | : |
| **LU** | 1 039 | 2 262 | 2 141 | 106% |
| **HU** | | 92 | 100 | : |
| **NL** | 1 632 | 2 871 | 2 733 | 67% |
| **AT** | 222 | 390 | 573 | 158% |
| **PL** | : | 506 | 653 | : |
| **PT** | 99 | 708 | 747 | 655% |
| **SI** | : | 132 | 149 | : |
| **SK** | : | 89 | 87 | : |
| **FI** | 35 | 70 | 54 | 54% |
| **SE** | : | 170 | 186 | : |
| **UK** | 44 | 203 | 207 | 370% |
| **LI** | : | : | 22 | : |
| **NO** | 24 | 12 | 14 | -42% |

*Source:* Eurostat (Transport)

* EU-25 aggregate excludes CY and MT.

**Table 5.13** Share of cabotage transport in total road transport* in Member States, 1999-2005 (based on tonne-km, in %)

| | 1999 | 2004 | 2005 |
|---|---|---|---|
| **EU-25**** | **:** | **0.86** | **0.87** |
| **EU-15** | **2.42** | **0.93** | **0.95** |
| **BE** | 2.52 | 3.79 | 3.64 |
| **CZ** | : | : | 0.08 |
| **DK** | 0.44 | 1.10 | 0.55 |
| **DE** | 0.55 | 0.64 | 0.73 |
| **EE** | : | 1.12 | 2.37 |
| **IE** | 4.08 | 2.95 | 2.58 |
| **EL** | : | 0.05 | 0.02 |
| **ES** | 0.20 | 0.47 | 0.45 |
| **FR** | 0.37 | 0.29 | 0.21 |
| **IT** | 0.20 | 0.43 | 0.52 |
| **LV** | : | 0.14 | 0.43 |
| **LT** | : | 0.23 | 0.31 |
| **LU** | 16.46 | 23.63 | 24.32 |
| **HU** | : | 0.45 | 0.40 |
| **NL** | 1.95 | 3.20 | 3.25 |
| **AT** | 0.65 | 1.00 | 1.55 |
| **PL** | : | 0.49 | 0.58 |
| **PT** | 0.38 | 1.73 | 1.75 |
| **SI** | : | 1.47 | 1.35 |
| **SK** | : | 0.48 | 0.39 |
| **FI** | 0.12 | 0.22 | 0.17 |
| **SE** | : | 0.46 | 0.48 |
| **UK** | 0.03 | 0.12 | 0.12 |
| **LI** | : | : | 5.64 |
| **NO** | 0.16 | 0.07 | 0.08 |

*Source:* Eurostat (Transport)

*Total transport = cumulated performance of national, international, cross-trade and cabotage transport.
** EU-25 aggregate excludes CY and MT.

# Air freight climbs

Table 5.14 Evolution of international air freight and mail*, 2003-2005** (in 1000 tonnes)

| | 2003 | 2004 | 2005 | % change 2003-2005 |
|---|---|---|---|---|
| BE | 606.4 | 660.0 | 694.2 | 14.5% |
| CZ | 52.2 | 57.0 | 54.9 | 5.1% |
| DK | 8.1 | 7.8 | 7.1 | -12.1% |
| DE | 2 410.1 | 2 754.0 | 2 996.9 | 24.3% |
| EE | 5.0 | 5.0 | 9.7 | 93.0% |
| EL | 103.6 | 93.9 | 89.1 | -14.0% |
| IE | 36.7 | 49.9 | 73.5 | 100.1% |
| ES | 338.7 | 393.0 | 376.3 | 11.1% |
| FR | 1 228.8 | 1 306.0 | 1 304.2 | 6.1% |
| IT | 585.9 | 681.5 | 718.4 | 22.6% |
| CY | 29.6 | 35.4 | 37.6 | 27.0% |
| LV | 13.5 | 8.3 | 15.4 | 14.0% |
| LT | : | : | 9.5 | : |
| LU | 602.6 | 616.6 | 624.8 | 3.7% |
| HU | 50.5 | 60.4 | 55.5 | 9.8% |
| MT | 16.1 | 15.7 | 14.8 | -8.2% |
| NL | 1 388.5 | 1 511.9 | 1 550.7 | 11.7% |
| AT | 136.6 | 179.1 | 206.5 | 51.2% |
| PL | : | 25.9 | 26.6 | : |
| PT | 97.8 | 102.1 | 102.4 | 4.8% |
| SI | : | 5.1 | 5.0 | : |
| SK | 12.8 | 8.1 | 4.0 | -68.5% |
| FI | 89.3 | 110.0 | 106.9 | 19.7% |
| SE | 117.0 | 139.5 | : | : |
| UK | 2 164.3 | 2 331.8 | 2 308.6 | 6.7% |
| IS | 42.4 | 56.3 | 59.6 | 40.8% |

*Source:* Eurostat (Transport)

*Note: total freight (cargo and mail) handled at the airports of the reporting countries.
**Time period selected as a result of implementation of new EU legislation in 2003 (Regulation 437/2003 on statistical returns in respect of the carriage of passengers, freight and mail by air).

In 2005, 94 % of air freight and mail transport was international (intra- and extra-EU), i.e. 10.3 million tonnes (excluding Sweden). International air freight (cargo and mail) has increased generally across the EU over time. For example, between 2004 and 2005 (based on EU-25 data excluding Sweden) intra-EU air transport grew by 10 %, while extra-EU air transport increased by 3.7 %.

Between 2003 and 2005, Germany - the largest air freight carrier - showed an increase of over 24 %, while volumes in Ireland and Estonia - although small - doubled (Table 5.14). Of course growths between these years might well have been different had it not been for the shockwaves of 11 September 2001 which not only hit air passenger transport but also air freight transport, and which are reflected in several drops around 2001 and 2002 (data not shown).

It should however be noted that countries report for 'major airports' only, which pass the threshold of 150 000 passengers units (one passenger unit being either one passenger or 100 kg of freight/mail). Thus, the figures for the individual years are the sum of the volumes handled at the main airports in each country. Readers should also note that because of the threshold criterion, volumes can jump more than they actually do, when airports exceeding this threshold are then included among the reporting airports.

## Up-and-coming airports climb the ranks

When it comes to looking at airports handling intra- or extra-EU freight, it is perhaps no surprise that the EU's traditionally largest airports, such as Frankfurt-Main, London-Heathrow or Amsterdam-Schiphol, rank among the top.

But what is perhaps more interesting is the fact that some of the more up-and-coming airports featured among the top few and noticeably for intra-EU freight. This reflects the development of new air cargo hubs to overcome the saturation of traditional airports, and which, although located some distance away from the main economic centre of a country, enjoy a central geographic location as well as access to the motorway network.

**Table 5.15 Top 20 airports in the EU*, based on freight and mail loaded/unloaded, 2005 (in 1000 tonnes)**

| Intra-EU freight traffic | | | | Extra-EU freight traffic | | | |
|---|---|---|---|---|---|---|---|
| Rank 2005 | Airport | Volume handled in 2005 (1000 t) | % change 2003-2005 | Rank 2005 | Airport | Volume handled in 2005 (1000 t) | % change 2003-2005 |
| 1 | Köln/Bonn (DE) | 333.7 | 16.3 | 1 | Frankfurt/Main (DE) | 1 710.5 | 21.7 |
| 2 | Bruxelles/National (BE) | 250.3 | 6.4 | 2 | Amsterdam/Schiphol (NL) | 1 443.1 | 11.0 |
| 3 | Frankfurt/Main (DE) | 196.3 | 22.4 | 3 | London/Heathrow (UK) | 1 231.0 | 5.6 |
| 4 | Nottingham East Midlands (UK) | 166.1 | 15.8 | 4 | Luxembourg/Luxembourg (LU) ** | 554.5 | 0.7 |
| 5 | London/Heathrow (UK) | 152.3 | 22.0 | 5 | Bruxelles/National (BE) | 444.0 | 19.6 |
| 6 | Bergamo/Orio Al Serio (IT) | 104.0 | 16.3 | 6 | Milano/Malpensa (IT) | 294.8 | 16.9 |
| 7 | Madrid/Barajas (ES) | 86.7 | 19.0 | 7 | Köln/Bonn (DE) | 272.9 | 37.2 |
| 8 | Milano/Malpensa (IT) | 80.7 | 43.6 | 8 | London/Gatwick (UK) | 217.5 | 6.4 |
| 9 | Luxembourg/Luxembourg (LU) ** | 70.3 | 6.5 | 9 | Madrid/Barajas (ES) | 180.8 | 22.2 |
| 10 | London/Stansted (UK) | 62.1 | 9.5 | 10 | London/Stansted (UK) | 162.9 | 26.7 |
| 11 | Athens (EL) | 58.6 | -3.4 | 11 | Munchen (DE) | 152.6 | 55.2 |
| 12 | Helsinki-Vantaa (FI) | 56.6 | 45.4 | 12 | Manchester/Intl (UK) | 139.1 | 19.7 |
| 13 | Wien/Schwechat (AT) | 53.7 | 12.0 | 13 | Wien/Schwechat (AT) | 125.2 | 60.1 |
| 14 | Amsterdam/Schiphol (NL) | 52.5 | -1.5 | 14 | Hahn (DE) | 93.1 | 174.2 |
| 15 | Barcelona (ES) | 50.6 | 28.3 | 15 | Roma/Fiumicino (IT) | 70.5 | -27.1 |
| 16 | Lisboa (PT) | 38.4 | 2.3 | 16 | Nottingham East Midlands (UK) | 64.3 | 23.5 |
| 17 | Budapest/Ferihegy (HU) | 33.5 | 9.3 | 17 | Maastricht Aachen (NL) | 53.8 | 95.2 |
| 18 | Praha/Ruzyne (CZ) | 33.3 | 26.2 | 18 | Helsinki-Vantaa (FI) | 53.8 | 22.7 |
| 19 | Larnaka (CY) | 29.8 | 39.8 | 19 | Düsseldorf (DE) | 42.2 | 27.4 |
| 20 | Munchen Airport (DE) | 21.9 | 31.1 | 20 | Lisboa airport (PT) | 41.6 | 17.8 |

*Source:* Eurostat (Transport)

* French, Swedish and Danish airports are not included.
** % change 2004-2005.

This is the case especially with Köln-Bonn airport, which with 333 700 tonnes, handled the largest volume of intra-EU freight in 2005, which was substantially more than that handled by Germany's most important airport Frankfurt-Main (Table 5.15). Nottingham East Midlands ranked forth for intra-EU freight with a volume of 166 100 tonnes, making it the UK's most important air cargo hub for intra-EU deliveries, ahead of London's Heathrow airport by well over 14 thousand tonnes.

When looking at extra-EU freight, no other national airport could beat the traditional incumbents for volumes of 1 million tonnes or more, led by Frankfurt-Main with a volume of over 1.7 million tonnes. However, Köln-Bonn airport ranked eighth with 273 thousand tonnes, and Hahn airport - a former military airport that gained a new lease of life with low-cost carriers - ranked 15$^{th}$ with 93 100 tonnes, ahead of that performed by Nottingham East Midlands. Hahn's ranking is clearly thanks to its 174 % growth on 2003 freight volumes.

## 86 % of seaborne transport was international in 2004

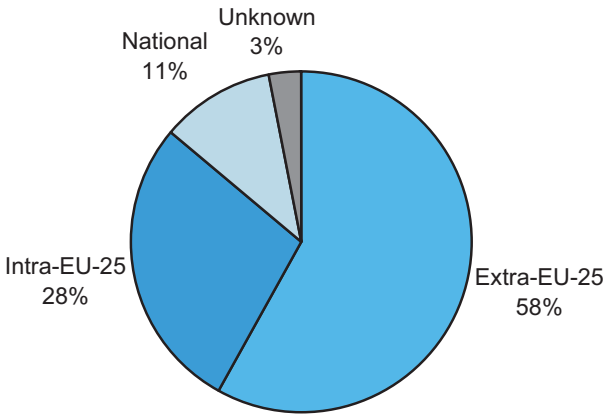
Of the 2.8 billion tonnes of goods transported by sea in the EU-25 in 2004 and declared by 'main' ports handling 1 million tonnes or above, about 86 % was international transport (Figure 5.7). Extra-EU transport was clearly most important, making up for 58 % of total maritime transport, which was more than twice as much as intra-EU transport (28 %). 3 % of transport could not be identified in terms of national or international transport.

Shares of international transport varied throughout the EU (see page 80, Table 5.7), rising to as much as around 99 % in the Netherlands, and declining to as little as 66 % in Greece (reflecting the importance of domestic maritime transport in this country's numerous islands). Norway followed Greece in this respect with a relatively low share of about 71 %, reflecting the importance again of domestic transport in a country with a very long coastline and a topography characterised by fjords.

Looking at the breakdown between intra- and extra-EU maritime transport, intra-EU shares were highest in the Baltic States (Estonia, Latvia and Lithuania) at 76 % each, with much of this transport being to and from neighbouring countries, the Netherlands and the United Kingdom.

Member States recording very high shares of extra-EU transport in 2004 were Italy (68 %) together with the Netherlands, Spain, Belgium and Slovenia (with shares of 60 % and above). And more than 75 % of the maritime transport of Bulgaria and Romania was with non-EU countries.

**Figure 5.7 Importance of international seaborne transport of goods*, 2004**




*Source:* Eurostat (Transport)

*Data based on the total of goods transported by 'main' ports (ports handling 1 million tonnes or above per year).

## Nearly two thirds of goods handled in maritime ports were unloaded

When considering both national and international cargo handling, what was the balance between inwards and outwards flows? As shown in Table 5.16, all the EU-25 ports taken together handled nearly 3.5 billion tonnes of goods (national and international) in 2004, consisting of 2.2 bn in inwards flows (unloaded goods) and 1.3 bn in outwards flows (loaded goods). In other terms, of the total volume handled, 64 % were unloaded.

Caution must be exercised when considering the total figures (inwards + outwards) as a measure of goods transport, since these may include some double counting (e.g. goods loaded and unloaded in ports of the same country).

Table 5.16 Maritime transport: gross weight of goods handled in all ports (in million tonnes), 1997-2004

| | 1997 | | 2000 | | 2003 | | 2004 | |
|---|---|---|---|---|---|---|---|---|
| | inwards | outwards | inwards | outwards | inwards | outwards | inwards | outwards |
| **EU-25** | : | : | : | : | **2 144.4** | **1 248.8** | **2 228.2** | **1 276.5** |
| **BE** | 100.0 | 61.6 | 110.9 | 68.4 | 103.9 | 77.2 | 108.9 | 78.9 |
| **BG** | : | : | : | : | 12.7 | 8.7 | 13.6 | 9.5 |
| **DK** | 71.6 | 52.4 | 52.9 | 43.7 | 56.9 | 47.0 | 54.6 | 45.8 |
| **DE** | : | : | 152.2 | 90.3 | 159.2 | 95.6 | 168.5 | 103.4 |
| **EE** | : | : | : | : | 4.7 | 42.4 | 4.0 | 40.8 |
| **EL** | : | : | 75.3 | 52.5 | 94.3 | 68.2 | 92.7 | 65.2 |
| **ES** | 184.9 | 85.7 | 171.6 | 63.3 | 249.6 | 94.1 | 269.9 | 103.2 |
| **FR** | 222.3 | 82.8 | 243.9 | 92.6 | 237.3 | 92.9 | 240.5 | 93.5 |
| **IE** | : | : | 31.7 | 13.6 | 33.2 | 12.9 | 34.7 | 13.0 |
| **IT** | : | : | 315.2 | 131.5 | 334.8 | 142.2 | 338.4 | 146.6 |
| **CY** | : | : | : | : | 5.7 | 1.6 | 5.6 | 1.3 |
| **LV** | : | : | : | : | 3.8 | 50.9 | 3.5 | 51.3 |
| **LT** | : | : | : | : | 4.1 | 26.1 | 4.4 | 21.5 |
| **MT** | : | : | : | : | 3.0 | 0.4 | 3.0 | 0.4 |
| **NL** | 313.2 | 89.0 | 315.9 | 90.0 | 318.5 | 91.8 | 339.5 | 101.2 |
| **PL** | : | : | : | : | 15.2 | 35.8 | 16.5 | 35.8 |
| **PT** | 40.7 | 14.0 | 43.8 | 12.6 | 42.8 | 14.7 | 43.1 | 15.9 |
| **RO** | : | : | : | : | 18.7 | 17.3 | 22.4 | 18.2 |
| **SI** | : | : | : | : | 7.7 | 3.1 | 8.8 | 3.3 |
| **FI** | : | : | 41.1 | 39.6 | 57.4 | 47.1 | 58.5 | 48.0 |
| **SE** | : | : | 86.8 | 72.5 | 88.6 | 72.9 | 90.6 | 76.8 |
| **UK** | 295.0 | 263.5 | 316.3 | 256.7 | 323.8 | 231.9 | 342.4 | 230.6 |
| **IS** | : | : | : | : | 3.2 | 1.8 | 3.4 | 1.9 |
| **NO** | : | : | : | : | 62.8 | 124.0 | 64.9 | 133.3 |

*Source:* Eurostat (Transport)

The share of unloaded goods in the total volume of goods handled in ports varied however sometimes widely between Member States. 16 of the EU-25 Member States (with maritime ports), together with Bulgaria and Romania, unloaded more than they loaded. Of these countries the share of unloaded goods was as much as 87 % in Malta, 82 % in Cyprus and 77 % in the Netherlands, and as little as 55 % or less in Finland, Denmark and Sweden.

The other four Member States (Latvia, Estonia, Lithuania and Poland on the Baltic Sea) as well as Norway loaded more than they unloaded. In Latvia and Estonia the amount loaded was over 14 times and 10 times respectively the amount unloaded. With regard to Norway and the three Baltic States, this balance is mainly due to oil exports, while for Poland it mainly reflects exports of dry bulk goods (see page 100, Figure 5.17).

The total volume handled in the EU-25 rose from 3.4 to 3.5 billion tonnes between 2003 and 2004 (+3.3 %), with increases being recorded in most Member States. The most important increases were recorded by Slovenia (+12 %), Spain (+9 %) and the Netherlands (+7 %). Five Member States showed decreases, with Lithuania recording the largest decline (-14 %).

Looking at the wider timespan of 1997-2004, and of those countries with data available, Denmark was the only one recording a fall in the volume handled (-19 %), a trend which can mainly be explained by declines in the transport of coal and of road goods vehicles, following the opening of the Great Belt and Øresund bridges. On the other hand, the highest increases which were recorded for Greece and Finland reflect improved statistical coverage.

As the country with a coastline measuring around 12 400 km it is perhaps not surprising that the United Kingdom was the largest handler in 2004, with 573 million tonnes passing through its ports (over 16 % of the EU total). Three other Member States followed with shares of over 10 %: Italy (14 %), the Netherlands (13 %) and Spain (11 %).

**Table 5.17** Maritime transport: top 15 ports (on the basis of gross weight of goods handled), 1997-2004 (in million tonnes)

| Rank 2004 | 1997 | | Rank 2004 | 2002 | | Rank 2004 | 2003 | | Rank 2004 | 2004 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Rotterdam (NL) | 303.4 | 1 | Rotterdam (NL) | 302.7 | 1 | Rotterdam (NL) | 307.4 | 1 | Rotterdam (NL) | 330.9 |
| 2 | Antwerp (BE) | 104.6 | 2 | Antwerp (BE) | 113.9 | 2 | Antwerp (BE) | 126.1 | 2 | Antwerp (BE) | 135.5 |
| 4 | Marseille (FR) | 92.9 | 4 | Marseille (FR) | 89.2 | 3 | Hamburg (DE) | 93.6 | 3 | Hamburg (DE) | 99.5 |
| 6 | Le Havre (FR) | 58.2 | 3 | Hamburg (DE) | 86.7 | 4 | Marseille (FR) | 92.4 | 4 | Marseille (FR) | 90.8 |
| 9 | London (UK) | 55.7 | 6 | Bergen (NO)* | 85.3 | 5 | Bergen (NO) | 76.4 | 5 | Bergen (NO) | 75.6 |
| 8 | Tees & Hartlepool (UK) | 51.2 | 7 | Le Havre (FR) | 63.8 | 6 | Le Havre (FR) | 67.4 | 6 | Le Havre (FR) | 71.9 |
| 7 | Grimsby & Immingham (UK) | 48.0 | 8 | Grimsby & Immingham (UK) | 55.7 | 7 | Grimsby & Immingham (UK) | 55.9 | 7 | Grimsby & Immingham (UK) | 57.6 |
| 22 | Forth (UK) | 43.1 | 9 | London (UK) | 51.2 | 8 | Tees & Hartlepool (UK) | 53.8 | 8 | Tees & Hartlepool (UK) | 53.8 |
| 11 | Amsterdam (NL) | 36.9 | 11 | Tees & Hartlepool (UK) | 50.4 | 9 | London (UK) | 51.0 | 9 | London (UK) | 53.3 |
| 12 | Dunkerque (FR) | 36.4 | 15 | Amsterdam (NL) | 48.5 | 10 | Algeciras (ES) | 48.3 | 10 | Algeciras (ES) | 52.6 |
| 16 | Milford Haven (UK) | 34.5 | 13 | Genova (IT) | 44.4 | 13 | Genova (IT) | 46.9 | 11 | Amsterdam (NL) | 49.9 |
| 10 | Algeciras (ES) | 34.2 | 12 | Dunkerque (FR) | 44.3 | 12 | Dunkerque (FR) | 45.8 | 12 | Dunkerque (FR) | 46.4 |
| 17 | Southampton (UK) | 33.1 | 22 | Trieste (IT) | 43.7 | 15 | Bremen und Bremerhaven (DE) | 42.5 | 13 | Genova (IT) | 45.9 |
| 37 | Sullom Voe (UK) | 32.1 | 10 | Algeciras (ES) | 42.2 | 11 | Trieste (IT) | 41.6 | 14 | Bremen und Bremerhaven (DE) | 45.4 |
| 24 | Liverpool (UK) | 30.8 | 14 | Forth (UK) | 42.2 | 14 | Amsterdam (NL) | 40.8 | 15 | Wilhelmshaven (DE) | 45.0 |

*Source:* Eurostat (Transport)

* Bergen (NO) started reporting in 2002.

## Port of Rotterdam largest handler

Individual ports can play a major role in maritime cargo handling, as illustrated in Table 5.17. Given the Netherlands' importance in maritime cargo generally and more specifically for crude oil within the EU, it is perhaps not very surprising that Rotterdam ranks first, processing a volume of nearly 331 million tonnes in 2004. The gross weight handled was nearly 2.5 times that processed by the EU's second-ranking port Antwerp in Belgium, or as much as the gross weight handled by Antwerp, Hamburg (third place) and Marseille (fourth place) combined. Most of the transhipment involves bulk goods such as oil, chemicals, coal and ores. In addition, Rotterdam is Europe's leading port handling containers (see page 101). The port plays an important role in the export of products to overseas and intercontinental destinations such as the United States and the Far East.

Between 1997 and 2004, Rotterdam and Antwerp maintained their respective first and second positions throughout the period (not all years shown). Readers will also note that the Norwegian port of Bergen has ranked fifth since 2002 (when reporting began), essentially due to high volumes of oil transported.

Looking at percentage changes over time, the port of Algeciras displays the highest increase (+54 %) lifting it to tenth place by 2004. This increase was followed by growths in Bremen/Bremerhaven and Hamburg of +48 % and +43 % respectively. Of the cargo handled by these ports, more than half of it was large containers, and as much as 62 % in the case of Bremen/Bremerhaven (see Table 5.22). Of the ports registering declines, Trieste (not in the top-15 in 2004) saw its cargo decrease most (-11 %). It was followed by London (-4 %) - due to the closure of a major oil terminal - and Marseille (-2 %).

# Inland navigation most important along the Rhine axes

In 2005, over 265 million tonnes of goods were forwarded by inland navigation in international transport, based on data for goods unloaded (Table 5.18).

For some Member States, inland navigation is clearly an important mode of international transport, particularly in north-western Europe. Located on or near the Rhine axes, Germany, France and the Benelux countries generated 95 % of EU inland shipping in 2005, with considerable loads being transhipped in large seaports such as Rotterdam, Antwerp or Hamburg.

The non-negligible volumes performed by Member States such as Austria, Hungary and Bulgaria reflect their location on the Danube axes which connects with the Rhine via the Rhine-Main-Danube canal and stretches as far as the Black Sea.

Between 2004 and 2005, international inland navigation transport grew by 6 % in the EU, an average which masks growth of as much as 52 % growth (in Poland) and contraction of as much as 33 % in Luxembourg. Whereas Germany, the largest forwarder (with a 39 % share), registered a slight contraction, Belgium and the Netherlands, second and third most important forwarders respectively, posted growths of 12 % and 13 % respectively.

**Table 5.18** **International transport by inland waterways, based on tonnes unloaded, available Member States, 1990-2005 (in 1000)**

| | 1990 | 2000 | 2004 | 2005 | % change 2004-2005 |
|---|---|---|---|---|---|
| **EU-25** | : | : | **250 124** | **262 566** | 5% |
| **BE** | 46 673 | 53 354 | 66 610 | 74 839 | 12% |
| **CZ** | : | 485 | 303 | 372 | 23% |
| **DE** | 98 766 | 109 349 | 105 109 | 103 182 | -2% |
| **FR** | 12 151 | 12 692 | 14 394 | 14 312 | -1% |
| **LU** | 1 141 | 1 195 | 1 249 | 834 | -33% |
| **HU** | : | : | 1 859 | 1 525 | -18% |
| **NL** | 52 865 | 50 320 | 53 929 | 60 756 | 13% |
| **AT** | : | 5 450 | 6 072 | 6 070 | 0% |
| **PL** | : | : | 386 | 588 | 52% |
| **SK** | : | - | 213 | 88 | -59% |
| **BG** | : | : | 3 033 | 2 944 | -3% |
| **RO** | : | : | 2 954 | 2 942 | 0% |

*Source:* Eurostat (Transport)

## River Information Services (RIS) to boost inland waterway freight transport

The European Commission recognises the vast potential of inland navigation as an alternative transport mode for freight transport. And River Information Services (RIS) offer an important system component in order to tap this potential. Through RIS, waterways can connect to the latest logistic developments, which offer reliable and predictable logistic supply chains. Inland shipping will become not only faster and more efficient, but also safer.

RIS streamlines information exchange between public and private parties participating in inland waterborne transport. The information is shared on the basis of information and communication standards, and used in different applications and systems for enhanced traffic or transport processes. In fact, implementation of communications and information technologies in organisational and operational processes is a crucial prerequisite to increase operational efficiency and safety in today's market.

RIS facilitates inland waterway transport organisation and management. Through effective information exchange, transport operations (such as trip schedules and terminal/lock operation plans) could easily be optimised, providing advantages for inland navigation and enabling it to be integrated into intermodal logistic chains.

Benefits also flow of course for statistics: RIS can be used to collect relevant inland waterway freight statistics. Since data already collected for other services can be used, then skippers, terminal and lock operators no longer need to provide special statistics. Electronic data collection will facilitate the process for data providers and statistical offices. Such statistics are evidently of interest to waterway authorities, international organisations, as well as of course companies engaged in inland navigation for strategic planning and monitoring.

*For more information, see the brochure on River Information Services available at: http://ec.europa.eu/transport/iw/index_en.htm*

## 5.1.4 Transport by type of commodity

So far up until now, the focus has been on general flows of goods, without any attention paid to the types of goods actually transported. Yet no analysis of goods transport and the various transport modes used can be complete without looking at what goods are transported and their relative importance. Such details can help policy-makers to look at ways of rebalancing transport modal shares, by exploiting the potential of railway and waterway transport for instance.

### What types of goods are transported?

The information presented within most of this section is limited to the 10 chapters of the NST/R classification* 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. The 10 chapters consist of 24 groups of goods (see below).

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 manufactured minerals, building materials
7 Fertilisers
8 Chemicals
9 Machinery, transport equipment, manufactured and miscellaneous articles

*For detailed information on the NST/R classification, please refer to 'Ramon', Eurostat's Classification Server (http://ec.europa.eu/eurostat/ramon/).*

* *Standard Goods Nomenclature for Transport Statistics / Revised.*

What is the relative importance of different types of goods in the various transport modes? Tables 5.19 (total transport), 5.20 (national transport) and 5.21 (international) show volumes of goods transported based on the 10 chapters of the NST/R classification (see box). Data are shown for road, railway and inland waterway transport based on an aggregate of 10 Member States for which data were consistently available (see footnote under tables for exact country coverage).

While this country coverage may appear relatively small, it offers a good indication nonetheless of the relative distribution by NST/R chapter. In addition, although data for railway transport are for 2002, while data for road and inland waterway transport are for 2004, railway goods transport remains fairly stable over time, thus again upholding the indicative value of this distribution.

Readers should note of course that the different country coverage and the exclusion of pipelines mean that any totals will not equal those given for the EU-25 as a whole in earlier sections.

**Table 5.19 Total goods transport (national and international), by group of goods (NST/R chapter), aggregate of available data*, 2004 (million tonnes)**

| | NST/R chapters | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total | % share |
| Road | 758 | 1 081 | 65 | 396 | 132 | 330 | 4 904 | 133 | 517 | 1 903 | 10 221 | 91% |
| Rail** | 33 | 15 | 67 | 39 | 54 | 94 | 74 | 10 | 35 | 115 | 535 | 5% |
| Inland waterways | 16 | 25 | 49 | 80 | 51 | 16 | 143 | 11 | 34 | 43 | 469 | 4% |
| Total | 807 | 1 121 | 182 | 514 | 238 | 440 | 5 121 | 154 | 586 | 2 062 | 11 225 | 100% |
| % share | 7% | 10% | 2% | 5% | 2% | 4% | 46% | 1% | 5% | 18% | 100% | |

*Source:* Eurostat (Transport)

*Aggregate covers the following countries: BE, DK, DE, ES, FR, IT, LU, NL, AT and PT.
**2002 data.

Based on the three inland modes of road, rail and inland waterways, the transport of 'crude and manufactured minerals and building materials' (Ch. 6) accounted for close to 46 % of total goods transported, making it the most important of the 10 goods categories (Table 5.19). This was three times as much as the share of 'Machinery, transport equipment and other manufactured and miscellaneous articles' (Ch. 9) which amounted to over 18 %. Readers should note that 'miscellaneous articles' include containers of which the content is not always known, and which have grown in importance.

Interestingly, while 'crude and manufactured minerals and building materials' (Ch. 6) was the largest category in road and inland waterway transport (4 904 and 143 million tonnes respectively), 'Machinery, transport equipment and other manufactured and miscellaneous articles' (Ch. 9) was the largest goods category in rail transport.

## Importance of goods varies between national and international freight...

The importance of a goods category can vary between national and international freight, which reflects the appropriateness of goods for international trade or local sourcing and supply. 'Crude and manufactured minerals and building materials' (Ch. 6) was the largest group of goods forwarded in national freight, accounting for 49 % of total goods moved and 'Machinery, transport equipment and other manufactured and miscellaneous articles' (Ch. 9) was, with a 17 % share, the second largest group (Table 5.20).

When looking at international freight, however, a different pattern emerges in which these two groups of goods exchange ranks (Table 5.21): 'machinery, transport equipment, manufactured and miscellaneous articles' (Ch. 9) was the most important group (with a share of over 31 %), while 'crude and manufactured minerals and building materials' (Ch. 6) was second most important (with a share of just above 13 %). Similar changes in position can be observed for some other groups of goods.

This change in position can most probably be explained by the fact that 'crude and manufactured minerals and building materials' tend to be sourced as locally as possible, making their importance in national freight far more important, whereas as 'machinery, transport equipment and other manufactured and miscellaneous articles' are more important in international trade. Reasons such as these most likely explain the freight shares in other categories of goods too.

**Table 5.20** National goods transport, by group of goods (NST/R chapter), aggregate of available data*, 2004 (million tonnes)

| | NST/R chapters | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total | % share |
| Road | 683 | 1 003 | 60 | 385 | 122 | 283 | 4 828 | 126 | 449 | 1 665 | 9 605 | 94% |
| Rail** | 20 | 12 | 52 | 33 | 38 | 67 | 64 | 8 | 25 | 61 | 381 | 4% |
| Inland waterways | 7 | 12 | 18 | 44 | 8 | 4 | 95 | 4 | 14 | 16 | 222 | 2% |
| Total | 710 | 1 027 | 130 | 463 | 168 | 354 | 4 987 | 139 | 488 | 1 742 | 10 207 | 100% |
| % share | 7% | 10% | 1% | 5% | 2% | 3% | 49% | 1% | 5% | 17% | 100% | |

*Source:* Eurostat (Transport)

*Aggregate covers the following countries: BE, DK, DE, ES, FR, IT, LU, NL, AT and PT.
**2002 data.

**Table 5.21** International goods transport, by group of goods (NST/R chapter) unloaded, aggregate of available data*, 2004 (million tonnes)

| | NST/R chapters | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Total | % share |
| Road | 76 | 78 | 5 | 10 | 10 | 47 | 76 | 7 | 69 | 238 | 616 | 61% |
| Rail** | 13 | 3 | 15 | 5 | 16 | 28 | 10 | 2 | 10 | 54 | 154 | 15% |
| Inland waterways | 9 | 13 | 31 | 36 | 44 | 12 | 48 | 7 | 20 | 27 | 247 | 24% |
| Total | 98 | 94 | 52 | 51 | 70 | 87 | 134 | 16 | 98 | 320 | 1 018 | 100.0% |
| % share | 10% | 9% | 5% | 5% | 7% | 9% | 13% | 2% | 10% | 31% | 100% | |

*Source:* Eurostat (Transport)

*Aggregate covers the following countries: BE, DK, DE, ES, FR, IT, LU, NL, AT and PT.
**2002 data.

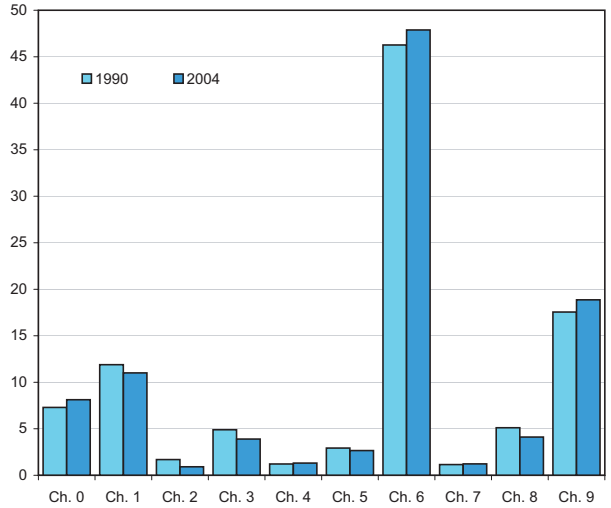
## ...and changes over time

Over time, some types of goods have become more important while others have declined. Readers should note here that unlike the three previous tables which were based on a common country dataset available for each mode, the following figures (Figures 5.8 to 5.16) are based on country datasets available according to transport mode and between reference years.

For example, the share of 'crude and manufactured minerals and building materials' (Ch.6) in national freight grew in road and rail transport (Figures 5.8 and 5.9 respectively). When it comes to international freight, however, the share declined over the same period in all three transport modes (Figures 5.11, 5.12 and 5.13).

Meanwhile, the share of 'machinery, transport equipment, manufactured and miscellaneous articles' (Ch. 9) grew much more in international freight than it did in national freight (Figure 5.11). For instance, while this goods category accounted for 32 % of international road freight in 1990, its share rose to 38 % by 2004. In rail and inland waterways too the share increased.

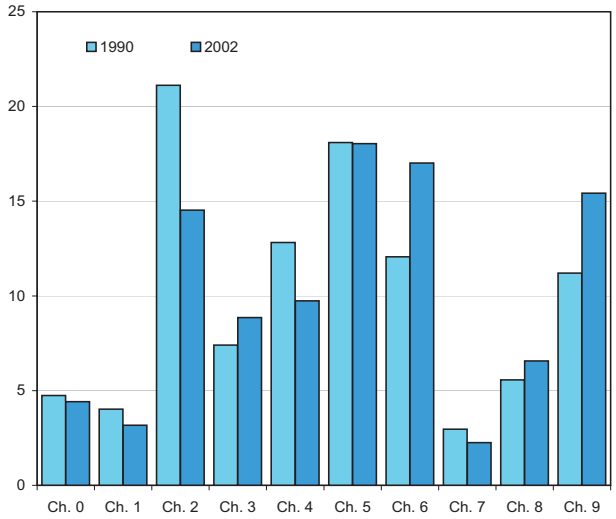
**Figure 5.8** **National road transport: importance of NST/R chapters in 1990 and 2004, country average* (in % of total goods transported)**




*Source:* Eurostat (Transport)

*Average based on the sum of tonnes forwarded by: BE, DK, DE, ES, FR, IE, IT, NL, PT and the UK.

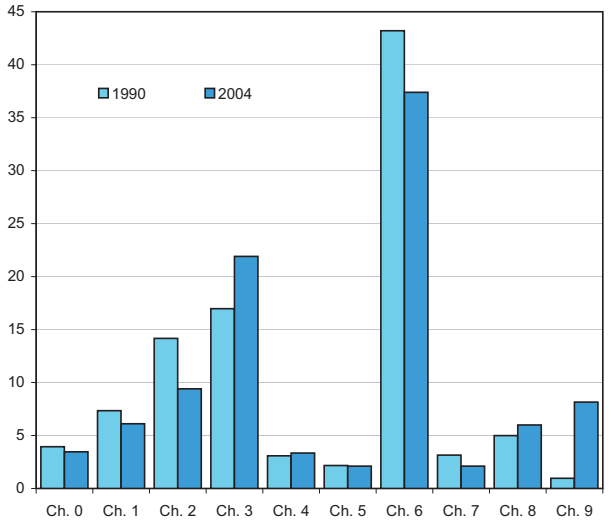
**Figure 5.9** **National rail transport: importance of NST/R chapters in 1990 and 2002, country average* (in % of total goods transported)**




*Source:* Eurostat (Transport)

*Average based on the sum of tonnes forwarded by: BE, DK, DE, EL, ES, FR, IT LU, NL and PT.

**Figure 5.10** **National inland waterway transport: importance of NST/R chapters in 1990 and 2004, country average* (in % of total goods transported)**



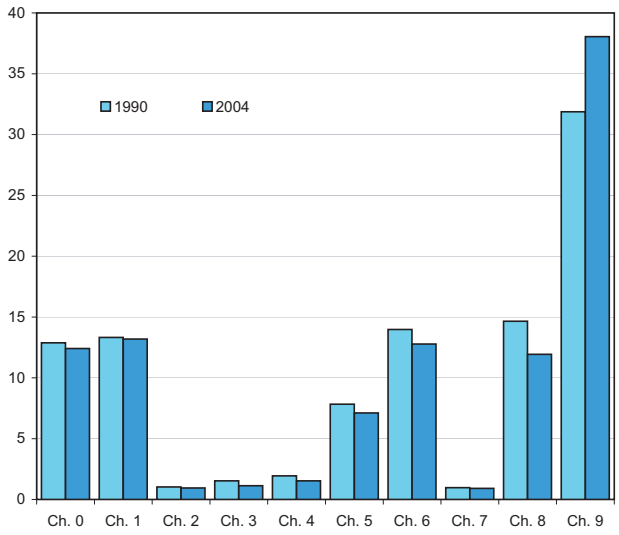

*Source:* Eurostat (Transport)

* Average based on the sum of tonnes forwarded by: BE, DE, FR and NL.

When looking at rail transport and inland waterways, there were notable differences in the importance of goods categories, pointing to the use of these modes for transporting bulk volumes, which are often low value-added products and for which delivery times are less urgent. In the case of inland waterway transport, for instance, pushed convoys of barges can carry freight volumes that would fill up several hundred lorries.

For example, 'petroleum products' (Ch. 3) and 'ores and metal waste' (Ch. 4) were far more important in international waterway transport, although their share declined from 1990. Also, compared with road and rail transport, the share of 'machinery, transport equipment and other manufactured articles' (Ch. 9) proportionally grew most in waterway transport, and notably in national inland waterway transport.

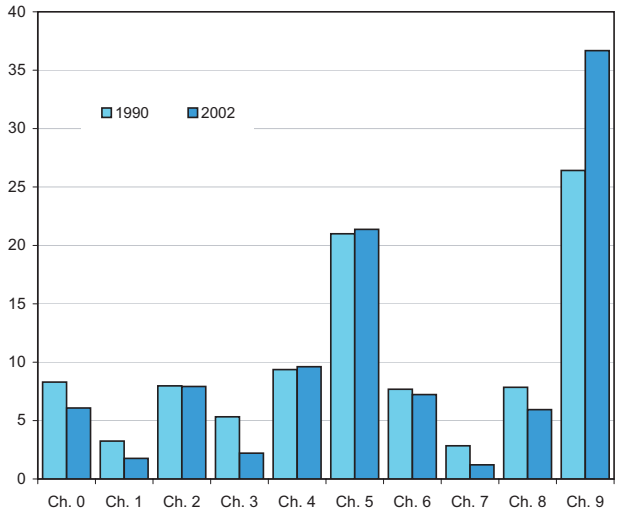
**Figure 5.11 International road transport: importance of NST/R chapters in 1990 and 2004, country average* (in % of total goods transported)**




*Source:* Eurostat (Transport)

*Average based on the sum of tonnes forwarded by: BE, DK, DE, ES, FR, IE, IT, NL, PT and the UK.

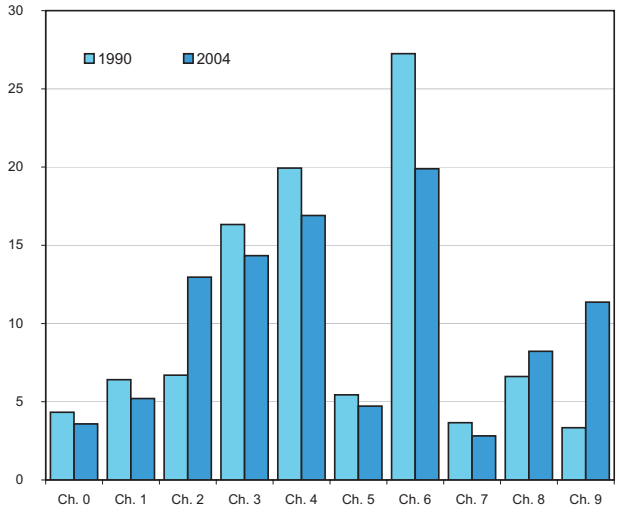
**Figure 5.12 International rail transport: importance of NST/R chapters in 1990 and 2002, country average* (in % of total goods transported)**




*Source:* Eurostat (Transport)

*Average based on the sum of tonnes forwarded by: BE, DK, DE, EL, ES, FR, IT LU, NL and PT.

**Figure 5.13 International inland waterway transport: importance of NST/R chapters in 1990 and 2004, country average* (in % of total goods transported)**




*Source:* Eurostat (Transport)

* Average based on the sum of tonnes forwarded by: BE, CZ, DE, FR, NL and AT.

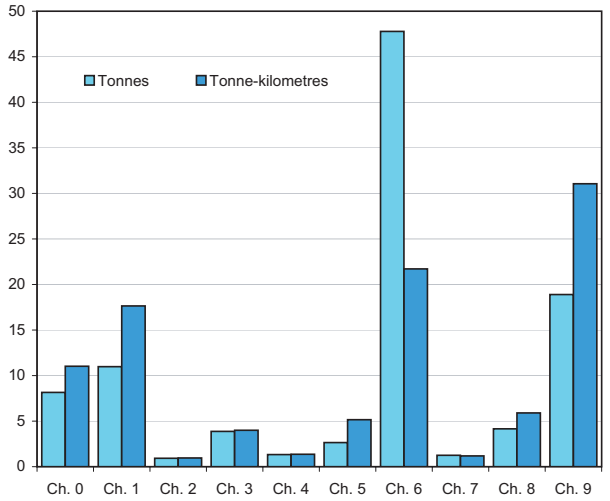
## Some products go far for their weight

Available data for national freight only make it possible to take distance travelled into account, which allows for comparative analysis (Figures 5.14 to 5.16). For instance, although 'crude and manufactured minerals and building materials' (Ch. 6) accounted for the heaviest volumes in road transport and inland waterways, and one of the heaviest in rail transport, the distance travelled - expressed in tonne-kilometres - was relatively short. This highlights the locally-sourced nature of this product at the national level as well.

This was most obvious in road transport where the share of this goods category in total tonne-kilometres performed (22 %) was less than half of the share in total volume forwarded (48 %). Moreover, this was the only goods category in road transport where this was the case: for others, either the opposite was true or there was not much difference. At the top of the goods categories travelling relatively far was 'metal products' (Ch. 5) where the ratio of tonne-kilometres to tonnes was 2 to 1.

Interestingly, the ratio between tonne-kilometres and tonnes was most often closer to 1 to 1 for goods categories in inland waterways, indicating that transport distance in national transport varies little between goods categories (Figure 5.16).

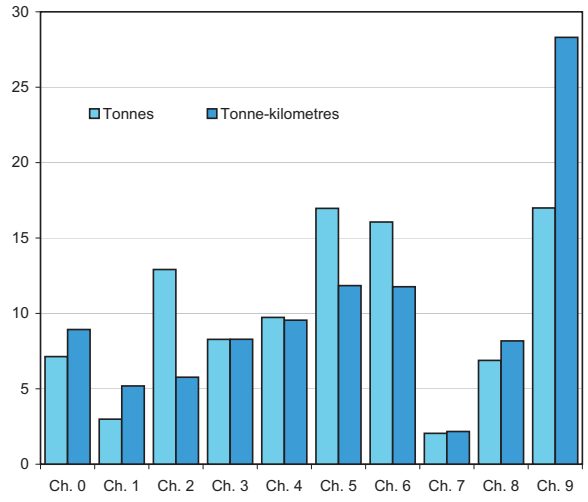
**Figure 5.14 Importance of NST/R chapters in national road transport, by weight and tonne-kilometres, EU-25*, 2004**




*Source:* Eurostat (Transport)

*Excluding EL and MT.

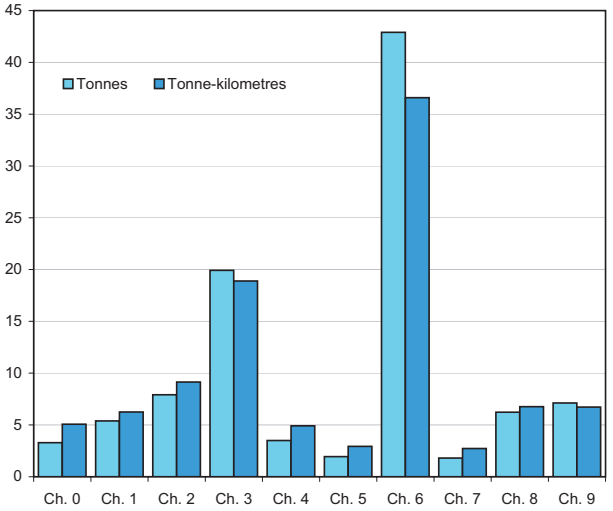
**Figure 5.15 Importance of NST/R chapters in national rail transport, by weight and tonne-kilometres, country average*, 2002**




*Source:* Eurostat (Transport)

* Average based on the sum of tonnes forwarded by: BE, DK, DE, EL, ES, FR, IT LU, NL, PT, AT and FI.

**Figure 5.16 Importance of NST/R chapters in national inland waterway transport, by weight and tonne-kilometres, country average*, 2004**




*Source:* Eurostat (Transport)

* Average based on the sum of tonnes forwarded by: BE, DE, FR, LU and NL.

## Bulk cargo accounts for two thirds of maritime cargo

In maritime transport, consistent data are available by type of cargo, which presents data according to a different classification compared with the NST/R goods chapters seen up until now.

In the EU-25 bulk cargo accounted for 66 % of the 3.4 billion tonnes handled (inwards and outwards) in the EU's main ports (handling over 1 million tonnes of cargo annually) (Figure 5.17).This comprised 41 % for liquid bulk (e.g. liquified natural gas, oil and chemicals) and 25 % for dry bulk (e.g. iron ore, coal, grain). Large freight containers were the third largest group, accounting for 16 % of total gross weight. It was followed by roll-on-roll-off units (11 %) and other miscellaneous cargo (7 %), a category including, among others, forestry, iron and steel products.

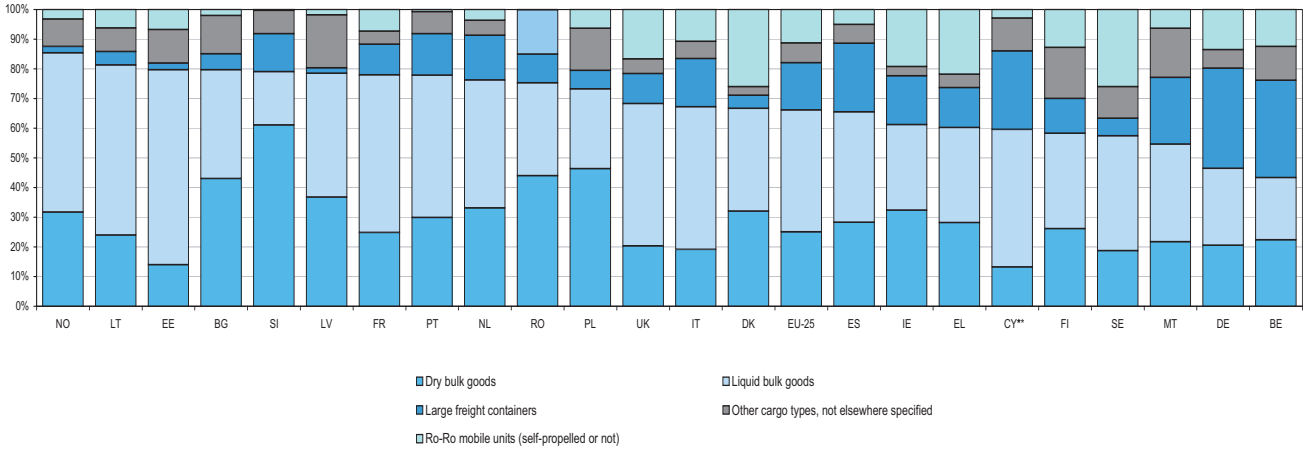
So much for the pattern at EU level: many Member States show national particularities. The share of liquid bulk goods reached as much as 66 % in Estonia, 54 % in Norway (due to the transport of North Sea oil), 57 % in Lithuania and 53 % in France. When it comes to dry bulk cargo handling, the largest shares could be found in Slovenia (61 %), reflecting the handling of ores and coal, and Poland (46 %), reflecting the handling of mainly coal. Of course, in terms of absolute volumes, the largest amounts were handled by the Netherlands, the UK and Spain (146, 114 and 106 million tonnes respectively).

When it comes to large container handling, Germany, Belgium and Cyprus stand out with this gross weight representing shares of 34 %, 33 % and 30 % respectively, around twice the EU average.

For countries featuring major car ferry services, the share of roll-on-roll-off mobile units was substantial in Sweden and Denmark (26 % each), Greece (22 %), Ireland (19 %) and in the UK (17 %), the Member State handling the highest weight with 93 million tonnes.

Other miscellaneous cargo reached the highest shares in Latvia, Finland and Malta (respectively 18 %, 17 % and 16 %).

**Figure 5.17 Gross weight of seaborne goods handled (inwards and outwards), by type of cargo, in main ports*, 2004 (in % of total cargo handled)**




*Source:* Eurostat (Transport)

*Main ports handling a gross weight of 1 million or more per year.
**2003 data.

## Countries specialised in different types of cargo handling

Looking at Member States' cargo handling shares in the EU-25 total (Table 5.22), the United Kingdom handled the largest shares in liquid bulk goods (19 %), and roll-on-roll-off mobile units (24 %), where it was 11 percentage points ahead of next-ranking Italy. These high shares can be explained by the importance of transport of North Sea oil for liquid bulk goods and of cargo services principally across the Channel and to Ireland and Northern Ireland in the case of roll-on-roll-off mobile units.

With regard to dry bulk goods, the Netherlands was the largest handler with a 16 % share, somewhat ahead of the UK, reflecting for instance the transport of coal and ores, and the easy access to an inland waterway network stretching into major industrial centres in the heart of Europe. Finally, when it came to handling large freight containers, Germany and Spain handled most (with around 16 % each).

Those were the top Member States, but what about the leading ports handling different types of cargo? With regard to container handling (data not shown), it was in fact the port of Rotterdam that handled the largest volume of containers, with a total of 8.2 million TEUs (twenty-foot equivalent units; a 20 foot ISO container). This volume was ahead of that handled by Hamburg (7 million TEUs) and, based on partial data, Antwerp (5.1).

**Table 5.22** **Top five handling Member States in seaborne cargo, by type of cargo, 2004 (in % of total EU gross weight handled in main ports*)**

| Large freight containers | | Dry bulk goods | | Liquid bulk goods | | Other cargo types, not elsewhere specified | | Ro-Ro mobile units | |
|---|---|---|---|---|---|---|---|---|---|
| Tonnes (million) | 537 | Tonnes (million) | 847 | Tonnes (million) | 1 391 | Tonnes (million) | 225 | Tonnes (million) | 383 |
| DE | 16% | NL | 16% | UK | 19% | IT | 12% | UK | 24% |
| ES | 16% | UK | 13% | IT | 16% | UK | 11% | IT | 13% |
| IT | 14% | ES | 12% | NL | 13% | ES | 10% | SE | 10% |
| NL | 12% | IT | 10% | FR | 12% | NL | 9% | DE | 9% |
| BE | 11% | FR | 9% | ES | 10% | BE | 9% | EL | 8% |

*Source:* Eurostat (Transport)

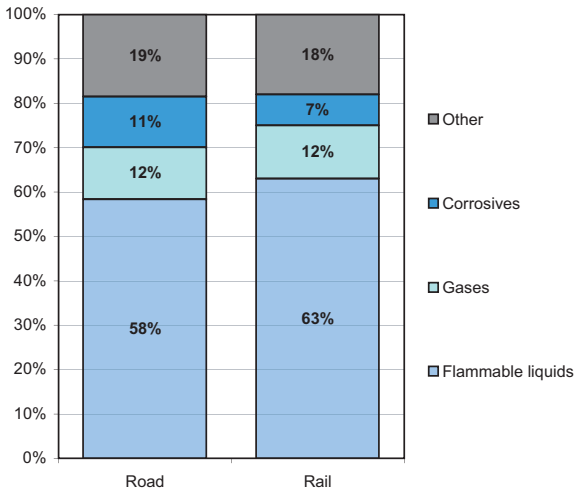
*Main ports handling a gross weight of 1 million or more per year.

## Dangerous goods travel too

Data on dangerous goods transport - currently just available for road and rail transport - show that dangerous goods accounted for about 4 % of total road freight tkm and for 14 % of total rail freight tkm in the EU-25 in 2005, highlighting the greater importance of the latter mode for dangerous goods transport. See also Chapter 6 on Transport safety.

Looking more closely at the types of goods transported, it is perhaps not surprising that flammable liquids (mostly consisting of hydrocarbons used for fuel - the lifeblood of much of transport), accounted for the largest shares of dangerous goods transported, based on tonne-kilometres. In 2005, flammable liquids accounted for 63 % in rail transport and for 58 % of dangerous goods transported in road transport (Figure 5.18). This was many times the next single largest product groups of gases (compressed, liquefied, dissolved under pressure) and corrosives (Figure 5.18). Other dangerous goods accounted for shares below 10 %: flammable solids, oxidizing and toxic substances and other dangerous goods.

**Figure 5.18** **Dangerous goods transport: share by group, EU-25, 2005 (in % of tonne-kilometres)**




*Source:* Eurostat (Transport)

# 5.2 PASSENGER TRANSPORT

## 5.2.1 General development

Efficient passenger transport systems are essential for both the European economy and people's quality of life. But while meeting the mobility requirements of citizens, they need to be sufficiently flexible to follow the evolution of transport demand. In the past half century, the demand for mobility has largely been satisfied by the increased use of private cars, which accounts today for the majority of trips.

The main factor behind the increased demand for mobility has been the geographical dispersion of economic activities with a clear trend towards moving away from traditional older urban centres. This has meant a separation of the place of work and residential areas, leading to an increase in commuting; an increasing number of households where at least two family members work at distinct locations other than the place of residence; the rapid growth of the services sector with demands for the mobility of professionals; a higher average disposable income resulting in a higher level of car ownership; increased leisure time resulting in more holiday journeys and recreational trips.

**Table 5.23 Passenger transport performance*, by transport mode, EU-25, 1995-2004 (in billion passenger-kilometres)**

| | Passenger cars | Power. two-wheel. | Bus & Coach | Railway | Tram & Metro | Air | Sea | Total |
|---|---|---|---|---|---|---|---|---|
| **2004** | *4 458* | *143* | *502* | 352 | *75* | *482* | *49* | ***6 061*** |
| **2003** | *4 399* | *140* | *493* | 347 | *73* | *454* | *49* | ***5 956*** |
| **2002** | *4 370* | *136* | *489* | 351 | *72* | *435* | *50* | ***5 903*** |
| **2001** | *4 277* | *135* | *493* | 355 | *71* | *441* | *50* | ***5 823*** |
| **2000** | *4 196* | *132* | *492* | 353 | *71* | *440* | *49* | ***5 734*** |
| **1995** | *3 787* | *120* | *474* | 324 | 65 | *324* | *55* | ***5 149*** |
| **% change 1995-2004** | 17.7% | 19.7% | 5.8% | 8.6% | 16.4% | 48.8% | -11.1% | **17.7%** |
| **% annual change** | 1.8% | 2.0% | 0.6% | 0.9% | 1.7% | 4.5% | -1.3% | **1.8%** |
| **% change 2003-2004** | 1.3% | 2.2% | 1.8% | 1.2% | 2.9% | 6.3% | -0.8% | **1.8%** |

*Source:* DG Energy and Transport

*Air and Sea: only domestic and intra-EU-25 transport; data under revision

## Rail performs much more in Japan

Table 5.24 Comparative transport performance of the EU-25, United States and Japan by transport mode*, 2004

| | EU-25 | | | United States | | | Japan*** | | |
|---|---|---|---|---|---|---|---|---|---|
| | pkm (billion) | modal share | 1000 pkm per inhab. | pkm (billion) | modal share | 1000 pkm per inhab. | pkm (billion) | modal share | 1000 pkm per inhab. |
| **Passenger car** ** | 4 458.1 | 76% | 9.8 | 7 165.0 | 86% | 24.4 | 755.0 | 58% | 5.9 |
| **Bus / coach** | 501.8 | 9% | 1.1 | 226.0 | 3% | 0.8 | 86.0 | 7% | 0.7 |
| **Railway** | 351.7 | 6% | 0.8 | 22.0 | 0.3% | 0.1 | 385.0 | 29% | 3.0 |
| **Waterborne** | *49.0* | 1% | 0.1 | 1.0 | 0.01% | 0.0 | 4.0 | 0.3% | 0.0 |
| **Air (domestic / intra-EU-25)** | 482.5 | 8% | 1.1 | 896.0 | 11% | 3.1 | 83.0 | 6% | 0.7 |
| **Total** | **5 843.0** | **100%** | **12.8** | **8 310.0** | **100%** | **28.3** | **1 313.0** | **100%** | **10.3** |

*Source:* DG Energy and Transport

*Excluding powered two-wheelers,trams and metros.
** For the United States includes light trucks/vans; For Japan includes light vehicles.
***2003 data.

When comparing passenger transport performance between the EU-25, the United States and Japan (based on data for modes available between all three), a number of differences emerge, with the EU-25's performance often situated between these two countries (Table 5.24).

Whereas the importance of car passenger transport in the EU-25 was less important than that in the USA, it was nevertheless ahead of Japan's comparatively low performance. In Japan, car passenger transport amounted to a modal share of 58 % and a ratio of 5 900 pkm per inhabitant. By contrast, the EU-25 and the USA recorded modal shares of 76 % and 86 % and ratios of 9 800 pkm and 24 400 pkm per inhabitant respectively. The EU-25 was closer to the USA in terms of modal share (with a difference of 10 percentage points) but closer to Japan in terms of pkm per inhabitant (with a difference of close to 4 000 pkm).

When it came to railways however, EU-25 performance was far greater than that of the USA, but still far below Japan's comparatively high performance. Whereas in Japan, rail accounted for a modal share of 29 % and a ratio of 3 000 pkm per inhabitant, in the EU-25 these values were 6 % and 800 pkm respectively, values which were however much more important than those in the USA (0.3 % and 100 pkm).

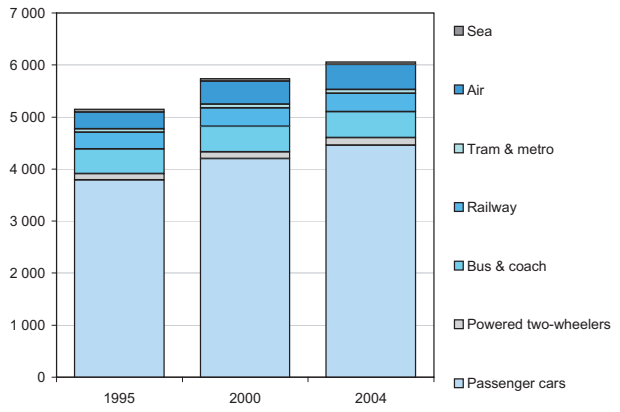
Looking at the other transport modes (available for comparison), bus and coach travel together with waterborne transport (mostly sea) were comparatively most important in the EU-25. For air transport, performance in the EU-25 was again between Japan and the USA.

## Passenger transport demand up 18 % between 1995 and 2004

As shown in Table 5.23 (page 102), in 2004 (the latest year for which passenger-kilometre data are available), transport demand in the EU-25 (comprising transport by passenger cars, powered two-wheelers, buses and coaches, railways, subways, tram and metro, together with estimates for air and sea transport) was estimated to be over six thousand billion passenger-kilometres (pkm). This represented an increase of close to 18 % on 1995 figures (5 149 billion pkm).

Passenger cars accounted for 73.5 % of the passenger transport performed in 2004, buses and coaches 8.3 %, air (intra-EU and domestic only) 8 %, railways 5.8 %, with the remaining shares accounted for by powered two-wheelers (2.4 %) and trams and metros (1.2 %) and sea (0.8 %). See Figure 5.19.

**Figure 5.19 Relative importance of transport modes in passenger trips, EU-25, 1995-2004 (in billion passenger-kilometres)**




*Source:* DG Energy and Transport

Note Air and sea: data for pkm only include intra-EU traffic and are estimates: based on port-to-port data collected under Council Directive 95/64/EC and on airport-to-airport data collected under Regulation (EC) 437/2003.

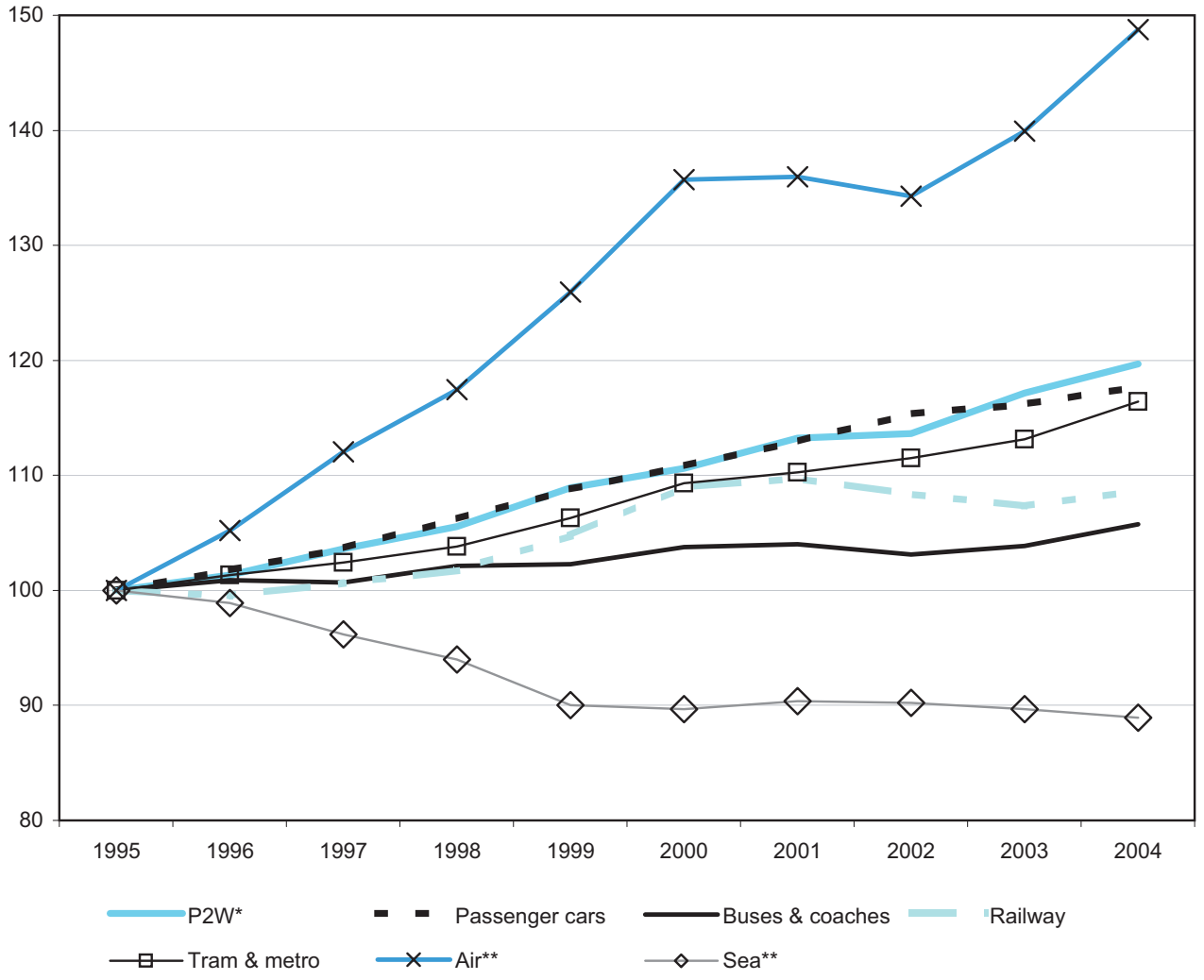
## Air transport rises fastest

Over the 1995-2004 period, the largest gain was recorded by air transport (intra-EU and domestic only): close to 49 %, a rise which increased its modal share of from 6.3 % to 8 % by 2004 (Figures 5.19 and 5.20). This upward climb seems to have only been partially affected by the events of September 11 2001, as can be seen from the small drop recorded between 2001 and 2002. However, readers should recall that air transport here concerns intra-EU and domestic only, where the impact was not as hard as in international air transport.

Air transport's rise was followed by powered two-wheelers (19.7 %), passenger cars (17.7 %) and trams and metros (16.4 %). The only mode to register a decrease was sea transport (-11.1 %).

The smaller increases in buses and coaches (5.8 %) and railways (8.6 %), given their smaller relative weights in passenger-kilometres performed, were not enough to secure their modal shares: both registered the largest relative losses of modal share (of 0.9 points and 0.5 points respectively).

**Figure 5.20** **Evolution of passenger transport in the EU-25, 1995-2004, on the basis of passenger-kilometres performed (1995 = 100)**




*Source:* DG Energy and Transport

* 'P2W': Powered two-wheelers.
**Air and Sea: only domestic and intra-EU-25 transport; data under revision

# Passenger cars as much as 90 % and as little as 60 % of the land modal share

Looking at individual countries, and limiting the analysis to land transport - i.e. passenger cars, buses and coaches, railways and tram and metro (excluding powered two-wheelers) - passenger cars accounted for as much as 90 % of the passenger-kilometres performed in Slovenia, against an EU average of 83 % (Table 5.25). This is all the more remarkable since, as one of the Member States to join the EU in 2004, most of the latter displayed below-average shares, indicating the importance of other, typically public transport modes.

Indeed, the passenger-car share was as little as 60 % in Hungary, where the share of railways in passenger-kilometres performed was the largest (13 %). Hungary also displayed the third largest share of buses and coaches (23.6 %) after Cyprus (26 %) and Malta (24.4 %), countries where this was the only other mode of transport. With regard to tram and metro, the share of this land transport mode went up to as much as 9 % in the Czech Republic.

**Table 5.25** **Land modal split of motorised passenger transport*, based on passenger-kilometres performed, by country, 2004 (in %)**

| | Passenger cars | Buses and Coaches | Railways | Tram & Metro |
|---|---|---|---|---|
| **EU-25** | *82.8* | *9.3* | *6.5* | *1.4* |
| **BE** | *80.8* | *12.3* | *6.3* | *0.7* |
| **CZ** | *68.9* | *15.5* | *6.7* | *8.9* |
| **DK** | *81.8* | *9.9* | *8.0* | *0.2* |
| **DE** | *84.8* | *6.6* | *7.1* | *1.5* |
| **EE** | *77.7* | *20.0* | *1.6* | *0.8* |
| **EL** | *73.3* | *23.3* | *1.8* | *1.6* |
| **ES** | *81.7* | *12.3* | *4.7* | *1.3* |
| **FR** | *85.1* | *4.9* | *8.6* | *1.4* |
| **IE** | *75.3* | *19.7* | *4.8* | *0.2* |
| **IT** | *82.5* | *11.5* | *5.3* | *0.7* |
| **CY** | *73.8* | *26.2* | - | - |
| **LV** | *72.9* | *19.1* | *5.6* | *2.4* |
| **LT** | *86.3* | *12.3* | *1.5* | - |
| **LU** | *85.6* | *10.8* | *3.6* | - |
| **HU** | *60.1* | *23.6* | *13.2* | *3.1* |
| **MT** | *75.6* | *24.4* | - | - |
| **NL** | *84.3* | *6.7* | *8.1* | *0.9* |
| **AT** | *75.1* | *13.8* | *7.8* | *3.2* |
| **PL** | *77.4* | *12.8* | *7.9* | *1.9* |
| **PT** | *81.4* | *13.1* | *4.5* | *1.0* |
| **SI** | *90.2* | *5.5* | *4.3* | - |
| **SK** | *70.0* | *22.7* | *6.4* | *0.9* |
| **FI** | *84.1* | *10.5* | *4.6* | *0.7* |
| **SE** | *83.0* | *7.6* | *7.6* | *1.7* |
| **UK** | *87.2* | *6.2* | *5.5* | *1.1* |

*Source:* DG Energy and Transport

*Excluding powered two-wheelers. If powered two-wheelers are included they would account for 2.6% of the resulting modal split, thereby reducing the share of other modes, and most notably passenger cars (which would have a modal share of 80.6 %).

## Men use a private car more than women

Based on data from national Time Use Surveys in a collection of countries*, women and men aged 20 to 74 spend on average between 1 and 1½ hours per day travelling to work and during work, to school, on domestic tasks and free time. However, the relative importance of transport modes differs from one country to another and between women and men.

Half or more of travel time is spent in a car in Belgium, Germany, Italy, Finland, Sweden, United Kingdom, Norway and Slovenia. The largest shares of travel time on foot are recorded in Latvia, Poland and Lithuania. Public transport seems to be used most in Hungary and Estonia.

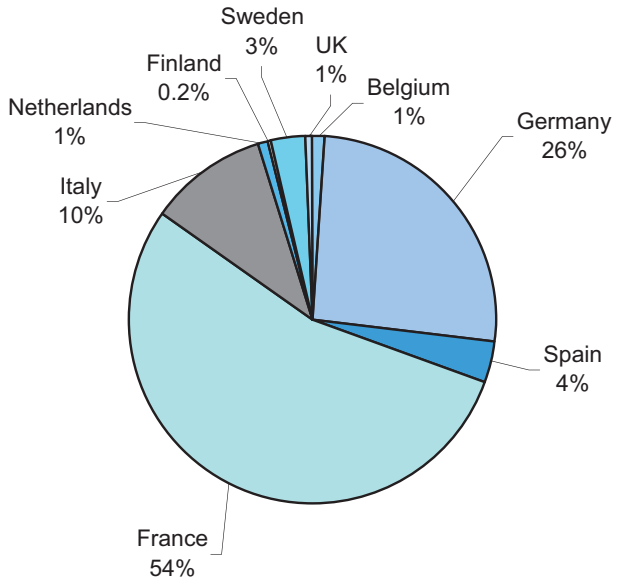
Men use a private car more than women, in particular in Estonia, Latvia, Lithuania, Hungary and Poland. Women however spend larger shares of their time on public transport, walking or cycling.

**BE, DE, EE, IT, LU, LT, HU, PL, SI, FI, SE, UK and NO; surveys conducted between 1998 and 2004 according to country.*

*For more information, see Statistics in focus, 'How is the time of women and men distributed in Europe?', Population and Social conditions, 4/2006, available at: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-NK-06-004/EN/KS-NK-06-004-EN.PDF*

# High speed rail accounted for over a fifth of rail transport passenger-kilometres in 2004

**Figure 5.21** **Major contributors to high-speed rail passenger-kilometres*, 2004**




*Source:* Energy and Transport

*Including performance on upgraded high-speedlines ('non-dedicated' high-speed lines).

Of the 352 billion passenger-kilometres performed by railways in 2004, high-speed rail accounted for over a fifth of the total, at over 76 billion pkm. This was more than twice the 1995 figures of 33 billion pkm and five times the 1990 figures (15 billion pkm). However, readers should interpret these data with caution: definitions of high speed rail can vary among Member States. It should also be noted that upgraded high speed lines ('non-dedicated' high speed lines) are also included in these Figures.

With a share of 54 %, France was the largest contributor to the EU total (Figure 5.21). In fact, generating 41.5 billion pkm, high-speed rail accounted for 56 % of France's total rail performance, the highest share among the nine Member States with high-speed rail performances. Germany and Sweden followed with a high-speed rail share of 27 % each (data not shown).

## Urban congestion charging: one promising option

To counter congestion and other (environmental, safety...) problems caused by urban traffic, more and more European cities are developing traffic-control systems. The Norwegian cities of Oslo, Bergen and Trondheim were the first to introduce a congestion charging scheme in the 1990s, while Rome introduced limited access to the city centre by specific groups of drivers who pay for access permits. In 2003 a high-tech congestion charging system was launched in London. Other examples are taking root.

According to a report from Transport For London, congestion levels in the charging zone are on average 26% lower compared with 2002, before the scheme was introduced. Typical delay values in 2005 were 1.8 minutes per kilometre, compared with 2.3 minutes per kilometre in 2002. The UK's national environmental transport body, Transport 2000, claim that during charging hours 65,000 fewer car movements per day are being made into or through the zone.

Among other data reported, vehicle emissions have been cut down: $CO_2$ (-16%), Nitrogen Oxide (-13%) and Particulate Matter (-15 %). See Chapter 7.

The Commission will, in September 2007, adopt a Green Paper on urban transport to look into the best way to deal with the growing congestion and pollution problems in European cities.

*For more information, visit: http://ec.europa.eu/transport/clean/index_en.htm and http://www.tfl.gov.uk/*

## 5.2.2 National passenger transport

National passenger transport performances vary around the EU when looking at the modal split and the daily performance. Since passenger transport by inland waterways does not play a significant role, except perhaps at local level such as for instance in and around Venice, the following paragraphs offer a first insight on the national particularities of the four main motorised inland transport modes (passenger cars, buses and coaches, railways and trams and metros).

Furthermore, it should be noted that the tables indicating the passenger-kilometres performed apply to those on national territory, which thus includes the national legs of international trips.

## Passenger car performance up 16 %

Transport performance by car totalled an estimated 4 458 billion pkm in the EU-25 in 2004 (Table 5.26), with the largest Member States contributing most, led by Germany (with a 19 % share). Readers should note however that for passenger car transport any comparison between countries should only be regarded as indicative due to different methods in collecting the data as well as in how estimates are made.

As could be expected, transport performances developed particularly fast in Member States where car ownership has developed rapidly, and in some cases in those where road networks have grown fast. Looking at the 1995-2004 period, performances rose fastest in Lithuania (158 %), Latvia (112 %) and Greece (84 %), against an EU-25 average of 18 %.

So much for absolute volumes; a more interesting picture is obtained when looking at the average number of kilometres per EU inhabitant. In 2004, an estimated 9 748 km were clocked up by person in the EU-25. However, this average was exceeded in ten Member States, reaching as much as around 13 500 pkm in Luxembourg, which was followed by Italy and France, with around 12 400 pkm and 12 200 pkm per person respectively). When looking beyond the EU, however, Iceland recorded an even higher value with 14 802 pkm per person. This contrasts with Member States where car usage is clearly less important, among which Malta ranks first with around 3 900 pkm performed per person.

**Table 5.26** **Transport performed by passenger cars, 1990-2004 (in billion passenger-kilometres)**

| | 1990 | 1995 | 2000 | 2003 | 2004 | % change 1995-2004 | pkm per person in 2004 |
|---|---|---|---|---|---|---|---|
| **EU-25** | **:** | ***3 787*** | ***4 196*** | ***4 399*** | ***4 458*** | ***18%*** | ***9 748*** |
| **EU-15** | ***3 101*** | ***3 522*** | ***3 862*** | ***4 029*** | ***4 071*** | ***16%*** | ***10 624*** |
| **BE** | 89 | 97 | 106 | 110 | 112 | 15% | 10 737 |
| **BG** | 4.5 | : | : | : | : | : | : |
| **CZ** | : | 55 | 64 | 67 | 68 | 24% | 6 617 |
| **DK** | 53 | 54 | 58 | 59 | 60 | 11% | 11 167 |
| **DE** | 683 | 815 | 831 | 858 | 869 | 7% | 10 528 |
| **EE** | : | *6* | *8* | *9* | *10* | *62%* | *7 105* |
| **IE** | *13* | *16* | *21* | *24* | *25* | *61%* | *6 207* |
| **EL** | 29 | 37 | 53 | 64 | 68 | 84% | 6 159 |
| **ES** | 174 | 250 | 303 | 346 | 355 | 42% | 8 380 |
| **FR** | *586* | *640* | *700* | *739* | *737* | *15%* | *12 212* |
| **IT** | 523 | 615 | 727 | 711 | 716 | 16% | 12 370 |
| **CY** | : | 2 | 3 | 3 | *4* | *51%* | *4 792* |
| **LV** | : | *5* | *9* | *10* | *11* | *112%* | *4 571* |
| **LT** | : | *10* | 16 | 19 | 26 | 158% | 7 487 |
| **LU** | *4* | *5* | *6* | *6* | *6* | *30%* | *13 508* |
| **HU** | 47 | 45 | 46 | 46 | 46 | 2% | 4 591 |
| **MT** | : | *1* | *1* | *2* | *2* | *19%* | *3 876* |
| **NL** | 137 | 131 | 141 | 146 | 146 | 11% | 9 004 |
| **AT** | 62 | 71 | 78 | 82 | 82 | 16% | 10 092 |
| **PL** | : | 111 | 150 | 172 | 182 | 64% | 4 752 |
| **PT** | 28 | 41 | *58* | *65* | *67* | *64%* | *6 396* |
| **RO** | : | : | : | : | : | : | : |
| **SI** | *10* | *12* | *15* | *16* | *16* | *31%* | *8 014* |
| **SK** | : | 18 | 24 | 25 | 24 | 35% | 4 523 |
| **FI** | 51 | 50 | 56 | 60 | 61 | 22% | 11 675 |
| **SE** | 86 | 87 | 92 | 96 | 97 | 12% | 10 807 |
| **UK** | 588 | 618 | 640 | 673 | 678 | 10% | 11 357 |
| **Modal share % *** | **:** | **81** | **82** | **83** | **83** | **-** | **-** |
| **IS** | : | 3.0 | 3.8 | 4.2 | 4.3 | 42% | 14 802 |
| **NO** | 42.7 | 43.7 | 46.8 | 50.5 | 51.0 | 17% | 11 133 |
| **CH** | 73.3 | 75.5 | 82.3 | 85.3 | 87.1 | 15% | 11 831 |

*Source:* DG Energy and Transport

* Considered: passenger cars; buses and coaches; tram and metro; and railways.
Note: UK data refer to Great Britain only.

# Bus and coach passenger-kilometres up 6 %

Equivalent to just 11 % of that by passenger cars, transport performance by buses and coaches totalled about 502 billion pkm in the EU-25 in 2004 (Table 5.27). Again the largest Member States contributed most, with this time Italy accounting for the largest share (20 %), highlighting the greater importance of this transport mode in this Member State, even if it had a higher car density than Germany (see Chapter 3).

Between 1995 and 2004, performance rose by 6 %, only a third as much as passenger car transport. The fastest rise was again in Latvia (51 %), followed by Luxembourg (43 %) and Spain (35 %). However, if comparison is made with 1990, Ireland would have possibly posted the largest growth (70 %), and Latvia one of the largest decreases (-53 %). Of all those Member States registering decreases, the new Member States recorded the largest drops, rising to as much as -61 % in the case of Slovenia and -30 % for Slovakia.

When looking at the kilometres performed on buses and coaches by inhabitant, an estimated average of around 1 100 km was performed in 2004, a ninth of that performed using passenger cars. This number was however surpassed by 17 Member States. Greeks and Austrians did the greatest distances by bus and coach, with values of respectively close to 2000 pkm and 1 900 pkm by person. Greece's high number can most probably be explained by the absence of a rail alternative in many cases, not least because of the country's numerous islands.

The smallest values were held by the Romanians and the Slovenians with around a quarter of these extents (432 pkm and 491 pkm respectively).

**Table 5.27** **Transport performed by buses and coaches, 1990-2004 (in billion passenger-kilometres)**

| | 1990 | 1995 | 2000 | 2003 | 2004 | % change 1995-2004 | pkm per person in 2004 |
|---|---|---|---|---|---|---|---|
| **EU-25** | **:** | ***474.4*** | ***492.4*** | ***492.7*** | ***501.8*** | ***6%*** | ***1 097*** |
| **EU-15** | **371.3** | **382.0** | ***406.4*** | ***409.2*** | ***418.7*** | ***10%*** | ***1 093*** |
| **BE** | 10.9 | 13.1 | 13.3 | 16.2 | 17.0 | 30% | 1 633 |
| **BG** | 26.0 | 11.6 | 13.9 | 13.0 | 11.1 | -4% | 1 422 |
| **CZ** | : | 18.6 | 16.2 | 16.4 | 15.2 | -18% | 1 490 |
| **DK** | 6.4 | 7.3 | *7.4* | *7.3* | *7.3* | *0%* | *1 352* |
| **DE** | 73.1 | 68.5 | 69.0 | 67.5 | 67.8 | -1% | 821 |
| **EE** | 4.5 | *2.0* | *2.6* | *2.3* | *2.5* | *21%* | *1 827* |
| **IE** | *3.9* | *5.2* | *6.1* | *6.5* | *6.6* | *27%* | *1 626* |
| **EL** | *17.7* | *20.2* | *21.7* | *22.0* | *21.6* | *7%* | *1 956* |
| **ES** | 33.4 | 39.6 | 50.3 | 49.2 | 53.5 | 35% | 1 262 |
| **FR** | 41.3 | 41.6 | 42.4 | 41.1 | 42.5 | 2% | 704 |
| **IT** | 84.0 | 87.1 | 93.6 | 98.3 | 99.8 | 15% | 1 725 |
| **CY** | : | *1.0* | *1.1* | *1.3* | *1.2* | *24%* | *1 698* |
| **LV** | 5.9 | *1.8* | *2.3* | *2.6* | *2.8* | *51%* | *1 198* |
| **LT** | 7.9 | *4.2* | 2.8 | 3.0 | 3.7 | -12% | 1 063 |
| **LU** | *0.5* | *0.5* | *0.6* | *0.7* | *0.8* | *43%* | *1 705* |
| **HU** | 19.3 | 16.6 | 18.7 | 18.7 | 18.2 | 10% | 1 801 |
| **MT** | : | *0.4* | *0.5* | *0.5* | *0.5* | *22%* | *1 250* |
| **NL** | *13.0* | *12.0* | *11.3* | *11.3* | *11.6* | *-4%* | *710* |
| **AT** | 14.2 | 14.8 | 14.8 | 14.9 | 15.1 | 2% | 1 861 |
| **PL** | 46.3 | 34.0 | 31.7 | 30.0 | 30.1 | -11% | 789 |
| **PT** | 10.3 | 11.3 | *11.8* | *10.5* | *10.8* | *-4%* | 1 032 |
| **RO** | 24.0 | 12.3 | 7.7 | 9.4 | 9.4 | -24% | 432 |
| **SI** | *6.4* | *2.5* | *1.6* | *1.1* | *1.0* | *-61%* | *491* |
| **SK** | : | 11.2 | 8.4 | 7.8 | 7.9 | -30% | 1 465 |
| **FI** | 8.5 | 8.0 | 7.7 | 7.7 | 7.6 | -5% | 1 457 |
| **SE** | 8.0 | 8.5 | 9.5 | 9.1 | 8.9 | 5% | 992 |
| **UK** | 46.2 | 44.3 | 47.0 | 47.0 | 48.0 | 8% | 804 |
| **Modal share % *** | **:** | **10.2** | **9.6** | **9.3** | **9.3** | - | - |
| **HR** | 7.0 | 4.1 | 3.3 | 3.7 | : | : | 837 |
| **TR** | : | 85.7 | 87.4 | : | : | : | : |
| **IS** | : | 0.4 | 0.5 | 0.5 | 0.6 | 42% | 1 907 |
| **NO** | 3.9 | 3.8 | 4.1 | 4.0 | 4.2 | 13% | 924 |
| **CH** | 3.3 | 3.2 | 3.2 | 3.4 | 3.4 | 6% | 460 |

*Source:* DG Energy and Transport

* Considered: passenger cars; buses and coaches; tram and metro; and railways.
Note: PL and SK data include only inter-urban traffic; UK data refer to Great Britain only; CH covers public transport only.

# Rail passenger-kilometres up 11 %

Equivalent to just 8 % of performance by passenger cars (in 2004), transport performance by rail totalled 359 billion pkm in 2005 (Table 5.28). Among the largest contributors in 2004, France was the biggest, with 76.5 billion pkm (a 21 % share), which put it ahead of Germany's 74.9 billion pkm. France's position can be explained not only by its large rail network but also by the fact that it has the largest high-speed network; two reasons that obviously make rail travel a very appealing option.

Between 1995 and 2005, performance rose in the EU-25 by 11 %, a growth that was seven percentage points less than that in road transport, but five points more than in buses and coaches (see below). However, looking at the larger 1990-2005 time span, rail performance actually decreased (by -6 %) because of decreases recorded between 1990 and 1995 in a number of Member States that joined in 2004, and most notably Poland (-64.5 %).

Between 1995 and 2005, the United Kingdom posted the largest increase (41 %) followed by Ireland and France (38 %). When looking at the average number of passenger-kilometres travelled, the EU-25 attained an average of 781 pkm per inhabitant, less than a fifth of passenger car performance.

Nine Member States (of the 27 with rail networks, i.e. excluding Cyprus and Malta) showed greater performances, reaching as much 1 260 pkm per person in largest contributing country France. It was followed by two other Member States with values of over 1 000 pkm (Denmark and Austria).

**Table 5.28 Transport performed by rail, 1990-2005 (in billion passenger-kilometres)**

| | 1990 | 1995 | 2000 | 2004 | 2005 | % change 1995-2004 | % change 1995-2005 | pkm per person in 2005 |
|---|---|---|---|---|---|---|---|---|
| **EU-25** | **381.9** | **323.8** | **352.8** | **351.7** | **359.0** | **9%** | **11%** | **781** |
| **BE** | 6.5 | 6.8 | 7.7 | 8.7 | 9.2 | 28% | 35% | 876 |
| **BG** | 7.8 | 4.7 | 3.5 | 2.4 | 2.4 | -49% | -49% | 308 |
| **CZ** | 13.3 | 8.0 | 7.3 | 6.6 | 6.7 | -18% | -17% | 652 |
| **DK** | 5.1 | 4.9 | 5.5 | 5.9 | 6.0 | 21% | 22% | 1 101 |
| **DE** | 61.0 | 71.0 | 75.4 | 72.6 | 74.9 | 2% | 6% | 908 |
| **EE** | 1.5 | 0.4 | 0.3 | 0.2 | 0.2 | -54% | -41% | 184 |
| **IE** | 1.2 | 1.3 | 1.4 | 1.6 | 1.8 | 23% | 38% | 433 |
| **EL** | 2.0 | 1.6 | 1.9 | 1.7 | 1.9 | 6% | 18% | 167 |
| **ES** | 15.5 | 16.6 | 20.1 | 20.3 | 21.2 | 23% | 28% | 491 |
| **FR** | 63.7 | 55.6 | 69.9 | 74.3 | 76.5 | 34% | 38% | 1 260 |
| **IT** | 44.7 | 43.9 | 47.1 | 45.6 | 46.1 | 4% | 5% | 789 |
| **CY** | - | - | - | - | - | - | - | - |
| **LV** | 5.4 | 1.4 | 0.7 | 0.8 | 0.9 | -41% | -35% | 388 |
| **LT** | 3.6 | 1.1 | 0.6 | 0.4 | 0.4 | -61% | -62% | 125 |
| **LU** | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | -12% | -5% | 598 |
| **HU** | 11.4 | 8.4 | 9.7 | 10.2 | 9.9 | 20% | 17% | 976 |
| **MT** | - | - | - | - | - | - | - | - |
| **NL** | 11.1 | 16.4 | 14.7 | 14.1 | 14.7 | -14% | -10% | 903 |
| **AT** | 9.0 | 9.8 | 8.4 | 8.5 | *8.8* | -12% | -10% | *1 066* |
| **PL** | 50.4 | 26.6 | 24.1 | 18.4 | 17.9 | -31% | -33% | 468 |
| **PT** | 5.7 | 4.8 | 4.0 | 3.7 | 3.7 | -23% | -23% | 350 |
| **RO** | 30.6 | 18.9 | 11.6 | 8.6 | 8.0 | -54% | -58% | 368 |
| **SI** | 1.4 | 0.6 | 0.7 | 0.8 | 0.8 | 28% | 30% | 388 |
| **SK** | 6.4 | 4.2 | 2.9 | 2.2 | 2.2 | -47% | -48% | 405 |
| **FI** | 3.3 | 3.2 | 3.4 | 3.4 | 3.5 | 5% | 9% | 664 |
| **SE** | 6.6 | 6.8 | 8.2 | 8.9 | 8.9 | 30% | 31% | 990 |
| **UK** | 33.4 | 30.3 | 38.4 | 42.6 | 42.8 | 41% | 41% | 713 |
| **Modal share % *** | : | **7.0** | **6.9** | **6.5** | : | - | - | - |
| **HR** | 3.4 | 1.1 | 1.2 | 1.2 | 1.3 | 10% | 15% | 285 |
| **TR** | 6.4 | 5.8 | 5.8 | 5.2 | 5.0 | -10% | -13% | 70 |
| **IS** | - | - | - | - | - | - | - | |
| **NO** | 2.1 | 2.4 | 2.6 | 2.6 | 2.7 | 10% | 14% | 588 |
| **CH** | 12.7 | 11.7 | 12.6 | 14.9 | 15.5 | 27% | 32% | 2 090 |

*Source:* DG Energy and Transport

* Considered: passenger cars; buses and coaches; tram and metro; and railways.

## Tram and metro performance up 16 %

Reflecting partly the uptake of cleaner, efficient urban transport initiatives, together with network extensions, the growth recorded by tram and metro performance between 1995 and 2005 was 16 %, the fastest of its main competitors, buses and coaches and railways (Table 5.29). Moreover, the growth was only two percentage points less than that recorded by passenger cars.

The highest volumes of passenger-kilometres were performed in Germany (20 %), France (16 %) and the UK (11 %), Member States with numerous underground or tram networks in major cities. But here too, readers should be alerted to varying concepts and definitions, and notably how metro transport is distinguished from other local or suburban rail transport. For example, whereas France includes the RER network, Germany excludes its S-Bahn.

When measured by passenger-kilometres performed by inhabitant, other Member States emerge as relatively major users of trams and metros. Against an EU average of 165 km per inhabitant, the Czechs clocked up a total of 855 km on average. They were followed by the Austrians (436 km each) and the Hungarians (239 km each).

Looking at 1995-2004 growths among Member States, performance rose fastest in Greece (96 %), followed by Portugal (60 %).

**Table 5.29** **Transport performed by trams and metros, 1990-2004 (in billion passenger-kilometres)**

| | 1990 | 1995 | 2000 | 2003 | 2004 | % change 1995-2004 | pkm per person in 2004 |
|---|---|---|---|---|---|---|---|
| **EU-25** | ***:*** | ***64.6*** | ***70.6*** | ***73.1*** | ***75.2*** | *16%* | *164.5* |
| **EU-15** | ***48.7*** | ***48.5*** | ***54.5*** | ***56.8*** | ***58.8*** | *21%* | *153.6* |
| **BE** | 0.7 | 0.8 | 0.9 | *0.9* | *0.9* | *14%* | *87.5* |
| **CZ** | | 7.7 | 8.1 | 8.6 | 8.7 | 13% | 854.5 |
| **DK** | - | - | - | 0.1 | 0.1 | : | 22.8 |
| **DE** | *15.1* | *14.4* | *14.6* | 14.8 | 15.0 | 4% | 181.6 |
| **EE** | | *0.1* | *0.1* | *0.1* | *0.1* | *0%* | *74.0* |
| **IE** | - | - | - | - | *0.1* | *:* | *12.4* |
| **EL** | *0.8* | *0.7* | *1.2* | *1.4* | *1.5* | *96%* | *131.3* |
| **ES** | 4.4 | 4.3 | *5.2* | *5.6* | *5.8* | *36%* | *137.0* |
| **FR** | 10.2 | 9.0 | 10.8 | 11.4 | 12.3 | 37% | 203.8 |
| **IT** | 4.2 | 5.3 | 5.6 | 6.1 | *6.1* | *16%* | *105.8* |
| **CY** | - | - | - | - | - | - | - |
| **LV** | | *0.4* | *0.4* | *0.3* | *0.4* | *-13%* | *150.9* |
| **LT** | - | - | - | - | - | - | - |
| **LU** | - | - | - | - | - | - | - |
| **HU** | | *2.5* | 2.6 | 2.5 | 2.4 | -3% | 239.2 |
| **MT** | - | - | - | - | - | - | - |
| **NL** | 1.3 | 1.4 | *1.4* | *1.5* | *1.5* | *10%* | *93.5* |
| **AT** | 2.5 | 3.0 | 3.4 | 3.5 | 3.5 | *19%* | *435.7* |
| **PL** | | *5.0* | *4.7* | *4.5* | *4.5* | *-11%* | *117.0* |
| **PT** | 0.7 | 0.5 | 0.5 | 0.8 | 0.8 | 60% | 80.9 |
| **SI** | - | - | - | - | - | - | - |
| **SK** | | *0.4* | *0.4* | *0.3* | *0.3* | *-22%* | *59.5* |
| **FI** | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 35% | 100.2 |
| **SE** | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 4% | 224.8 |
| **UK** | 6.5 | 6.8 | 8.3 | 8.3 | 8.6 | 27% | 144.7 |
| **Modal share % *** | **:** | **1.4%** | **1.4%** | **1.4%** | **1.4%** | **-** | **-** |

*Source:* DG Energy and Transport

* Considered: passenger cars; buses and coaches; tram and metro; and railways.

# At least 36 kilometres travelled per person every day in the EU-25

All four passenger modes combined, an average of 32 kilometres were travelled by EU citizens per day in 2004 (Figure 5.22); a figure that rises to about 36 km when air and sea transport are included, and which would most certainly increase further if powered two-wheelers and bicycles were taken into account.

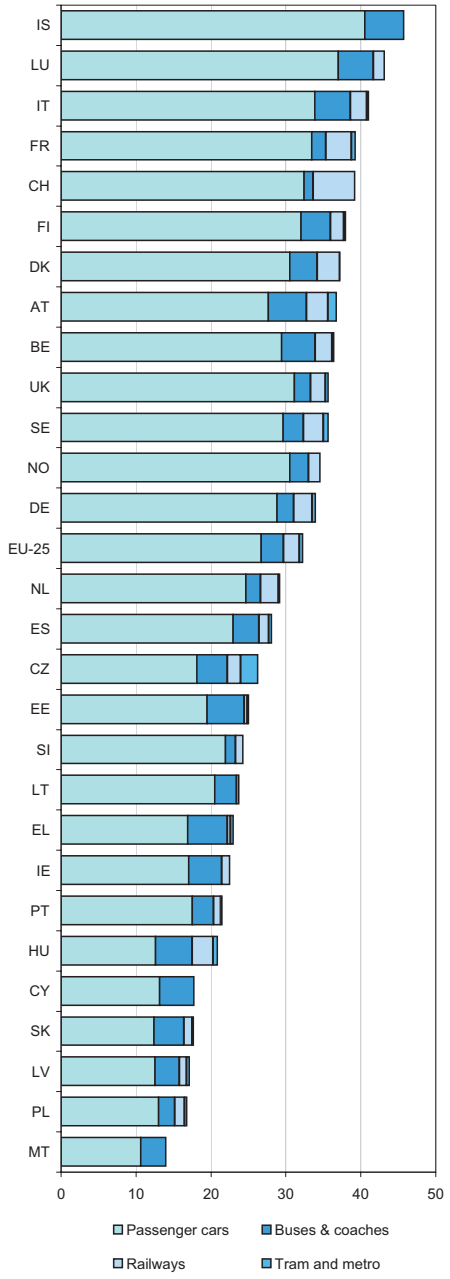
Of the average of 32 km, passenger car transport accounted for 27 km. This mode was followed, a long way behind, by buses and coaches (3 km), railways (2 km) and trams and metros (0.5 km). Of course, this average - based on total passenger-kilometres performed - covers not only people's daily commute, but also tourism and other everyday trips necessitating transport.

Behind the EU average was a wide range of different average daily distances, going from just 14 km in Malta to over 43 km in Luxembourg, a value that should however be interpreted with care, because of the high number of cars registered in the country. Luxembourg was in fact surpassed by Iceland (46 km).

Interestingly, all the Member States that joined in 2004 display below-average distances, essentially because of low distances performed by car, which were not sufficiently offset by often higher-than-average distances in the other transport modes and notably in buses and coaches.

There was in fact a positive linear relation between the average daily distance covered per person by car and the number of passenger cars per inhabitant, and these Member States generally had the lowest car densities (see Chapter 3). Malta was the notable exception to this, as it had one of the EU's top car densities.

**Figure 5.22** **Average daily distance travelled per person on motorised transport*, 2004 (in kilometres)**




*Source:* DG Energy and Transport

*Considered: Tables 5.25 to 5.28 (passenger cars, buses and coaches, railways, trams and metros respectively).
BG and RO: insufficient data.

# 161 million domestic air passengers in 2005

As mentioned in the introductory part of this section, Eurostat's air transport data does not yet provide for passenger-kilometre (pkm) analysis. Absolute passenger numbers carried offers however a satisfactory measure of air transport's importance. In 2005, the total number of passengers carried in domestic air transport amounted to close to 161 million, which represented 23 % of total passengers carried (national and international combined). This was 5 % more than a year previously (Table 5.30).

Growths were much larger than this average in a number of Member States with many high growth rates in the Member States that joined in 2004 and 2007.

Among the 30 airports handling the largest passenger volumes (Table 5.31), Madrid-Barajas carried 19.5 million passengers. It was followed by Paris-Orly (15.6 million), Barcelona (13.1 million) and Roma-Fiumicino (12.1 million). Volumes reflect of course country size: of the seven Member States with airports in the top 30, five were the largest (both in terms of geography and population: Germany, Spain, France, Italy and the UK), and Sweden the third largest in terms of geography.

Moreover volumes are also the result of connections with islands or overseas territories. This is the case for Greece, France, Spain and Italy for instance. In fact, Greece's high number of mainland-island connections is what makes it the seventh Member State to feature in the top 30 with Athens airport.

**Table 5.30 Domestic air passenger transport (passengers carried*), 2005**

| | Passengers carried | % change 2003-2005 | % change 2004-2005 |
|---|---|---|---|
| **EU-25** | **160 846 910** | **:** | **4.9%** |
| **ES** | 39 005 319 | 24.6% | 14.7% |
| **UK** | 26 687 579 | 9.4% | 3.8% |
| **FR** | 26 660 709 | -0.2% | -1.2% |
| **IT** | 24 663 574 | 0.7% | 1.9% |
| **DE** | 21 901 131 | 3.3% | 2.4% |
| **NO** | 10 133 673 | -6.0% | -7.7% |
| **SE**** | 7 300 303 | 6.2% | 3.9% |
| **EL** | 5 762 758 | 16.2% | 4.7% |
| **PT** | 2 966 241 | 4.0% | 21.2% |
| **FI** | 2 819 242 | 4.4% | -1.5% |
| **DK**** | 1 706 234 | 6.3% | 4.6% |
| **PL** | 861 322 | : | -3.5% |
| **CH** | 745 189 | -10.3% | 0.6% |
| **IE** | 641 177 | : | -6.4% |
| **AT** | 575 063 | 5.0% | 2.3% |
| **RO** | 273 829 | 53.0% | 30.6% |
| **CZ** | 194 769 | 20.6% | 12.3% |
| **SK** | 63 438 | 99.2% | 77.9% |
| **NL** | 81 932 | -46.8% | -23.2% |
| **EE** | 21 069 | : | 27.4% |
| **MT** | 8 188 | -81.4% | -78.3% |
| **LT** | 2 841 | 378.3% | 43.1% |
| **IS** | 2 837 | 192.8% | 38.6% |
| **HU** | 1 910 | 1810.0% | : |
| **BE** | 1 442 | -4.8% | 20.4% |
| **LV** | 498 | : | 274.4% |
| **CY** | 421 | -38.0% | 26.8% |
| **SI** | 119 | : | -11.2% |

*Source:* Eurostat (Transport)

*Number of passengers carried: all passengers on a particular flight counted once only and not repeatedly on each individual stage of that flight; this excludes direct transit passengers. This is different to the number of passengers on board. The national figures exclude double counting of passengers reported by different domestic airports, as departures and as arrivals.

**Passengers boarded.

Note that LU does not have any domestic passenger traffic.

**Table 5.31 Top 30 airports in domestic air transport, based on passengers carried, 2005 (in 1000)**

| Rank | Airport | Number of passengers (in 1000) | % change 2003-2005 |
|---|---|---|---|
| **1** | Madrid/Barajas Airport (ES) | 19 462 | 10.7% |
| **2** | Paris/Orly Airport (FR) | 15 566 | 1.2% |
| **3** | Barcelona Airport (ES) | 13 141 | 18.9% |
| **4** | Roma/Fiumicino Airport (IT) | 12 079 | -3.3% |
| **5** | Munchen Airport (DE) | 8 977 | 6.8% |
| **6** | Frankfurt/Main Airport (DE) | 7 004 | -7.4% |
| **7** | Milano/Linate Airport (IT) | 6 747 | 5.7% |
| **8** | Oslo/Gardermoen Airport (NO) | 6 694 | -3.6% |
| **9** | London/Heathrow Airport (UK) | 6 673 | 0.3% |
| **10** | Edinburgh Airport (UK) | 6 116 | 11.3% |
| **11** | Palma De Mallorca Airport (ES) | 5 976 | 12.6% |
| **12** | Stockholm/Arlanda Airport (SE) * | 5 771 | 3.5% |
| **13** | Berlin-Tegel Airport (DE) | 5 580 | -9.9% |
| **14** | Athens Airport (EL) | 5 166 | 18.6% |
| **15** | Paris/Charles-De-Gaulle Airport (FR) | 5 003 | -1.3% |
| **16** | Glasgow Airport (UK) | 4 604 | 0.7% |
| **17** | Hamburg Airport (DE) | 4 537 | 4.9% |
| **18** | Nice/Cote D'azur Airport (FR) | 4 257 | 1.8% |
| **19** | Catania/Fontanarossa Airport (IT) | 4 183 | 6.8% |
| **20** | Las Palmas/Gran Canaria Airport (ES) | 4 112 | 29.0% |
| **21** | London/Gatwick Airport (UK) | 3 941 | 0.9% |
| **22** | Tenerife Norte/Los Rodeos Airport (ES) | 3 863 | 38.5% |
| **23** | Toulouse/Blagnac Airport (FR) | 3 704 | 4.2% |
| **24** | Düsseldorf Airport (DE) | 3 605 | 0.5% |
| **25** | Köln/Bonn Airport (DE) | 3 438 | 4.8% |
| **26** | Belfast/Aldergrove Airport (UK) | 3 431 | 14.2% |
| **27** | Manchester/Intl Airport (UK) | 3 388 | 10.3% |
| **28** | Marseille Provence Airport (FR) | 3 249 | -0.5% |
| **29** | Milano/Malpensa Airport (IT) | 3 153 | -18.6% |
| **30** | Malaga Airport (ES) | 3 133 | 19.8% |

*Source:* Eurostat (Transport)

* % change 2004-2005.

## Madrid-Barajas and Barcelona largest airport pair

When it comes to looking at airport-to-airport passenger numbers, it is not surprising that the most important pairs are in the EU's largest Member States (data not shown). Interestingly, the top pair was not in Germany, the UK, France nor in Italy, but in Spain: a total of 4.3 million passengers flew on the route between Madrid-Barajas and Barcelona in 2005 (based on passengers carried). This can most probably be explained by the business traffic between what are Spain's two largest economic centres. This pair is all the more interesting as the next largest counted 2.4 million passengers (Roma-Fiumicino - Milano-Linate). It was followed by Paris-Orly - Toulouse-Blagnac (2.3 million) and Paris-Orly - Nice-Côte d'Azur (2.2 million).

## Domestic passengers as much as almost 100 % in maritime transport

Turning finally to maritime transport, the importance of island connections - of importance in air transport - especially applies to domestic maritime passenger transport, where air transport is often not a viable or low-cost alternative. Moreover it can account for a substantial share of total maritime transport.

Based on passengers handled (embarked and disembarked), this is notably the case for Portugal (where domestic passenger traffic accounted for very close to 100 % of total traffic), Greece (97 %), Italy (94 %) and Spain (77 %) (Table 5.32). This was against an EU average of about 58 % (see also page 117). Readers should be aware however that data only cover ports handling 200 000 passengers or more per year, which does not give the complete picture: passenger numbers handled by smaller ports, which are mainly involved in national transport, are therefore not covered.

Apart from the highest passenger number handled in Greece (85 million) - which reflects notably tourism in the Aegean islands - the 74 million registered by Italy shows the importance of only a few important ferry services, and notably the connection between Reggio-Calabria and Messina (linking the Italian mainland and Sicily) and the ports of Naples and Capri, also offering frequent connections, mainly during the holiday season.

Perhaps surprising is the 16 million passengers handled in Germany's main ports. An important share of this number was in fact accounted for by the small port of Norddeich (German North-Sea coast), offering a service to the island of Norderney, a popular holiday resort.

**Table 5.32** **Maritime transport: number of domestic passengers handled (embarked and disembarked) in main ports*, 2004 (in 1000)**

| | Passengers handled (1000) | | % share in total handling |
|---|---|---|---|
| | Disembarked | Embarked | |
| DK | 8 571 | 8 560 | 38% |
| DE | 7 990 | 8 029 | 56% |
| EL | 42 720 | 42 718 | 97% |
| ES | 7 990 | 7 605 | 77% |
| FR | 2 194 | 2 228 | 17% |
| IT | 37 126 | 37 010 | 94% |
| PT | 306 | 306 | 100% |
| FI | 448 | 481 | 6% |
| SE | 1 454 | 1 454 | 9% |
| UK | 1 824 | 1 830 | 12% |

*Source:* Eurostat (Transport)

*Main ports: ports handling 200 000 passengers or more per year.

## 5.2.3 International passenger transport

Unlike the international transport of goods, data availability on international transport of passengers is not as satisfactory, since EU legal acts do not cover road and inland waterways. And with regard to the transport modes for which data are available - rail, maritime and air passenger-kilometre data are only available for rail.

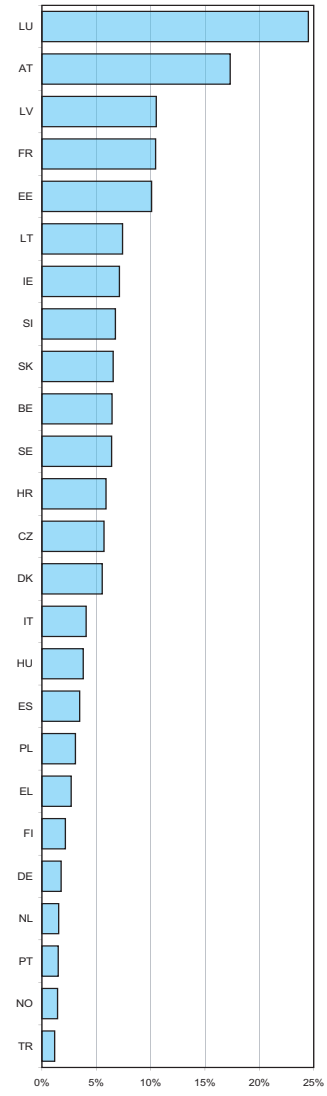
While looking at the present figures, readers should remember that the previous section on national transport includes the national legs of international journeys.

## International trips accounted for around 5 % of total rail transport

As could be expected, international rail passenger transport is not that important as a share of total rail transport. Of the 360-370 billion passenger-kilometres performed by rail in 2005, it represented about 5 % of total rail passenger transport in the EU (Figure 5.23). Looking behind the EU average, the share was more important in certain Member States, reaching as much 25 % in Luxembourg (2004 data) and 17 % in Austria. The next highest shares were in two of the Baltic States, Latvia (11%) and Estonia (10%), together with France (10 %; 2004 data).

A central geographical location can mostly explain these high shares, not only for tourism but also for commuter purposes (particularly in the case of Luxembourg), but so too can the offer of high-speed rail services, such as is the case in France. The relatively high share of Austria can be explained by its geographical location and Vienna as important East-West rail gateway

**Figure 5.23 Importance of international rail passenger transport in total rail transport based on passenger-kilomètres performed, 2005* (in %)**




*Source:* Eurostat (Transport)

*2004 data: DE, IE, FI, FR, IT, LT, LU and SI.

Note: BG, RO, UK not available. CY and MT do not have any rail network.

# Largest single rail passenger movements on the Channel Tunnel

Of the 7 billion passengers transported by rail in 2004, about 45 million (0.6 %) were making international journeys. More than 60 % of this total was carried out in 5 country pairs alone (Table 5.33), some pairs clearly pointing to the existence of Trans-European Networks (TENs).

Nowhere is this is more obvious than in the relations between the United Kingdom and France on the one hand, and Denmark and Sweden on the other, with respectively the Channel Tunnel and the Öresund fixed link being the only rail connections possible between them. The Channel Tunnel and the Öresund fixed link - both Trans-European Networks - accounted for nearly 45% of total international rail passenger transport.

The Channel Tunnel was clearly the busiest connection with 12.8 million passengers using the service (6.4 million in each direction). This was nearly double the passenger through-put of the Öresund fixed link (6.8 million). While most passengers on the Channel Tunnel were probably tourists, around half of the rail passengers using the Öresund fixed link in 2005 were commuters.

When considering the number of relations between countries, it is possible to distinguish between two categories of countries: those with relatively few but important relations and those with many relations but relatively small passenger volumes per relation. France and Belgium are prime examples of the first type with relations with 10 and 9 countries respectively, whereas as Germany with 21 country relations exemplifies the second type (data not shown).

**Table 5.33** **Top 5 intra-EU-25 country pairs in rail passenger transport (based on number of passengers), 2004**

| Rank | Embarking | Disembarking | Passengers (million) |
|---|---|---|---|
| 1 | United Kingdom | France | 6.4 |
| | France | United Kingdom | 6.4* |
| 2 | Denmark | Sweden | 3.2 |
| | Sweden | Denmark | 3.6 |
| 3 | Belgium | France | 2.0 |
| | France | Belgium | 1.7 |
| 4 | Austria | Germany | 1.8 |
| | Germany | Austria | 1.0 |
| 5 | United Kingdom | Belgium | 1.1 |
| | Belgium | United Kingdom | 1.1* |

*Source:* Eurostat (Transport)

*Based on data reported by the United Kingdom.

# Intra-EU port passenger handling highest in Sweden

It is estimated that at least 159 million passengers on international trips were handled by the EU's main ports (i.e. ports handling 200 000 passengers or more) in 2004. This translates as a share of about 42 % of total passenger handling (national and international).

Most of these passengers handled were making international trips within the EU (or 38 % of total passenger flows), an observation which tallies with the importance of main intra-EU ferry routes. The other 4 % of passengers handled were on extra-EU trips.

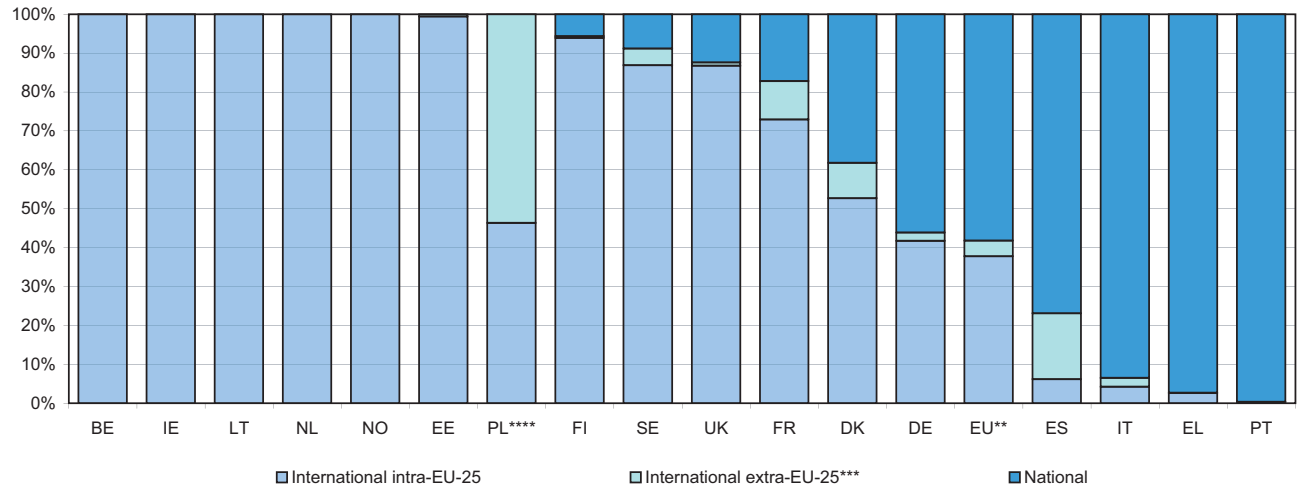
For example, the high figures for the UK and France most likely reflect the intensive (intra-EU) cross-channel traffic, and those for Sweden and Denmark the traffic between these same two countries or with Germany and Finland. Sweden in fact counted the highest amount of intra-EU passenger movement and possibly the highest total international transport (intra- and extra-EU passenger transport).

Readers should note however that when passengers travel within the EU, they are counted once by the port authority upon embarkation and another time (by another EU Member State) upon disembarkation. This resulting double counting does not arise in the case of extra-EU transport where EU port authorities register passengers only once (either embarkation or disembarkation and refer to different journeys).

The lower-than-average shares of international passenger handling in Portugal, Greece, Italy and Spain clearly reflect the greater importance of ferry connections to islands that are national territory. In Portugal this share reached as much as almost 100 %.

With regard to international extra-EU handling, passenger throughput was most important in Poland, Spain, France and Denmark, reflecting the importance of particular services, for instance tourism in the Baltic Sea for Poland, or services to Northern Africa for Spain and France (see also Table 5.33). In Poland the share of extra-EU passenger handling was as much as 54 %, but readers should note that data also include volumes where the ports of embarking/disembarking were unknown (representing about 50 % of the data).

**Figure 5.24 National, international intra- and extra-EU maritime passengers handled (inwards and outwards) in main ports* 2004**




*Source:* Eurostat (Transport)

* Ports handling 200 000 passengers or more.
** EU: Data based on the sum of 16 Member States with maritime ports (excluding CY, LV, MT and SI); CZ, LU, HU, AT and SK are landlocked.
*** International extra-EU data also include volumes where the ports of embarking/disembarking were unknown.
****PL: international extra-EU data also include volumes where the ports of embarking/disembarking were unknown (representing about 50 % of the data).

With regard to international extra-EU traffic, these passenger movements were most important in Poland, Spain, France and Denmark, reflecting the importance of particular services, for instance tourism in the Baltic Sea for Poland, or services to Northern Africa for Spain and France (see also Table 5.34).

**Table 5.34** **Number of passengers handled (inwards and outwards) in international maritime transport, based on passenger handling in main ports*, 2004 (in 1000)**

| | Intra-EU | Extra-EU | Total |
|---|---|---|---|
| BE | 743 | 0 | 743 |
| DK | 23 627 | 4 069 | 27 696 |
| DE | 11 916 | 608 | 12 524 |
| EE | 6 415 | 37 | 6 452 |
| IE | 2 434 | 0 | 2 434 |
| EL | 2 255 | 91 | 2 346 |
| ES | 1 248 | 3 431 | 4 679 |
| FR | 18 789 | 2 539 | 21 328 |
| IT | 3 337 | 1 790 | 5 127 |
| LT | 144 | 0 | 144 |
| NL | 2 011 | 0 | 2 011 |
| PL | 896 | 1 037 | 1 933 |
| PT | 2 | 0 | 2 |
| FI | 15 409 | 69 | 15 478 |
| SE | 28 546 | 1 403 | 29 949 |
| UK | 25 561 | 238 | 25 799 |
| NO | 5 777 | : | : |

*Source:* Eurostat (Transport)

*Ports handling 200 000 passengers or more.

## Cross-Channel passenger traffic remains most important

**Table 5.35** **Top 20 passenger ports in international maritime transport*, 2004**

| Rank | Port | Passengers (1000) | | |
|---|---|---|---|---|
| | | Inwards | Outwards | Total |
| 1 | Dover (UK) | 7 147 | 7 129 | 14 274 |
| 2 | Calais (F) | 6 626 | 6 630 | 13 257 |
| 3 | Helsingborg (SE) | 5 943 | 5 864 | 11 809 |
| 4 | Helsingor (DK) | 5 803 | 5 808 | 11 612 |
| 5 | Helsinki (FI) | 4 358 | 4 357 | 8 715 |
| 6 | Stockholm (SE) | 3 867 | 3 947 | 7 813 |
| 7 | Rodby ( Faergehavn) (DK) | 3 372 | 3 372 | 6 745 |
| 8 | Puttgarden (DE) | 3 304 | 3 438 | 6 742 |
| 9 | Tallinn (EE) | 3 231 | 3 221 | 6 452 |
| 10 | Turku (FI) | 1 689 | 1 667 | 3 357 |
| 11 | Frederikshavn (DK) | 1 606 | 1 583 | 3 190 |
| 12 | Portsmouth (UK) | 1 532 | 1 545 | 3 077 |
| 13 | Goteborg (SE) | 1 299 | 1 308 | 2 607 |
| 14 | Oslo (NO) | 1 224 | 1 226 | 2 450 |
| 15 | Mariehamn (FI) | 1 207 | 1 207 | 2 413 |
| 16 | Holyhead (UK) | 1 119 | 1 144 | 2 262 |
| 17 | Rostock (DE) | 1 131 | 1 121 | 2 253 |
| 18 | Algeciras (ES) | 995 | 1 093 | 2 087 |
| 19 | Trelleborg (SE) | 963 | 978 | 1 940 |
| 20 | Hirtshals (DK) | 891 | 851 | 1 743 |

*Source:* Eurostat (Transport)

*On the basis of number of passengers embarked and disembarked.

The importance of particular routes in international maritime passenger transport (both intra- and extra-EU transport) is confirmed when looking at the top-20 ports in Table 5.35. Readers should note that unlike air transport, detailed information on port-to-port transport cannot be disclosed.

The fact that Dover and Calais are the EU's two most important international passenger ports highlights the Channel's position as home to the EU's busiest international maritime passenger traffic: a total of 14.3 million passengers passed through Dover (inwards and outwards) for routes across the Channel, the Atlantic (e.g. Brittany) and the North Sea, and a total 13.3 million passed through the port of Calais. Traffic over the Öresund is the second busiest area, as suggested by the connections between Göteborg and Frederikshavn and Helsingborg and Helsingor in Sweden and Denmark respectively.

Within the top-20, the port of Oslo in EEA state Norway ranked 14th, and of the other 19 ports, only two reflected extra-EU flows: Spain's port of Algeciras (18th place) linking up with Morocco, and Denmark's port of Hirtshals (20th place) connecting up with Norway.

# Air transport: 77 % of passengers carried were non-domestic

Turning to international air passenger transport, of the 704 million passengers (national and international) carried in 2005, close to 77 % of them were on international flights (intra- and extra EU). As illustrated in Figure 5.25, all EU-25 Member States had international air transport services but to varying degrees.

The EU's smallest Member States and smallest islands understandably display the highest shares, sometimes of up to 100 %. Luxembourg typifies this with international air transport making up the entire sector. It was followed by other Member States where shares of national transport were very insignificant. At the other end of the spectrum came larger Member States with smaller shares of international transport (as a result of domestic air transport being viable) with Sweden showing the smallest share (68 %), but which was actually surpassed by EEA country Norway (45 %).

## Flight delays increase

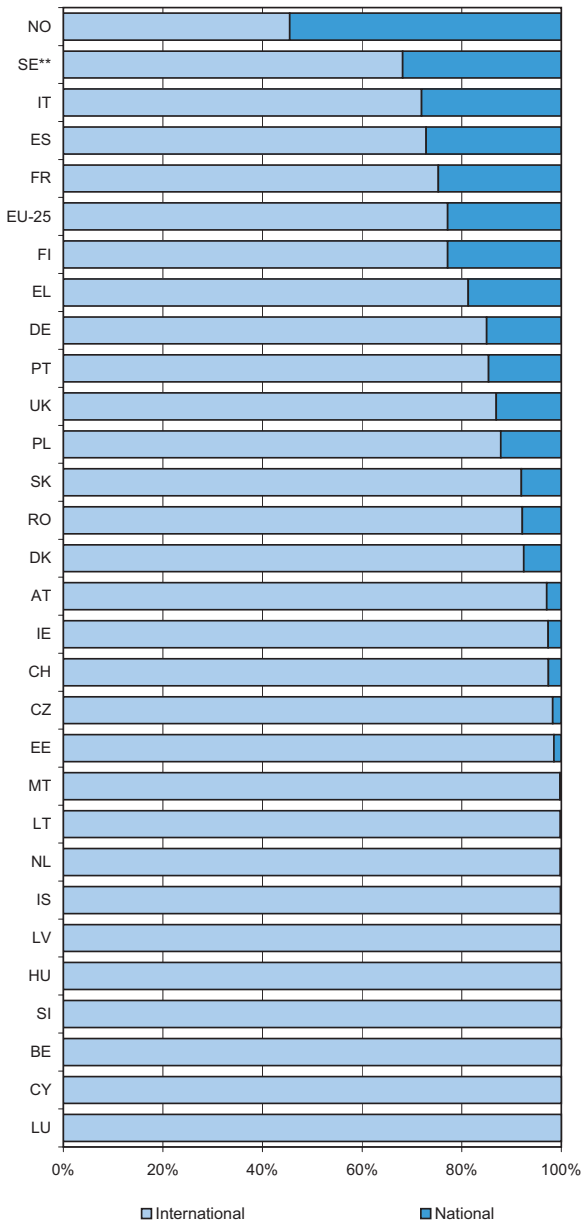
Based on a report from Eurocontrol*, 'Delays to Air Transport in Europe', the average delay per aircraft movement in Europe, for all causes of delay, was 12.4 minutes for departure traffic in 2006, meaning an increase of 9.5% on 2005. For arrival traffic the delay was 12.3%; an increase of 11.4 %. However, when it comes to delays caused by air traffic flow management (ATFM), despite the increase in traffic, the average delay per movement remained the same as in 2005, at 1.9 minutes. Over the past 5 years, delays attributable to ATFM have decreased by 13%.

55 % of primary departure delay causes in 2006 were attributable to airlines (i.e. passengers and baggage, cargo and mail, aircraft and ramp handling, technical and aircraft equipment, flight operations, among others.) 16 % were due to the airports, for reasons such as air traffic flow management arising from restrictions to the destination airport, immigration, customs and health services, airport facilities, or restrictions either at the destination or departure airport. Weather conditions and en-route (such as ATC demand/capacity) delay causes accounted for 10 % of delay causes each, and mandatory security requirements 5 %. Some 4 % were due to miscellaneous reasons.

** Eurocontrol is the European Organisation for the Safety of Air Navigation. Currently numbering 37 Member States, its primary goal is the development of a seamless, pan-European Air Traffic Management (ATM) system. The achievement of this is a key element to the present and future challenges facing the aviation community.*

*For more detail, and other statistical information, see the eCoda pages on Eurocontrol's website (http://www.eurocontrol.int).*

**Figure 5.25** **Importance of international air transport (passengers carried*) in total air transport, 2005**




*Source:* Eurostat (Transport)

*Based on data which for national transport exclude double counting between national partner airports and which for international transport exclude double counting for the EU aggregate (between EU-25 partner airports).
**SE: data based on passengers boarded.
BG: data not available.

# Slightly higher climb for intra-EU air passenger transport

Total international passenger volumes in air transport climbed for the most part between 2003 and 2005 and between 2004 and 2005, as can be seen from Table 5.36: proof that international passenger picked up since the immediate aftermath of the tragic terrorist attacks in the United States in 2001 which hit air transport demand very hard. Between 2004 and 2005, the total international passenger number in the EU-25 went up by 9.6 %, comprising a 9 % growth for extra-EU passengers and a slightly higher 10 % rise for intra-EU passengers.

Some of the highest growths were registered for the East European Member States that joined in 2004. Based on data available, Slovakia showed the highest growth rate (89 %), followed by Lithuania (70 %). Even the larger newcomers the Hungary and the Czech Republic showed rates of 52 % and 35 % respectively. These growth rates clearly reflect the rapid development of international air transport towards especially Western Europe, particularly boosted by the introduction of low cost carriers.

In Slovakia, the increase in intra-EU traffic was perhaps the most staggering, at 194 %, while its extra-EU traffic actually decreased (-11 %). The driving forces behind this were clearly EU enlargement as well as the more ongoing development of free market economies, growing business ties and tourism. By contrast, the highest rates among the former EU-15 Member States were sometimes considerably inferior, not exceeding 25 % (Italy).

**Table 5.36 Total international air passenger transport (passengers carried), 2003-2005**

| | Passsengers in 2005 (1000s) | | | % change 2003-2005 | | | % change 2004-2005 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Extra-EU | Intra-EU | Total | Extra-EU | Intra-EU | Total | Extra-EU | Intra-EU | Total |
| **EU-25** | **245 042** | **298 334** | **543 376** | **:** | **:** | **:** | **9.0%** | **10.0%** | **9.6%** |
| **BE** | 4 928 | 12 885 | 17 813 | 16.1% | 13.5% | 14.2% | 11.6% | -1.3% | 2.0% |
| **CZ** | 3 029 | 8 042 | 11 071 | 12.3% | 45.7% | 34.7% | 18.3% | 11.4% | 13.2% |
| **DK** | 6 247 | 14 254 | 20 501 | : | : | : | 6.2% | 5.5% | 5.7% |
| **DE** | 50 172 | 73 904 | 124 076 | 13.2% | 24.6% | 19.7% | 6.3% | 9.9% | 8.4% |
| **EE** | 180 | 1 192 | 1 372 | : | : | : | 41.5% | 40.7% | 40.8% |
| **IE** | 2 590 | 21 023 | 23 613 | : | : | : | 13.6% | 17.5% | 17.1% |
| **EL** | 3 638 | 21 398 | 25 036 | -25.3% | 5.7% | -0.3% | 13.0% | 2.9% | 4.3% |
| **ES** | 15 191 | 89 483 | 104 675 | 28.3% | 14.8% | 16.5% | 16.9% | 8.1% | 9.3% |
| **FR** | 38 300 | 42 995 | 81 294 | 16.5% | 12.5% | 14.3% | 9.0% | 5.1% | 6.9% |
| **IT** | 17 091 | 46 152 | 63 243 | 19.1% | 27.0% | 24.8% | 10.7% | 11.0% | 10.9% |
| **CY** | 1 139 | 5 643 | 6 782 | -13.9% | 15.0% | 8.8% | -2.7% | 7.5% | 5.6% |
| **LV** | 282 | 1 589 | 1 872 | : | : | : | 67.9% | 79.0% | 77.2% |
| **LT** | 237 | 1 194 | 1 431 | -4.3% | 101.2% | 70.1% | 35.2% | 46.2% | 44.3% |
| **LU** | 225 | 1313 | 1 538 | : | : | : | 19.2% | -0.5% | 1.9% |
| **HU** | 2 096 | 5 951 | 8 047 | 10.0% | 74.8% | 51.6% | 8.9% | 31.7% | 24.9% |
| **MT** | 305 | 2 444 | 2 749 | -13.4% | 6.0% | 3.4% | -0.8% | 0.0% | -0.1% |
| **NL** | 20 178 | 26 173 | 46 351 | 11.6% | 8.5% | 9.9% | 5.4% | 3.7% | 4.4% |
| **AT** | 6 844 | 12 265 | 19 110 | 20.9% | 19.6% | 20.0% | 11.4% | 5.8% | 7.8% |
| **PL** | 1 622 | 4 597 | 6 219 | : | : | : | 11.0% | 23.0% | 19.6% |
| **PT** | 3 352 | 13 954 | 17 306 | 24.3% | 14.1% | 15.9% | 15.9% | 6.7% | 8.3% |
| **RO** | : | : | 3 220 | : | : | 26.8% | : | : | 7.9% |
| **SI** | 431 | 786 | 1 217 | : | : | : | -2.1% | 29.7% | 16.3% |
| **SK** | 355 | 1 101 | 1 456 | -10.7% | 194.0% | 88.6% | 0.3% | 59.3% | 39.3% |
| **FI** | 2 053 | 7 476 | 9 529 | -2.5% | 17.2% | 12.3% | 11.6% | 5.5% | 6.8% |
| **SE*** | 3 893 | 11 705 | 15 598 | 13.8% | 8.7% | 10.0% | 16.1% | 3.3% | 6.2% |
| **UK** | 60 887 | 116 438 | 177 326 | 9.4% | 12.0% | 11.1% | 8.5% | 5.4% | 6.5% |
| **IS** | : | : | 2 108 | : | : | 13.2% | : | : | 8.9% |
| **NO** | : | : | 8 445 | : | : | 35.1% | : | : | 11.8% |
| **CH** | : | : | 28 131 | : | : | 5.0% | : | : | -2.3% |

*Source:* Eurostat (Transport)

*SE: data based on passengers boarded.
BG: data not available.

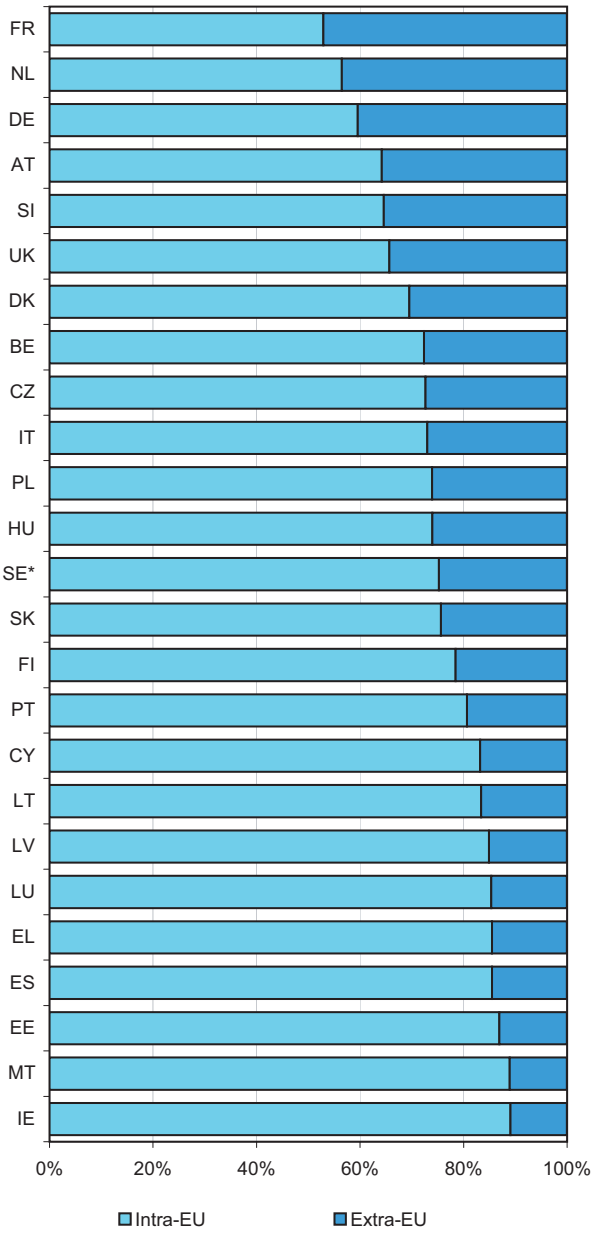
## Extra-EU flows highest in countries with long-haul gateways

Taking into account international departures and arrivals, the share of extra-EU air transport was about 45 % in the EU-25, leaving 55 % for intra-EU air transport (data excluding double counting; data not shown). See also Figure 5.26.

Looking at Member States (for which data however do not exclude double counting and are therefore not comparable with the EU-25 average), the extra-EU share varied from 47 % in France to just 11 % in Ireland. France was followed by the Netherlands (44 %) and Germany (40 %).

Among those Member States displaying high shares of extra-EU international transport, many of them were those with Europe's major international airport hubs for intercontinental and long-haul air traffic, such as Paris-Charles de Gaulle, London-Heathrow, Frankfurt-Main and Amsterdam-Schiphol (Table 3.39). Nevertheless, it was the UK that handled the largest absolute number of extra-EU international passengers (61 million in total; see Table 5.36).

**Figure 5.26** **Relative importance of extra- and intra-EU passenger transport (passengers carried) by air transport, by country, 2005**




*Source:* Eurostat (Transport)

*SE: data based on passengers boarded.
BG and RO: data not available.

**Table 5.37** **Extra-EU passenger air transport to world regions in 2005: shares of individual Member States (in %)**

| | Total | Europe except EU | America | Asia and Australasia | Africa |
|---|---|---|---|---|---|
| EU-25 | 100 | 100 | 100 | 100 | 100 |
| BE | 2.1 | 3.1 | 1.2 | 0.3 | 4.1 |
| CZ | 1.1 | 1.7 | 0.4 | 0.7 | 1.6 |
| DK | 2.6 | 5.8 | 1.0 | 2.1 | 0.8 |
| DE | 20.2 | 27.5 | 16.2 | 21.5 | 13.4 |
| EE | 0.1 | 0.1 | 0.0 | 0.0 | 0.2 |
| IE | 1.1 | 0.7 | 2.6 | 0.0 | 0.2 |
| EL | 1.4 | 2.6 | 0.5 | 1.4 | 0.7 |
| ES | 6.3 | 6.8 | 9.9 | 1.5 | 4.1 |
| FR | 16.0 | 7.6 | 14.5 | 15.1 | 34.8 |
| IT | 6.8 | 5.8 | 5.8 | 6.9 | 10.5 |
| CY | 0.4 | 0.4 | 0.0 | 0.9 | 0.2 |
| LV | 0.1 | 0.2 | 0.0 | 0.0 | 0.1 |
| LT | 0.1 | 0.2 | 0.0 | 0.0 | 0.2 |
| LU | 0.1 | 0.2 | 0.0 | 0.0 | 0.3 |
| HU | 0.8 | 1.6 | 0.2 | 0.6 | 0.6 |
| MT | 0.1 | 0.2 | 0.0 | 0.1 | 0.3 |
| NL | 8.4 | 7.8 | 9.7 | 9.7 | 5.7 |
| AT | 2.6 | 4.6 | 0.7 | 3.8 | 1.5 |
| PL | 0.6 | 0.7 | 0.6 | 0.2 | 0.8 |
| PT | 1.4 | 1.1 | 2.4 | 0.0 | 1.7 |
| SI | 0.2 | 0.4 | 0.0 | 0.1 | 0.1 |
| SK | 0.1 | 0.2 | 0.0 | 0.0 | 0.4 |
| FI | 0.8 | 1.1 | 0.3 | 1.5 | 0.3 |
| SE | 1.5 | 3.3 | 0.6 | 1.0 | 0.8 |
| UK | 25.4 | 16.5 | 33.4 | 32.6 | 16.7 |

*Source:* Eurostat (Transport)

As shown in Table 5.37, the shares of individual Member States in total extra-EU passenger transport vary considerably. With a 25 % share, the UK leads in total extra-EU passenger transport, ahead of Germany (20 %) and France (16 %).

When one looks at the specific destinations by world region however, rankings show some variation. While the UK was the largest extra-EU passenger transporter to America and Asia and Australasia, with shares of around 33 % respectively, it ranked second for non-EU Europe and Africa.

Germany came first place for flights to non-EU Europe with a market share of almost 27.5 %. Reflecting historical and cultural ties, France was the main partner for services to the continent of Africa (with a market share of 35 %).

## EU-US aviation agreement takes off

International aviation is governed by a web of bilateral agreements between individual countries. The restrictions faced by carriers - from around the world - have led to an inefficient and fragmented aviation industry, with very few consistently profitable airlines, and an industry especially vulnerable to economic shocks.

The first ever EU-US aviation agreement, signed in spring 2007, will help to remedy this and create a transatlantic market for air services to the benefit of European companies and passengers alike. The agreement enables European airlines to offer flight connections to the US from any EU airport. Among the benefits expected are billions of euros in economic benefits, millions of additional passengers and up to new 80 000 jobs over a 5 year period.

Commenting on the agreement, Mr Jacques Barrot, Commissioner for transport, said "This agreement is both a centrepiece for today's reinvigorated transatlantic relationship and a big step forward in international aviation. By allowing new services to be launched from airports right across Europe, it will shake up both the transatlantic market and the European airline industry itself. Already, the European airline industry is feeling its effects in a positive way, with plans for new services and signs of a much more flexible and dynamic approach to airline investment among European carriers.".

The ultimate objective of the European Union is to create an Open Aviation Area: a single air transport market between the EU and the US in which investment can flow freely and in which European and US airlines can provide air services without any restriction, including access to the domestic markets of both parties. The EU negotiating mandate foresaw the possibility of a staged-approach provided that mechanisms are in place to ensure progression to subsequent stages. The agreement contains a strong mechanism for the phase-two agreement within a strictly defined timescale and a list of priority items. The second-stage negotiations will start no later than 30 May 2008.

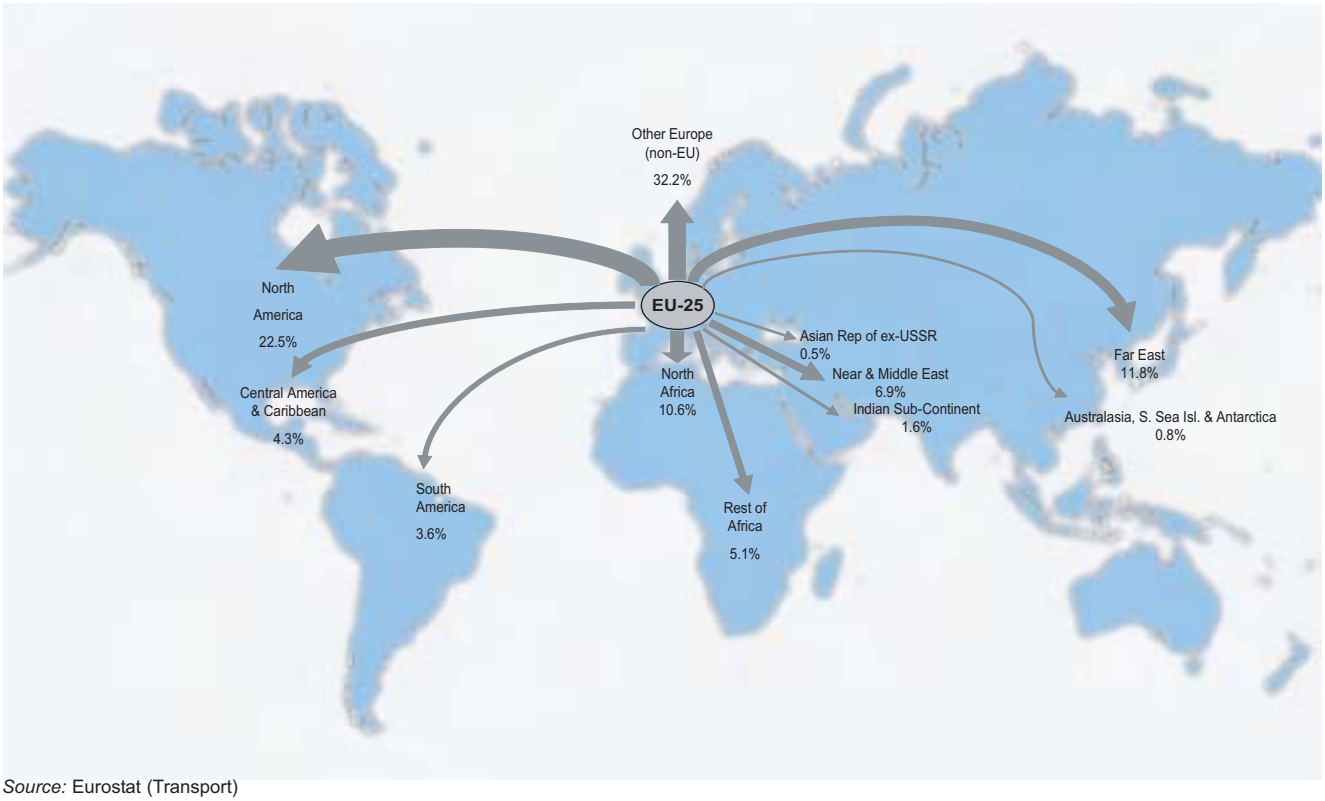
*For further information, visit:: http://ec.europa.eu/transport/air_portal/international/pillars/global_partners/us_en.htm*

# Most extra-EU traffic flies to non-EU Europe and North America

Where are people flying to? Looking at extra-EU transport to particular 'world destinations' at the level of the EU (Map 5.1), the largest number of passengers (more than 80 million) went to 'Other Europe' (i.e. non-EU European countries), forming almost a third of the total (32.2 %). North America followed with a 22.5 % share (56 million passengers).

Against an average 2004-2005 growth rate of 9 %, passenger numbers rose fastest routes to Australasia and South America, which recorded growths of 18 % and 17 % respectively (data not shown).

**Map 5.1** **Destinations of extra-EU passenger air transport, 2005**




*Source:* Eurostat (Transport)

## London Heathrow airport largest handler for international passengers

Considering either international intra-EU or international extra-EU passenger transport, and based on the total number of passengers at arrival and departure within the EU (both in scheduled and non-scheduled traffic), London-Heathrow airport was the busiest airport in 2004, handling 24.7 million passengers in 2005 for intra-EU traffic and 36.3 million for extra-EU flights (Tables 5.38 and 5.39). It was followed by Amsterdam-Schiphol and Paris-Charles de Gaulle for intra-EU traffic but by Paris-Charles de Gaulle and Frankfurt-Main for extra-EU flights.

Compared with the top-15 ranking in 2003, the position of airports did not change a great deal. Thanks to the second highest growth in passenger numbers registered, Munich airport climbed two places to 12th place respectively, while Brussels National airport dropped two places to 14th place. All 15 airports recorded positive passenger growths, with Rome-Fiumicino recording the highest (28 %). The airport displaying the smallest growth was Brussels National airport (1.6 %).

When looking at international extra-EU passenger transport, a slightly different picture emerges, with more airports (12) holding onto their 2003 ranking. While Madrid-Barajas recorded the steepest growth (34 %), unchanging its ranking, the airport to climb furthest up the ranks was Manchester International which, with a growth of 21 %, moved to 10th place.

**Table 5.38 Top-15 airports: total passengers carried in international intra-EU transport, 2005**

| Rank 2005 | Airport | Total pass. carried 2005 | % change 2003-2005 | Rank 2003 |
|---|---|---|---|---|
| 1 | London/Heathrow Airport (UK) | 24 740 120 | 8.9% | 1 |
| 2 | Amsterdam/Schiphol Airport (NL) | 24 353 506 | 11.2% | 2 |
| 3 | Paris/Charles-De-Gaulle Airport (FR) | 22 018 484 | 10.9% | 3 |
| 4 | Frankfurt/Main Airport (DE) | 18 758 140 | 16.8% | 4 |
| 5 | London/Stansted Airport (UK) | 17 961 501 | 20.9% | 6 |
| 6 | London/Gatwick Airport (UK) | 17 235 454 | 10.9% | 5 |
| 7 | Dublin Airport (IE) | 15 896 055 | 7.1%* | 7 |
| 8 | Palma De Mallorca Airport (ES) | 14 637 664 | 10.9% | 8 |
| 9 | Madrid/Barajas Airport (ES) | 12 787 689 | 19.3% | 9 |
| 10 | Manchester/Intl Airport (UK) | 12 772 564 | 10.5% | 11 |
| 11 | Kobenhavn/Kastrup Airport (DK) | 12 604 241 | 5.3%* | 10 |
| 12 | Munchen Airport (DE) | 12 004 119 | 26.9% | 14 |
| 13 | Barcelona Airport (ES) | 11 293 923 | 17.0% | 13 |
| 14 | Bruxelles/National Airport (BE) | 11 027 040 | 1.6% | 12 |
| 15 | Roma/Fiumicino Airport (IT) | 10 044 500 | 28.0% | 15 |

*Source:* Eurostat (Transport)

* Change 2004-2005

**Table 5.39 Top-15 airports: total passengers carried in international extra-EU transport, 2005**

| Rank 2005 | Airport | Total pass. carried 2005 | % change 2003-2005 | Rank 2003 |
|---|---|---|---|---|
| 1 | London/Heathrow Airport (UK) | 36 270 642 | 7.2% | 1 |
| 2 | Paris/Charles-De-Gaulle Airport (FR) | 26 359 900 | 14.2% | 2 |
| 3 | Frankfurt/Main Airport (DE) | 26 028 844 | 6.7% | 3 |
| 4 | Amsterdam/Schiphol Airport (NL) | 19 644 302 | 10.4% | 4 |
| 5 | London/Gatwick Airport (UK) | 11 517 103 | 10.3% | 5 |
| 6 | Madrid/Barajas Airport (ES) | 9 475 415 | 34.0% | 6 |
| 7 | Milano/Malpensa Airport (IT) | 7 675 738 | 18.0% | 7 |
| 8 | Munchen Airport (DE) | 7 470 238 | 22.7% | 8 |
| 9 | Wien/Schwechat Airport (AT) | 6 145 523 | 20.6% | 9 |
| 10 | Manchester/Intl Airport (UK) | 5 922 650 | 21.2% | 12 |
| 11 | Kobenhavn/Kastrup Airport (DK) | 5 682 483 | 4.6%* | 10 |
| 12 | Roma/Fiumicino Airport (IT) | 5 658 973 | 10.1% | 11 |
| 13 | Bruxelles/National Airport (BE) | 4 922 857 | 16.0% | 13 |
| 14 | Paris/Orly Airport (FR) | 4 910 447 | 19.3% | 14 |
| 15 | Düsseldorf Airport (DE) | 4 376 609 | 10.8% | 15 |

*Source:* Eurostat (Transport)

* Change 2004-2005

## London-Heathrow - New York-JFK: largest airport pair in international flights

So much for the individual importance of airports, but what was their importance in airport-to-airport relations? Unsurprisingly, London-Heathow airport was the EU airport to feature most often in international (intra-EU and extra-EU) airport pairs (data not shown). While the largest airport pair for intra-EU air travel was Dublin - London-Heathrow (with 2.1 million passengers), for extra-EU travel it was London-Heathrow - New York-JFK (with 2.9 million passengers). Among the top-ten pairs, London-Heathrow appeared five times for intra-EU travel and eight times for extra-EU travel (data not shown).

# 6. Transport safety

# 6. TRANSPORT SAFETY

## Freedom of movement… safely

A train accident here, an air crash there, an oil spillage on one coastline… With increasing traffic numbers on the ground, on the water and in the air, together with the opening up and interconnecting of national transport networks in an enlarged Europe, it comes as no surprise that transport safety was reiterated as a priority in 'Keep Europe moving', the mid-term review of the 2001 Transport White Paper; a rise in urgency that has also been fuelled by increased terrorist activity in the last few years.

Based on available data covered in this chapter, close to 43 000 lives were lost in traffic accidents in 2005 on EU territory - road, rail and air traffic combined - with road accidents claiming the overwhelming majority (96 %) of these. But the true toll of deaths connected with transport is certainly higher than the modes covered by such a figure, if one were to include maritime accidents or those involving for example metro and light rail, or terrorist attacks on transport networks such as those in London (in 2005), or worse still those in Madrid (2004) when looking at other years.

Although the overall mortality rate has been steadily in decline, much has been done at EU level to reduce it further through safety initiatives in the various transport modes, including the setting up of specialised agencies, the creation of a road safety charter, the recent adoption of legislation on issues such as driving and rest times for professional drivers, obligatory seat-belt wearing,… as well as a raft of other measures or research projects on vehicle safety.

## Cars and roads take most lives

The car is obviously people's preferred mode of transport (see previous chapters), but at the same time the transport mode causing the highest number of accidents and the highest death toll. Based on available data from the CARE database (see box), there were close to 1.3 million road accidents in the EU-25 in 2005, representing nevertheless a decline on the number in 2004.

Of these cases, close to 41 300 lost their lives: car drivers and passengers, bus and coach occupants, powered two-wheelers' riders and passengers, cyclists, pedestrians, commercial vehicle drivers, etc. This translates as 90 road deaths for every million inhabitants in the EU in 2005. Note that this calculation is based on all persons killed within generally 30 days from the day of the accident. This total represents a decrease of 5 % on the 2004 death toll.

To put these figures into some perspective, although occasional air, rail and maritime accidents often bring about high death tolls in a shocking big bang, if each 'isolated' road death were cumulated into equally as large news-breaking numbers, road disasters would clearly grab the headlines far more often.

## Measuring transport safety

Measuring transport risk - and comparing it with other countries - is not clear cut, for there are different ways of measuring it. One method is to simply count the number of accidents and divide it by the total population, to arrive at, for example, the number of deaths per million inhabitants. But while the mortality-population ratio cancels out countries' respective population differences, it does not reflect the actual usage or transport performance of the transport mode.

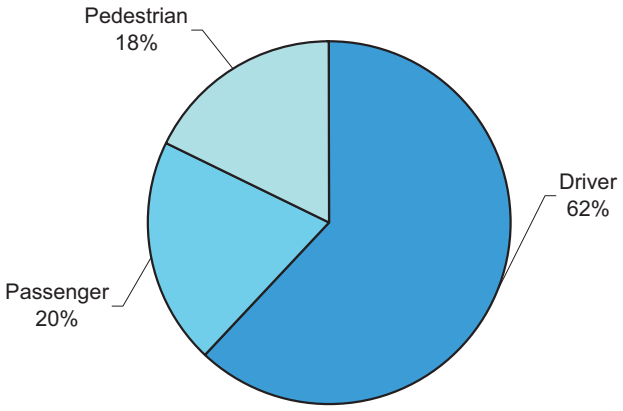
For example, one train accident resulting in a hundred deaths in a very small country would give a very high ratio of deaths per million inhabitants, but if only 10% of the population use the train and for short journeys, this does not say much about the relative safety of rail travel, compared with say the car.

Linking the number of deaths with the distance travelled serves as a better measure in this respect: the unit of measure representing the transport of one passenger over a distance of one kilometer.

This said, when it comes to making comparisons with air transport, reliable statistics on passenger kilometres in air traffic are scarce. What is more, even if reliable pkm figures were obtainable, the picture would nevertheless be distorted since only a few accidents happen during the cruising phase; most happen at take-off and during the initial climb or during the final approach and landing. Long-haul flights are therefore not noticeably more dangerous than short-haul flights

Another problem is posed by the differentiation between passenger, driver and even also third party deaths (such as a pedestrian crossing the road for example). For a passenger faced with choosing between one transport mode or the other, data based on passenger deaths are probably the most valuable, rather than a general indicator which includes drivers, pedestrians and passengers.

**Figure 6.1 Breakdown of fatalities by type of user, EU-25*, 2004 (in %)**




*Source*: CARE database

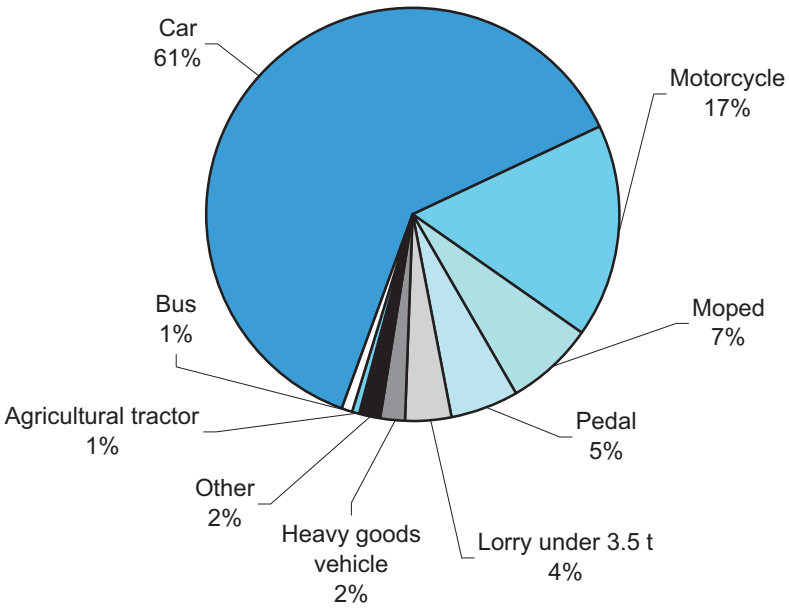
*Estimated data (data covering 21 Member States accounting for 96 % of the EU-25 road death toll in 2004)

Based on 2004 data from CARE covering 21 Member States (Figure 6.1), 62 % of road deaths involved drivers, 20 % passengers and 18 % pedestrians. Men were most at risk, accounting for 77 % of these fatalities (data not shown).

As illustrated in Figure 6.2, the car accounts for the largest number of fatalities, which is not to say that it is the riskiest road vehicle, of course, but reflects more the extent of car usage (see passenger transport (in chapter 5). Based this time on EU-15 data for 12 Member States (albeit excluding Germany), which suggest to some extent the overall situation in the EU-25, an estimated 61 % driver and passenger fatalities on the road involved a car. Motorcycles accounted for the second largest number of deaths (17 %). They were followed by other two-wheelers: mopeds (7 %) and bicycles (5 %).

Interestingly, perhaps contrary to popular belief, most accidents happen off the motorway on urban and outer urban areas, when looking at EU-15 data for 14 Member States (excluding Germany). In 2004, just 5 % of accidents happened on motorways, compared with 94 % on other roads. In terms of fatalities, this balance was respectively 7 % and 92 %.

**Figure 6.2 Breakdown of driver and passenger fatalities on the road, by type of vehicle involved, EU-15*, 2004 (in %)**




*Source*: CARE database

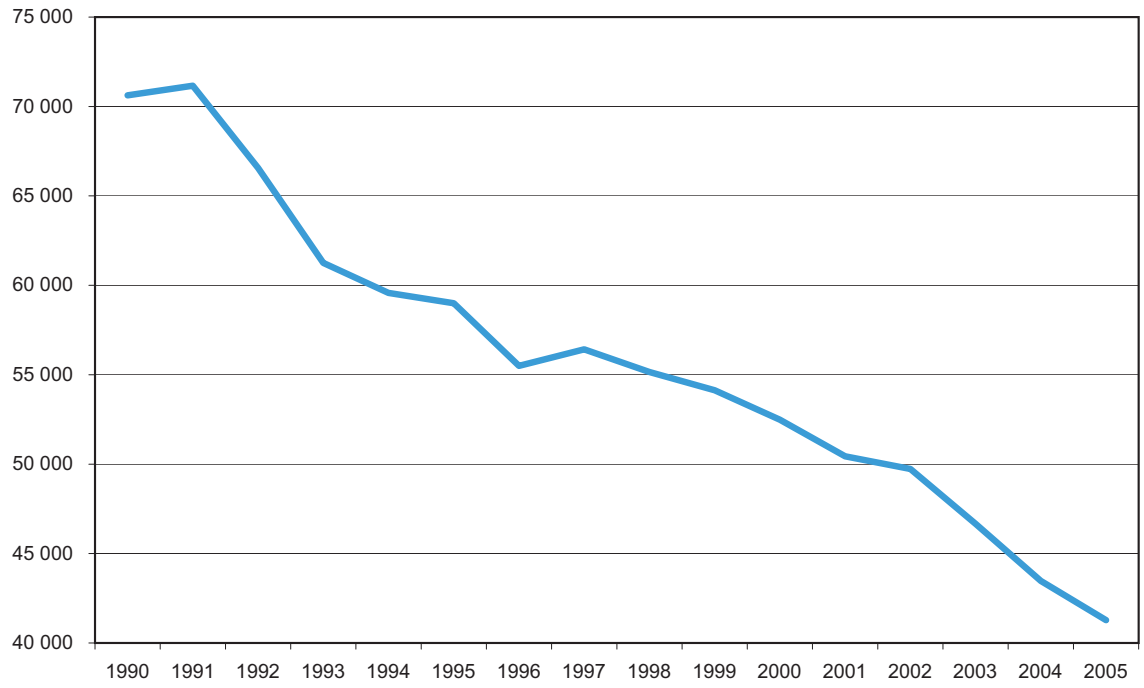
*EU-15 data based on data available for 12 Member States accounting for an estimated 81 % of total driver and passenger fatalities in the EU-15 in 2004.

## CARE-ing for road users

The Community Road Accident Database - 'CARE' for short - is a Community database on road accidents resulting in death or injury, based on detailed data of individual accidents as collected by the Member States. Offering a high level of disaggregation, CARE distinguishes itself from most other existing international databases. This structure allows for maximum flexibility and potential with regard to analysing the information contained in the system and opens up a whole set of new possibilities in the field of accident analysis. The database is maintained by DG Energy and Transport.

*For more information, visit: http://ec.europa.eu/transport/care/index_en.htm*

**Figure 6.3 Evolution of road fatalities*, EU-25, 1990-2005**




*Source*: DG Energy and Transport

*All fatalities on the road: car drivers and passengers, bus and coach occupants, powered two-wheelers' riders and passengers, cyclists, pedestrians, commercial vehicle drivers, etc.

While the total road death toll is shocking - tantamount to the decimation of many a European town - it was actually far less than the peak of 71 160 deaths recorded in 1991 (over the 1990-2005 period), representing a decline of almost 42 % (Figure 6.3). This record is all the more encouraging when viewed against the simultaneous rise in road traffic over the same period (see Chapter 5). The reasons for the decline in deaths are many and include safer cars and infrastructure, together with both stricter laws and a better perception of the risks connected with non-wearing of seat belts, speeding and drink-driving (see box on page 130).

## Transport accidents major external cause of death among the under-20s in 2005

Within the EU-27, 25% of the deaths among those under 20 years old were due to external causes (mainly accidents and suicides) based on 2005 data. Around half of these were due to transport accidents, which killed almost two and a half times more males than females. The highest male death rates with respect to transport accidents were found in Cyprus (22 deaths per 100 000 men aged 0-19), Lithuania (18), Greece and Latvia (both 12), Portugal (11), and the lowest in the Netherlands (3), Sweden (5), Bulgaria, Germany, Ireland and United Kingdom (both 6).

*For further information, see Statistics in focus, 'Causes of death in the EU', Population and Social conditions, 10/2006.*

## Country averages mask regional differences

Of course country totals are only averages of the numerous regions that make up a country. Regional data (NUTS) for 2004 show a very wide range in the fatality ratio around the EU-25, when measured as persons killed per million passenger cars registered.

For example, despite the progress noted over the last decade, many Greek regions continue to display high fatality rates: among the 10 most dangerous regions, seven were located in Greece in 2004. This was particularly the case for the region Sterea Ellada with a figure of 1 576 persons killed in road accidents per one million passenger cars registered, far ahead of the regions Peloponnisos (1 159) and Dytiki Ellada (1 095).

The Polish region of Warminsko-Mazurskie came fourth place (815). Because no regional breakdown is available for Latvia, this country came fifth place (752). The other non-Greek region in the top-10 was Észak-Alföld in Hungary (670).

*For more information, see Statistics in Focus, 'EU road safety 2004: Regional differences', Transport, 14/2007.*

As shown in Table 6.1, downward trends between 1990 and 2005 were evident in nearly all Member States with declines in road deaths per million inhabitants of up to 62 % (Estonia). Only Malta showed an increase, which was moreover exceptionally high at 325 %: an increase which can be explained by the small absolute numbers involved (rising from only 4 to 17 deaths). Just as is the case with other small Member States, a very low number of serious accidents can greatly affect the national result.

Although there was generally a positive correlation between population size and fatality numbers, there were some exceptions. For instance, contrary to what one might have expected, the highest death toll was not in Germany - the largest Member State population-wise - but in Poland (5 444), a country with a population about half of the size of Germany's. Of the EU's largest Member States, the United Kingdom recorded the lowest number of fatalities (3 336), considerably less than similarly populated France and Italy.

Those are the absolute numbers, but how do Member States' records compare when measured against population or passenger car numbers or total passenger kilometres?

As regards the first two indicators, the Member States which came out best compared with the EU average were Malta, the Netherlands, and Sweden (Table 6.2). These three Member States recorded fatality rates of between 42 and 49 per million inhabitants, which was around half the EU average of 90, and of between 80 and 106 per million passenger cars, compared with an EU average of 188.

By contrast, the countries with the highest rates were Lithuania and Latvia, Lithuania recording the top rate of 223 deaths per million inhabitants (two and a half times the EU average) and Latvia the top rate of 595 for deaths per million passenger cars (more than three times the EU average).

When relating the number of deaths with the number of passenger kilometers travelled, there were an estimated 9 deaths for every billion passenger kilometers in the EU-25. However, readers should note that this estimate is based on the sum of passenger kilometres for cars and motorised two-wheelers, and therefore does not take into account other forms of road transport, notably buses and coaches or bicycles.

Based on this indicator, Latvia displayed the highest ratio at an estimated 41 deaths per billion passenger kilometers travelled, followed a long way behind by Poland (29). By contrast, among the nine Member States displaying below-average rates, the Netherlands, Sweden and the UK showed the lowest, with mortality rates of between 4 and 5 each.

With road deaths taking the greatest toll among transport modes, it is not surprising that road safety has been at the forefront of the EU's transport concerns. 'Keep Europe moving', the mid-term review of the 2001 Transport White Paper reiterates the aim to halve the number of deaths on the EU's roads by 2010, a goal also incorporated into the Commission's 3rd Road Safety Action Programme[1]. Following the 2004 enlargement, the objective was turned into a maximum figure of 25 000 fatalities a year, which based on current trends will be difficult to meet according to the Commisson.

[1] For more information, visit: http://ec.europa.eu/transport/roadsafety/road_safety_observatory/care_en.htm.

**Table 6.1** Evolution of road fatalities*, by country, 1990-2005

| | 1990 | 2005 | % change 1990-2005 |
|---|---|---|---|
| **EU-25** | **70 628** | **41 274** | **-42%** |
| **BE** | 1 976 | 1 089 | -45% |
| **BG** | 1 567 | 957 | -39% |
| **CZ** | 1 291 | 1 286 | -0.4% |
| **DK** | 634 | 331 | -48% |
| **DE** | 11 046 | 5 361 | -51% |
| **EE** | 436 | 168 | -61% |
| **EL** | 2 050 | 1 614 | -21% |
| **ES** | 9 032 | 4 442 | -51% |
| **FR** | 11 215 | 5 339 | -52% |
| **IE** | 478 | 399 | -17% |
| **IT** | 7 151 | 5 426 | -24% |
| **CY** | 116 | 102 | -12% |
| **LV** | 947 | 442 | -53% |
| **LT** | 933 | 760 | -19% |
| **LU** | 70 | 46 | -34% |
| **HU** | 2 432 | 1 278 | -47% |
| **MT** | 4 | 17 | 325% |
| **NL** | 1 376 | 750 | -45% |
| **AT** | 1 391 | 768 | -45% |
| **PL** | 7 333 | 5 444 | -26% |
| **PT** | 2 646 | 1 247 | -53% |
| **RO** | 3 782 | 2 641 | -30% |
| **SI** | 517 | 258 | -50% |
| **SK** | 731 | 560 | -23% |
| **FI** | 649 | 371 | -43% |
| **SE** | 772 | 440 | -43% |
| **UK** | 5 402 | 3 336 | -38% |
| **HR** | 1 360 | 597 | -56% |
| **MK** | : | 143 | : |
| **TR** | 6 286 | 4 525 | -28% |
| **IS** | 24 | 19 | -21% |
| **LI** | : | 2 | : |
| **NO** | 332 | 224 | -33% |
| **CH** | 954 | 409 | -57% |

*Source*: European Commission (DG Energy and Transport)

* All fatalities on the road: car drivers and passengers, bus and coach occupants, powered two-wheelers' riders and passengers, cyclists, pedestrians, commercial vehicle drivers, etc.

**Table 6.2** Selected road fatality indicators, by country, 2005 (in number of deaths)

| per million inhabitants | | per million passenger cars | | per billion pkm* | |
|---|---|---|---|---|---|
| **MT** | 42 | **MT** | 80 | **SE** | 4 |
| **NL** | 46 | **NL** | 106 | **UK** | 5 |
| **SE** | 49 | **SE** | 106 | **NL** | 5 |
| **UK** | 55 | **DE** | 116 | **FI** | 6 |
| **DK** | 61 | **UK** | 118 | **DE** | 6 |
| **DE** | 65 | **LU** | 150 | **DK** | 6 |
| **FI** | 71 | **FI** | 153 | **IT** | 7 |
| **FR** | 88 | **IT** | 157 | **FR** | 7 |
| **EU-25** | **90** | **DK** | 168 | **LU** | 7 |
| **IT** | 93 | **FR** | 175 | **EU-25** | **9** |
| **AT** | 93 | **AT** | 185 | **AT** | 9 |
| **IE** | 96 | **EU-25** | **188** | **BE** | 10 |
| **LU** | 101 | **ES** | 219 | **MT** | 11 |
| **ES** | 102 | **BE** | 221 | **ES** | 12 |
| **BE** | 104 | **IE** | 240 | **IE** | 16 |
| **SK** | 104 | **SI** | 273 | **SI** | 16 |
| **PT** | 118 | **CY** | 287 | **EE** | 17 |
| **EE** | 125 | **PT** | 297 | **PT** | 18 |
| **CZ** | 126 | **CZ** | 325 | **CZ** | 18 |
| **HU** | 127 | **EE** | 340 | **EL** | 22 |
| **SI** | 129 | **EL** | 369 | **SK** | 23 |
| **CY** | 135 | **PL** | 441 | **HU** | 27 |
| **PL** | 143 | **SK** | 430 | **CY** | 28 |
| **EL** | 145 | **HU** | 442 | **LT** | 29 |
| **LV** | 192 | **LT** | 522 | **PL** | 29 |
| **LT** | 223 | **LV** | 595 | **LV** | 41 |

*Source*: European Commission (DG Energy and Transport)

* Indicator based on passenger kilometres of cars and motorised two-wheelers only (2004 data) and road fatalities in 2005.

## Measures make a difference for life

A comparative study* of the developments of road safety in Sweden, the United Kingdom, and the Netherlands concluded that, from 1980 to 2000, in three of the countries with the best road safety record, fatality trends had dramatically decreased, due to:

- Passive safety measures: 15 % to 20 %
- Wearing of seat belts: 15 % to 20 %
- Alcohol counter-measures: 15 % to 20 %
- Specific measures for vulnerable road users: 30 % to 40 %
- Actions targeting infrastructure: 5 % to 10 %
- Education, training and communication: 7 % to 18 %

** For more information, see 'Sunflower report' here: http://ec.europa.eu/transport/roadsafety/publications/doc/ sunflower_paper.pdf*

## Intelligence in the driving seat

Although car manufacturers have gone to great efforts to improve their vehicles' passive and active safety, research shows that existing measures are not enough in most countries, and experts agree that more emphasis should be placed on preventive and active safety.

The EU's **TRACE** project aims to update the knowledge achieved so far about the causes of road accidents and will evaluate the effectiveness of technology-based traffic safety countermeasures.

Statistical analysis of road accidents is being undertaken from three research angles: road users, pre-accident driving situations, and risk factors. This will help to both identify the nature and the magnitude of the safety problems, and analyse accident causation issues.

This is being backed up by methodological work on epidemiological and statistical issues concerning accident causation and risk analysis, as well as on how to handle the human factors in accident causation and the evaluation of the safety benefits of technology.

*For more information, visit: http://www.trace-project.org/*

The Commission's **Intelligent Car Initiative** comes in here as a comprehensive answer to the need of citizens, industry and the Member States to find common solutions to Europe's mobility problems and to improve the take-up of ICT in road transport. In the long run, it aims to move towards a new situation, with fewer accidents and less congestion.

The term 'Intelligent Cars' refers to a wide range of ICT-based stand-alone or co-operative systems, including infrastructure systems. Certain stand-alone systems are already in use, including anti-lock braking systems (ABS), and electronic stability programme (ESP) systems which help the driver maintain control of the vehicle in critical driving situations.

A variety of newer systems are under development or being introduced onto the market. 'eCall' automatically triggers an emergency call if the vehicle is involved in a serious accident. Other systems on the horizon include adaptive cruise control to help keep distance from the vehicle ahead, lateral support systems for lane changing and accidental lane departure, hypovigilance systems for sleepy drivers.

*For more information, visit: http://ec.europa.eu/information_society/activities/esafety*

[1] For more information, visit: http://ec.europa.eu/transport/roadsafety/road_safety_observatory/care_en.htm.

## Fewer mortalities on the railways

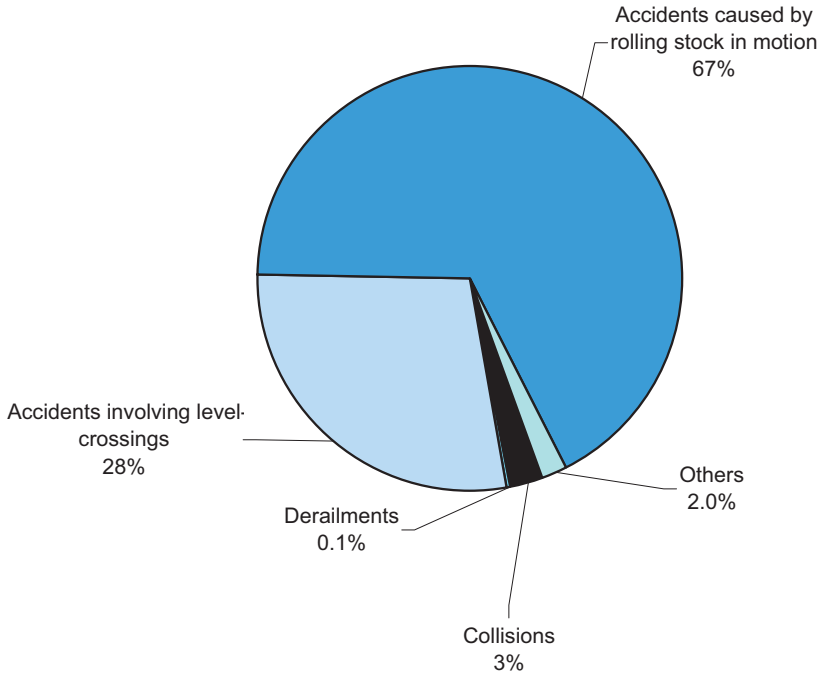
Despite rail travel sometimes being a less appealing mode of transport for many EU citizens, it gave rise to far fewer fatalities: in 2005 a total of 1 464 fatalities (excluding suicides) were due to railway accidents. This is a small figure nonetheless when compared with the road death toll, translating as about 3 deaths for every million inhabitants, significantly less than the 90 recorded for road accidents.

Of these mortalities, only 4 % (62) were passengers, which was also considerably lower than the share in road accidents. As shown in Figure 6.4, of the total mortalities 67 % were killed in accidents caused by rolling stock in motion (people trespassing and walking on the line, and a small fraction of employees carrying out maintenance work and in shunting procedures) and 28 % in level-crossing accidents. Collisions accounted for only 3 % and derailments for a minute share of 0.1 %.

A further 1 648 persons were seriously injured in 2005, with accidents caused by rolling stock in motion accounting for 32 % of this total, accidents at level-crossings for 28 % and collisions for 10 %.

From the point of view of passenger safety, the number of passenger fatalities has generally tended to decrease over time. Between 2004 and 2005, they decreased by 25 % from a total of 83 to 62. Of course, with such relatively small numbers, a single major accident can seriously influence statistical trends: this was the case, for example, in 1998 with the high-speed rail accident at Eschede in Germany, claiming over 100 lives (data not shown).

**Figure 6.4 Breakdown of rail accident mortalities by cause, EU-25, 2005 (in %)**




*Source*: Eurostat (Transport)

Table 6.3 Number of accidents involving dangerous goods, EU-25, 2005

| | Total number of accidents involving dangerous goods | Number of accidents releasing dangerous goods | Number of accidents involving dangerous goods per billion tkm of dangerous goods transport |
|---|---|---|---|
| **EU-25** | **74** | **31** | **:** |
| **BE** | 0 | 0 | 0 |
| **CZ** | 0 | 0 | 0 |
| **DK** | 2 | 0 | 17 |
| **DE** | 5 | 0 | 0 |
| **EE** | 4 | 0 | 1 |
| **IE** | 0 | 0 | 0 |
| **EL** | 0 | 0 | 0 |
| **ES** | 9 | 0 | 3 |
| **FR** | 5 | 2 | : |
| **IT** | 0 | 0 | 0 |
| **LV** | 0 | 0 | 0 |
| **LT** | 7 | 0 | 2 |
| **LU** | 0 | 0 | 0 |
| **HU** | 0 | 0 | 0 |
| **NL** | 5 | 0 | 10 |
| **AT** | 21 | 20 | 15 |
| **PL** | 1 | 0 | 0 |
| **PT** | 1 | 0 | 13 |
| **SI** | 0 | 0 | : |
| **SK** | 0 | 0 | 0 |
| **FI** | 0 | 0 | 0 |
| **SE** | 3 | 0 | 3 |
| **UK** | 11 | 9 | 9 |
| **LI** | 0 | 0 | 0 |
| **NO** | 2 | 2 | 5 |

*Source*: Eurostat (Transport)

CY and MT do not have any rail network.

As with any mode of transport, accidents involving dangerous goods can escalate into a far greater tragedy than for example the crash itself, opening the door to hazards such as fire, explosion, chemical burn or environmental damage, the effects of which can ripple out far further than the actual accident scene.

As shown in Table 6.3, in 2005 there were 74 rail accidents involving dangerous goods in the EU-25, of which 31 concerned accidents in which dangerous goods were released, i.e. spillage resulting in contamination of the soil, release of harmful gaseous substances, etc. Generally, the number of such accidents in 2005 was very low in most Member States (zero or close to zero). With 21 accidents involving dangerous goods, Austria recorded the highest number, and 20 were accidents releasing dangerous goods. It was followed by the UK (11) and Spain (9).

Looking at the number of accidents only gives part of the picture, however. A fairer evaluation of relative safety is obtained when bringing transport performance into the equation, i.e. the number of accidents involving dangerous goods per billion tonne-kilometres (tkm) of dangerous-goods transport. Using this indicator, Denmark in fact emerges as the Member State recording the highest rate, with 17 accidents per billion tkm, ahead of Austria (15). Portugal ranked third (13).

## Sky-high safety in the air

The safety of air transport has been top on the EU's priority list ever since the introduction of a common air transport policy. And with air traffic increasing and EU air space opening up to competition by numerous operators from within and beyond the EU, it has never been so high on the agenda. This has been all the more so since the 11 September terrorist attacks, which emphasised the question of 'air security' - as opposed to air safety - which targets the prevention of illegal acts in aviation.

Figure 6.5 shows the number of deaths both over EU territory (regardless of whether the operator was registered in the EU or not) and resulting from accidents anywhere in the world involving EU operators. This is an important distinction, given that the planes flying over our heads are from EU and non-EU countries. Such information can feed into measures taken to increase air safety, such as for example setting stringent safety standards for EU air carriers or for banning non-EU carriers that fail EU requirements (see box).

As can be seen, the evolution of lives lost over EU-25 territory by any operator follows very closely that of lives lost by EU-25 operators anywhere. While the two indicators are different, a closer look at the specific accidents involved explains some of this overlap.

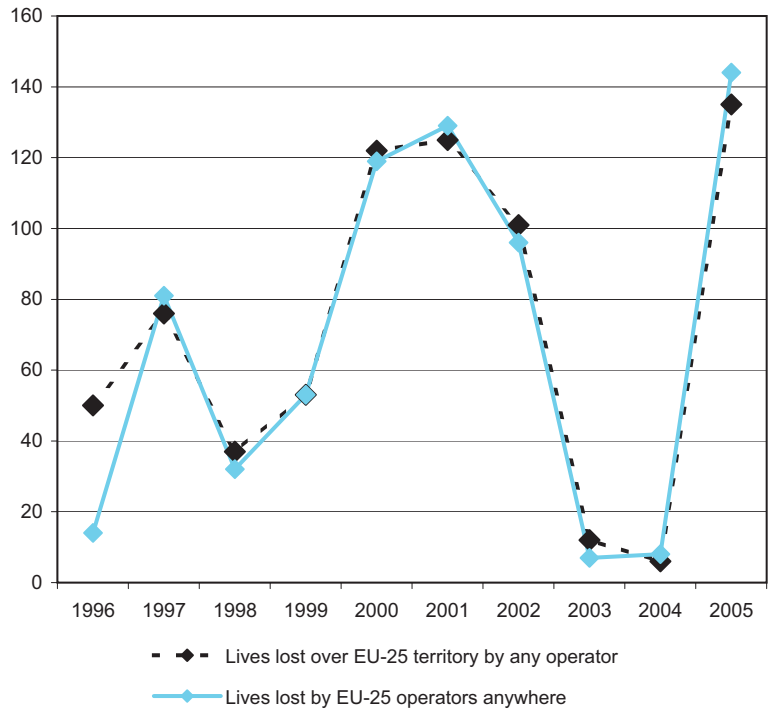
For instance, the accident peaks for both indicators in 2000, 2001 and 2005 involved EU operators with the accidents happening over EU territory: in 2000 Concorde in Paris, claiming 109 lives of the 122 recorded for that year; in 2001 an accident in Milan killing 110 (of the 125 recorded for that year), and in 2005 an accident in Greece which was responsible for 121 of the 135 lives lost that year.

A different explanation holds however for the very close death tolls in 2002. Of the 101 lives lost over EU territory by any operator, 71 of these can be explained by an accident happening over Southern Germany but which involved a non-EU registered aircraft. Meanwhile, several smaller-scale accidents were responsible for the 96 lives lost by EU-25 operators anywhere, among which perhaps the most notable was a crash in Luxembourg, claiming 20 lives.

Although caution should be exercised when studying this breakdown, the data can be used to help identify weak points in the system. In addition to faulty equipment, many air accidents have been ascribed to failings in air traffic management and pilot error, such as handovers of flights between different zones or verbal communication between them and pilots.

In early 2004, the EU adopted a package of legislation as the first step in creating the so-called 'single European sky'. This initiative seeks to promote a more rational organisation of European airspace, increasing capacity while ensuring uniformly high safety standards throughout Europe. It aims to put in place a framework for decision-making and operational improvement that will enhance the efficiency, safety and cost-effectiveness of the system.

**Figure 6.5 Evolution of fatalities* in air accidents, EU-25, 1996-2005**




*Source*: Aircclaims

* Onboard fatalities only

### Air safety gets extra thrust with airline blacklist and website

One fairly recent, decisive step towards enhancing European air safety and passenger protection was taken in early 2006 with a regulation* which allows the European Commission to keep European airspace free from airlines and aircraft considered to be unsafe.

Since then the Commission has provided a regularly updated list online of airlines considered to be unsafe and therefore not permitted to fly passengers or cargo in the EU or operate within European airspace. States where these airlines were registered include, inter alia, the Democratic Republic of the Congo, Equatorial Guinea, Sierra Leone and Swaziland.

In addition to its punitive effect, it is expected that the blacklist will encourage all airlines operating in Europe to comply fully with safety standards and will dissuade unscrupulous airlines from starting up services in Europe. One important consequence will be to root out the practice of flags of convenience whereby some countries issue Air Operation Certificates to dubious airline companies. Through its wide publication the list could have an impact world-wide.

The above Regulation also gives passengers the right to be informed about the identity of the airline which will operate the flight(s) for which they have made a reservation.

*For more information, visit:*
*http://ec.europa.eu/transport/air-ban/ and http://ec.europa.eu/transport/air_portal/index_en.htm*

** Regulation (EC) No 2111/2005 of the European Parliament and of the Council of 14 December 2005 on the establishment of a Community list of air carriers subject to an operating ban within the Community and on informing air transport passengers of the identity of the operating air carrier.*

## Maritime safety: casting the safety net wider

Remember the very tragic maritime accident of the M/S Estonia in 1994 in which 852 lives were lost in a roll-on roll-off ferry that sunk in the Baltic Sea? Or the somewhat more recent Erika and Prestige accidents in respectively 1999 and 2002, which wreaked havoc to the EU's coastlines after spilling their toxic cargo (Table 6.4)? This is of course without even speaking of the countless lives lost on small fishing and leisure boats every year.

**Table 6.4 Selected major oil spills in Europe**

| Name of ship | Year | Location | Oil lost (t) |
|---|---|---|---|
| **Amoco Cadiz** | **1978** | off Brittany, France | 223 000 |
| **Haven** | **1991** | Genoa, Italy | 144 000 |
| **Torrey Canyon** | **1967** | Scilly Isles, United Kingdom | 119 000 |
| **Irenes Serenade** | **1980** | Navarino Bay, Greece | 100 000 |
| **Urquiola** | **1976** | La Coruna, Spain | 100 000 |
| **Independenta** | **1979** | Bosphorus, Turkey | 95 000 |
| **Jakob Maersk** | **1975** | Oporto, Portugal | 88 000 |
| **Braer** | **1993** | Shetland Islands, United Kingdom | 85 000 |
| **Prestige** | **2002** | Cape Finistere, Spain * | 77 000 |
| **Aegean Sea** | **1992** | La Coruna, Spain | 74 000 |
| **Sea Empress** | **1996** | Milford Haven, United Kingdom | 72 000 |
| **Erika** | **1999** | Brittany, France | 20 000 |

*Source*: DG Energy and Transport

## Navigating the seas ahead

Since the early 1990s, and particularly in the wake of such accidents, the EU has introduced legislation aimed at improving the level of maritime safety and the prevention of accidental pollution by ships. The third maritime safety package should reinforce existing legislation, notably regarding classification societies, port state control, monitoring of maritime traffic, responsibility of flag states, maritime accident investigations and liability of ship-owners.

The Green Paper 'Towards a future Maritime Policy for the Union: A European vision for the oceans and seas' is a further step in this direction, which has the protection of Europe's maritime ecosystems, as well as economic growth and jobs close at heart.

*For more information, visit: http://ec.europa.eu/maritimeaffairs*

Reliable data on the number of deaths occurring in maritime transport operations are not easy to obtain: a situation that can again be explained by the previously mentioned problem of flags of convenience, a practice whereby many EU ship operators register vessels in non-EU registers. However, as seen in Chapter 3, the share of such registrations can be sizeable; a presentation of EU-registered accidents alone would therefore significantly distort the true situation.

Fatalities aside, data are however obtainable on ship losses from Lloyds' Register Fairplay[2]. 'Ship losses' refers to vessels that following an incident have ceased to exist either because they were irrecoverable or broken up. Of the 23 Member States that owned ships of 1000 GT and above (excluding Luxembourg and Slovakia) - numbering close to 11 000 vessels in 2005 - only eight of these countries registered losses of ships, i.e. a total of 15. This translates as 0.14 %. Greece lost the largest number (6), followed by Germany (3), which perhaps is not surprising given that they shared well over half the EU-25 fleet between them.

## Agencies of safety

Given increased concerns about transport safety, the EU has stepped up its determination to improve mobility safety through the creation of a number of specialised agencies in the past few years. Opening for operation in 2005, the **European Railway Agency (ERA)** in Valenciennes, France, has the task of helping the Community to establish an integrated European railway area by reinforcing safety and interoperability of railways throughout Europe.

*Visit: http://www.era.eu.int*

Seated in Cologne, Germany, the **European Aviation Safety Agency (EASA)** is the centrepiece of the European Union's strategy for aviation safety. Its mission is to promote the highest common standards of safety and environmental protection in civil aviation.

*Visit: http://www.easa.eu*

Created in the aftermath of the Erika disaster, the **European Maritime Safety Agency (EMSA)**, enhances the maritime safety system in the Community, through helping to reduce the risk of maritime accidents and marine pollution from ships and the loss of human lives at sea. It has been operational since 2002 and is located in Lisbon, Portugal.

*Visit: http://www.emsa.eu*

With regard to road safety, the **European Road Safety Observatory (ERSO)** is both a forum in the EU for exchanging best practices and a coordinator of all Community activities in the fields of road accident and injury data collection and analysis. More specifically, it is developing homogeneous accident data collection protocols in several EU countries and constituting an injury and fatal accident databank.

*Visit: http://www.erso.eu*

[2] For more information, visit: http://www.lrfairplay.com/

# 7. Energy consumption and the environment

# 7. ENERGY CONSUMPTION AND THE ENVIRONMENT

## On the road to sustainability

The transport sector is the fastest growing consumer of energy and producer of greenhouse gases in the EU, even if advances in transport technology and fuel have resulted in marked decreases in emissions of certain pollutants.

Although issues in their own right, the environment and energy clearly come together when looking at the subject of transport sustainability, for consumption and emissions are fairly closely linked: what goes into the fuel tank comes out of the exhaust pipe in the form of emissions.

Improving the sustainability of the transport sector clearly requires a more comprehensive and integrated approach which reconciles transport, environment and energy policies. And it necessitates policies that combine legislation and economic instruments, with a shift in focus from 'end-of-pipe' actions to ones that are more preventative.

Against the backdrop of mounting energy concerns, among which an oil price hike in early 2006, 'Keep Europe Moving', the mid-term review of the 2001 White Paper also highlighted the need to make transport contribute more to energy security, by consuming less. Of total final energy consumption in the EU, the transport sector (excluding maritime transport) accounted for a share of nearly 31% in 2004.

Integration of environmental considerations has been high on the political agenda following the Treaty of Amsterdam, which introduced 'sustainable development' as one of the EU's core objectives. But worryingly, according to the mid-term review, the measures taken so far will not be enough to counter the increasing environmental pressures of transport especially when it comes to $CO_2$ emissions.

The following chapter looks first at what goes into the fuel tank, energy consumption, before inspecting what comes out of the exhaust pipe, in the form of emissions.

## 7.1 ENERGY CONSUMPTION

A look at data on final energy consumption helps to estimate the scale of environmental impacts of energy use, such as air pollution, global warming and oil pollution. They can be used to help monitor the performance of key policies that can steer energy consumption and stimulate energy efficiency. The type and extent of energy-related pressures on the environment depends both on the sources of energy (and how they are used) and on the total amount of energy consumed.

Final energy consumption covers all energy delivered to the final consumer's door (in the industry, transport, household and other sectors) for all energy uses. Deliveries for transformation and/or own use of the energy producing industries, as well as network losses are however not included.

In the following pages, final energy consumption in transport refers to fuels used in all transport activities irrespective of the economic sector in which the activity occurs, i.e. fuels consumed in: land transport (NACE 60) excluding pipelines; water transport (61) excluding maritime transport; and air transport (62). Readers should also note that data show the amount of fuel supplied in the EU, but by the very nature of certain types of transport, and notably air transport, the fuel may be used outside the EU (i.e. on flights to non-EU countries).

In addition, the following points should also be noted when looking at the individual transport modes.

Road transport fuels include leaded and unleaded petrol, diesel, motor spirits and LPG, but exclude lubricants.

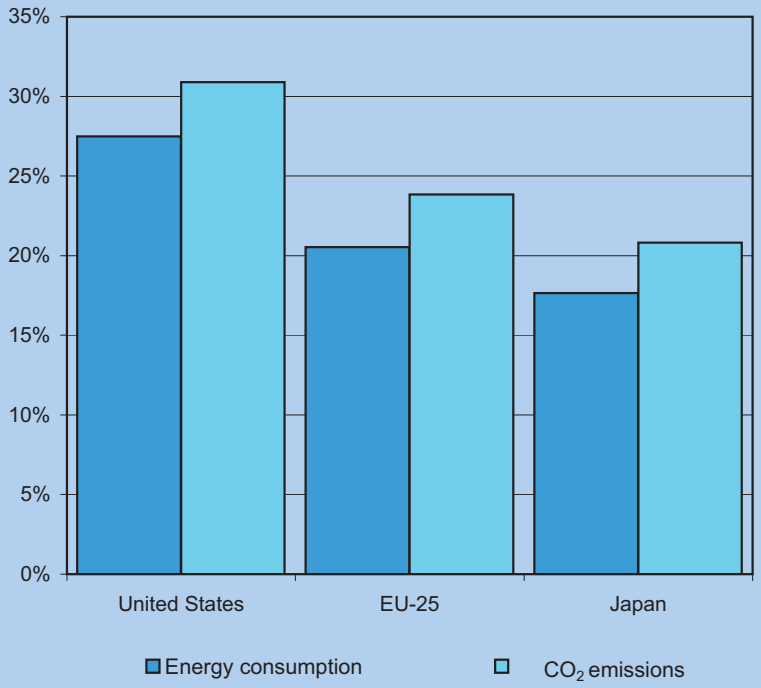
Rail transport includes main energy sources (electricity, diesel and LPG), but excludes coal because of its very small share; for electricity a conversion factor was used. Electrified urban transport systems such as metro and tramways are also included.

When it comes to air transport, data show the amount of aviation fuel supplied, but as mentioned above, by the very nature of the industry, the fuel may in fact be used in or over many other countries.

Finally, inland navigation covers diesel oil and includes consumption by small vessels (including leisure boats) performing coastal shipping and not using fuel from international maritime bunkers (hence the term 'inland navigation' as opposed to 'inland waterways'). This explains data for countries without a significant inland waterway network.

## EU-25 performs better than the US, but worse than Japan

**Figure 7.1** **Importance of transport in total primary energy supply* and in total $CO_2$ emissions**, EU-25, United States and Japan, 2004 (%)**




*Source*: IEA/OECD

*Total amount of primary energy consumed, as opposed to total final consumption. Primary energy supplied includes energy transformed into other forms and the energy used to do this transformation. It also includes losses through transportation, friction, heat loss and other inefficiencies. It is the result of domestic energy production plus imports, minus exports, stock changes and international marine bunkers.
**Carbon dioxide emissions from all transportation include emissions from combustion of fossil fuels for road, rail, air, and other forms of transportation, but do not include international aviation or maritime emissions.

Comparable data from the International Energy Agency and the OECD helps to put the performance of the EU-25 in terms of energy consumption and $CO_2$ emissions into an international perspective.

Based on the share of transport in total primary supplied, which, it should be noted, renders a different share to that using total final consumption (see Figure 7.1), transport accounted for 21 % of energy consumption in the EU-25, which was 6 percentage points less than the transport share in the United States, but 3 percentage points more than that in Japan. Industry, services, among others, accounted for the remaining shares.

A similar pattern emerges for the share of transport in $CO_2$ emissions, which was albeit proportionally higher. Whereas in the EU-25 this share was 24 %, in the United States it was 7 percentage points more (31 %), but 3 percentage points less in Japan. This comparison also highlights the fact that transport pollutes proportionally more than the energy it consumes.

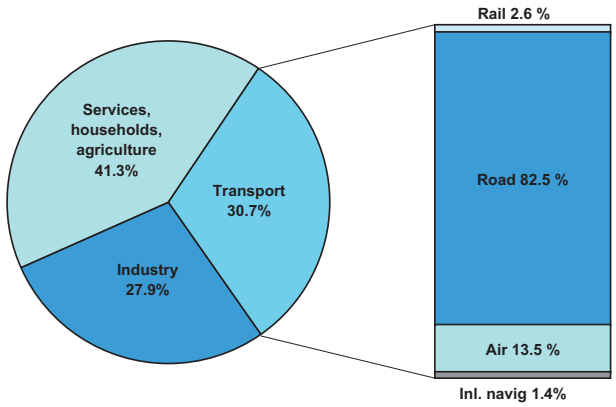
Of note too is the fact that between 1990 and 2004, the transport share in energy consumption rose fastest in the EU-25, compared with the United States and Japan (data not shown). The 18 % share in 1990 meant an increase of 2.5 percentage points, compared with 2004. This contrasts with share growths of 1.6 percentage points for the United States and just 0.7 points for Japan.

## Transport grows to become biggest energy guzzler

With these points in mind, the share of transport (road, rail, inland navigation and aviation) in total final energy consumption (excluding non-energy use) increased between 1990 and 2004 to reach 352 mtoe (million tonnes of oil equivalent) in 2004, or almost 31 % of total final energy consumption (Figure 7.2). This was four percentage points more than its share in 1990 (Table 7.1).

The growth in transport's share in energy consumption meant that it overtook industry's 28 % share (1990: 33 %): a relative change that can also be explained by the changing characteristics of the manufacturing sector. Not only has energy-efficiency been increasing in many manufacturing activities, but many of these activities have gradually migrated to non-EU countries with lower cost bases, thereby reducing industry's share in the EU's final energy consumption.

**Figure 7.2** **Share of transport in final energy consumption*, EU-25, 2004 (in % of million toe)**




*Source*: Eurostat (Energy)

*Final energy consumption covers all energy delivered to the final consumer's door (in the industry, transport, household and other sectors) for all energy uses. Deliveries for transformation and/or own use of the energy producing industries, as well as network losses are however not included. The indicator can be presented in relative or absolute terms. The relative contribution of a specific sector is measured by the ratio between the final energy consumption of that sector and total final energy consumption. It is a useful indicator which highlights a country's sectoral needs in terms of final energy demand.

**Table 7.1** **Evolution of final energy consumption* in transport, industry, households and services, EU-25, 1990-2004 (in million toe)**

| | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 | % change 1990-2004 |
|---|---|---|---|---|---|---|---|---|
| **Final energy consumption** | **1 014** | **1 026** | **1 087** | **1 113** | **1 101** | **1 130** | **1 142** | **13%** |
| **Industry** | 333 | 305 | 312 | 313 | 310 | 315 | 319 | -4% |
| **% share** | 33% | 30% | 29% | 28% | 28% | 28% | 28% | |
| **Households/Services** | 409 | 427 | 441 | 464 | 451 | 470 | 472 | 15% |
| **% share** | 40% | 42% | 41% | 42% | 41% | 42% | 41% | |
| **Transport** | 272 | 295 | 334 | 337 | 340 | 345 | 352 | 29% |
| **% share** | 27% | 29% | 31% | 30% | 31% | 30% | 31% | |

*Source*: Eurostat (Energy)

Table 7.2 Share of transport in final energy consumption*, 2004 (in % of million toe)

| | Share of transport in final energy consumption % |
|---|---|
| LU | 59% |
| MT | 57% |
| CY | 47% |
| ES | 41% |
| GR | 39% |
| IE | 39% |
| PT | 36% |
| UK | 36% |
| DK | 34% |
| IT | 33% |
| FR | 32% |
| LT | 31% |
| EU-25 | **31%** |
| HR | 30% |
| AT | 29% |
| SI | 29% |
| NL | 29% |
| DE | 28% |
| BE | 27% |
| NO | 26% |
| BG | 26% |
| SE | 25% |
| LV | 25% |
| EE | 24% |
| CZ | 24% |
| HU | 22% |
| TR | 22% |
| PL | 20% |
| RO | 20% |
| FI | 18% |
| IS | 15% |
| SK | 15% |

*Source*: Eurostat (Energy)

The importance of transport in final energy consumption varied throughout the EU in 2004, reaching double the EU average in Luxembourg and Malta, at 59 % and 57 % respectively, and dropping to as much as half the EU average in Slovakia and EFTA country Iceland, at 15 % (Table 7.2). These country differences can be explained by various reasons, such as the relative importance of industry and, in some cases, tourism. The high share in Malta, for example, stems essentially from the importance of tourism and the relatively low importance of industry in the Member State.

Luxembourg is somewhat an exception, as transport consumes such a high share principally because of the country's particular geographic location and attractive fuel prices. This results in 'fuel tourism', whereby notably relatively large amounts of road fuel are bought on Luxembourg soil (and therefore recorded by energy data) but not wholly consumed within the country's territory, either through road haulage or the enormous number of cross-border workers commuting by car from the neighbouring countries of Belgium, France and Germany. Energy consumption in aviation also grew fastest in this Member State.

# Air transport second largest energy consumer after road transport

Table 7.3 Evolution of energy consumption by transport mode, 1990-2004*, (in thousand toe)

| | | 1990 | 2004 | % change 1990-2004 | % share in total national consumption in 2004 |
|---|---|---|---|---|---|
| EU-25 | Road | 227 957 | 290 013 | 27% | 82.5% |
| | Railways | 9 125 | 9 250 | 1% | 2.6% |
| | Air transport | 28 378 | 47 420 | 67% | 13.5% |
| | Inland navigation | 6 578 | 5 047 | -23% | 1.4% |
| BE | Road | 6 442 | 8 488 | 32% | 83.2% |
| | Railways | 177 | 170 | -4% | 1.7% |
| | Air transport | 955 | 1 427 | 49% | 14.0% |
| | Inland navigation | 129 | 116 | -10% | 1.1% |
| BG | Road | 2 000 | 2 128 | 6% | 89.9% |
| | Railways | 216 | 65 | -70% | 2.7% |
| | Air transport | 284 | 173 | -39% | 7.3% |
| | Inland navigation | 18 | 0 | -100% | 0.0% |
| CZ | Road | 2 311 | 5 550 | 140% | 90.0% |
| | Railways | 272 | 277 | 2% | 4.5% |
| | Air transport | 221 | 334 | 51% | 5.4% |
| | Inland navigation | - | 6 | - | 0.1% |
| DK | Road | 3 066 | 4 027 | 31% | 78.4% |
| | Railways | 113 | 101 | -11% | 2.0% |
| | Air transport | 683 | 888 | 30% | 17.3% |
| | Inland navigation | 150 | 121 | -19% | 2.4% |
| DE | Road | 50 418 | 53 187 | 5% | 84.9% |
| | Railways | 2 116 | 1 877 | -11% | 3.0% |
| | Air transport | 5 627 | 7 312 | 30% | 11.7% |
| | Inland navigation | 656 | 234 | -64% | 0.4% |
| EE | Road | 730 | 581 | -20% | 87.1% |
| | Railways | 65 | 48 | -26% | 7.2% |
| | Air transport | 36 | 30 | -17% | 4.5% |
| | Inland navigation | 7 | 8 | 14% | 1.2% |
| IE | Road | 1 546 | 3 811 | 147% | 82.9% |
| | Railways | 48 | 43 | -10% | 0.9% |
| | Air transport | 365 | 727 | 99% | 15.8% |
| | Inland navigation | 26 | 18 | -31% | 0.4% |
| EL | Road | 3 903 | 6 022 | 54% | 75.7% |
| | Railways | 75 | 61 | -19% | 0.8% |
| | Air transport | 1 264 | 1 208 | -4% | 15.2% |
| | Inland navigation | 566 | 669 | 18% | 8.4% |
| ES | Road | 17 676 | 30 817 | 74% | 80.3% |
| | Railways | 528 | 1 040 | 97% | 2.7% |
| | Air transport | 2 467 | 5 006 | 103% | 13.0% |
| | Inland navigation | 1 655 | 1 534 | -7% | 4.0% |
| FR | Road | 36 171 | 42 273 | 17% | 84.3% |
| | Railways | 1 150 | 1 299 | 13% | 2.6% |
| | Air transport | 3 870 | 6 256 | 62% | 12.5% |
| | Inland navigation | 718 | 308 | -57% | 0.6% |
| IT | Road | 30 393 | 39 094 | 29% | 89.0% |
| | Railways | 738 | 900 | 22% | 2.0% |
| | Air transport | 1 884 | 3 707 | 97% | 8.4% |
| | Inland navigation | 389 | 248 | -36% | 0.6% |
| CY | Road | : | 553 | : | 64.6% |
| | Air transport | : | 303 | : | 35.4% |
| LV | Road | 798 | 818 | 3% | : |
| | Railways | 188 | 93 | -51% | : |
| | Air transport | 73 | 48 | -34% | : |
| | Inland navigation | : | : | : | : |
| LT | Road | 1 719 | 1 197 | -30% | 90.8% |
| | Railways | 132 | 77 | -42% | 5.8% |
| | Air transport | 135 | 40 | -70% | 3.0% |
| | Inland navigation | 5 | 5 | 0% | 0.4% |
| LU | Road | 863 | 2 144 | 148% | 83.1% |
| | Railways | 13 | 10 | -23% | 0.4% |
| | Air transport | 131 | 425 | 224% | 16.5% |

| | | 1990 | 2004 | % change 1990-2004 | % share in total national consumption in 2004 |
|---|---|---|---|---|---|
| HU | Road | 2 580 | 3 484 | 35% | 90.1% |
| | Railways | 270 | 162 | -40% | 4.2% |
| | Air transport | 164 | 221 | 35% | 5.7% |
| | Inland navigation | 9 | 1 | -89% | 0.0% |
| MT | Road | 149 | 166 | 11% | 62.2% |
| | Air transport | 72 | 101 | 40% | 37.8% |
| NL | Road | 8 040 | 11 004 | 37% | 73.2% |
| | Railways | 147 | 188 | 28% | 1.3% |
| | Air transport | 1 614 | 3 563 | 121% | 23.7% |
| | Inland navigation | 556 | 283 | -49% | 1.9% |
| AT | Road | 3 929 | 6 779 | 73% | 88.2% |
| | Railways | 357 | 304 | -15% | 4.0% |
| | Air transport | 310 | 598 | 93% | 7.8% |
| | Inland navigation | 7 | 9 | 29% | 0.1% |
| PL | Road | 5 940 | 10 503 | 77% | 92.8% |
| | Railways | 1 095 | 528 | -52% | 4.7% |
| | Air transport | 205 | 285 | 39% | 2.5% |
| | Inland navigation | 99 | 1 | -99% | 0.0% |
| PT | Road | 3 026 | 6 343 | 110% | 87.2% |
| | Railways | 82 | 67 | -18% | 0.9% |
| | Air transport | 576 | 842 | 46% | 11.6% |
| | Inland navigation | 43 | 25 | -42% | 0.3% |
| RO | Road | 3 579 | 4 664 | 30% | 90.1% |
| | Railways | 282 | 333 | 18% | 6.4% |
| | Air transport | 233 | 140 | -40% | 2.7% |
| | Inland navigation | 312 | 41 | -87% | 0.8% |
| SI | Road | 872 | 1 330 | 53% | 96.4% |
| | Railways | 29 | 28 | -3% | 2.0% |
| | Air transport | 27 | 21 | -22% | 1.5% |
| SK | Road | 1 340 | 1 497 | 12% | 94.4% |
| | Railways | 100 | 61 | -39% | 3.8% |
| | Air transport | : | 27 | : | 1.7% |
| FI | Road | 3 631 | 3 936 | 8% | 82.1% |
| | Railways | 99 | 98 | -1% | 2.0% |
| | Air transport | 463 | 554 | 20% | 11.6% |
| | Inland navigation | 116 | 206 | 78% | 4.3% |
| SE | Road | 6 103 | 7 140 | 17% | 84.9% |
| | Railways | 252 | 278 | 10% | 3.3% |
| | Air transport | 764 | 847 | 11% | 10.1% |
| | Inland navigation | 143 | 147 | 3% | 1.7% |
| UK | Road | 36 312 | 39 319 | 8% | 72.6% |
| | Railways | 1 076 | 1 530 | 42% | 2.8% |
| | Air transport | 6 794 | 12 232 | 80% | 22.6% |
| | Inland navigation | 1 269 | 1 107 | -13% | 2.0% |
| HR | Road | : | 1 658 | : | 91.0% |
| | Railways | 32 | 53 | 66% | 2.9% |
| | Air transport | : | 81 | : | 4.4% |
| | Inland navigation | : | 29 | : | 1.6% |
| TR | Road | 8 377 | 10 338 | 23% | 80.7% |
| | Railways | 243 | 230 | -5% | 1.8% |
| | Air transport | 480 | 1 861 | 288% | 14.5% |
| | Inland navigation | 250 | 381 | 52% | 3.0% |
| IS | Road | 181 | 213 | 18% | 61.9% |
| | Air transport | 84 | 125 | 49% | 36.3% |
| | Inland navigation | 19 | 6 | -68% | 1.7% |
| NO | Road | 2 591 | 3 285 | 27% | 67.9% |
| | Railways | 104 | 142 | 37% | 2.9% |
| | Air transport | 505 | 603 | 19% | 12.5% |
| | Inland navigation | 926 | 810 | -13% | 16.7% |

*Source*: Eurostat (Energy)

*Data for 1990 may not always be reliable for some countries.

Within the transport share in EU-25 energy consumption (excluding maritime transport and pipelines), road transport was clearly the largest energy consumer, eating up almost 83 % of the total in 2004, or 290 million tonnes of oil equivalent (mtoe). This translates as over a quarter of the total final energy consumption in the EU (i.e. transport, industry, households and services).

Air transport was the second largest consumer filling up at the pump, with a 13 % share in the transport total. Rail transport accounted for 2.5 %, with electric traction accounting for 66 % of rail energy (see Table 7.5, page 147). Inland navigation (which includes small vessels performing coastal shipping) consumed just 1.4 %.

This overall pattern was echoed in the individual Member States, but to varying degrees (Table 7.3). For example, the share of energy consumption going to road transport was often highest in the new Member States in Eastern Europe (including Bulgaria and Romania), with shares reaching 90 % and above. In Slovenia this share reached as much as 96 %. By contrast, road shares were lowest in Cyprus and Malta, with 65 % and 62 % respectively.

When looking at the different shares of energy consumption between transport modes in the Member States, the main variation was the changeable balance between road transport and aviation - the two transport modes that have seen the highest growths over time. The shares of the other transport modes - rail and inland navigation - where applicable, did not vary much.

For example, Cyprus and Malta which displayed the lowest shares of consumption in road transport were also the Member States where the aviation shares were highest: respectively 35 % and 38 %. This also applied to EFTA country Iceland. Tourism and geographic isolation as islands are clearly the chief causes of this different balance, as well as, of course, the absence of alternative modes, for instance inland waterways and rail for Cyprus and Malta.

When it comes to energy consumption in rail transport, shares were generally highest in the new Member States, reflecting chiefly the greater importance of rail transport in these countries. Shares were as much as 10 % in Latvia, and 6 % in Lithuania and Romania.

Finally, the share of energy consumption going to inland navigation reached as much as 8 % in Greece, which can partly be explained again by the significance of tourism; a share that was however overtaken by Norway (17 %). Although these shares might be surprising, readers should note that figures include consumption by small vessels (including leisure boats) performing coastal shipping and not using fuel from international maritime bunkers. This explains data for countries without a significant inland waterway network.

**Table 7.4** **Evolution of final energy consumption in transport, by transport mode, 1990-2004, EU-25 (in million toe)**

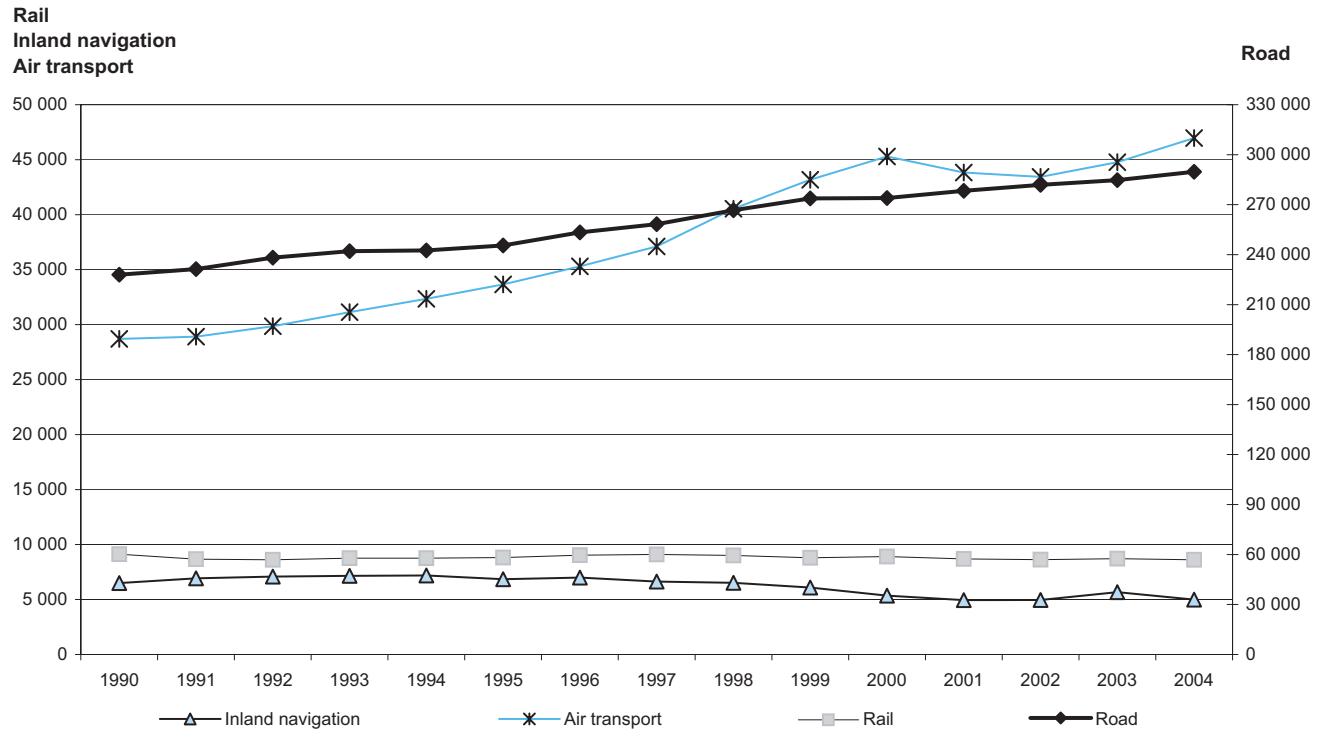
| | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 | % change 1990-2004 |
|---|---|---|---|---|---|---|---|---|
| **Transport** | **272** | **295** | **334** | **337** | **339** | **345** | **352** | **29%** |
| **Rail transport** | 9.1 | 8.8 | 9.2 | 9.1 | 9.0 | 9.1 | 9.3 | 1% |
| **% share** | 3.4% | 3.0% | 2.8% | 2.7% | 2.7% | 2.7% | 2.6% | |
| **Road transport** | 228.0 | 245.5 | 274.0 | 278.4 | 282.0 | 284.8 | 290.0 | 27% |
| **% share** | 83.8% | 83.3% | 82.1% | 82.7% | 83.1% | 82.7% | 82.5% | |
| **Air transport** | 28.4 | 33.7 | 45.3 | 44.2 | 43.5 | 44.8 | 47.4 | 67% |
| **% share** | 10.4% | 11.4% | 13.6% | 13.1% | 12.8% | 13.0% | 13.5% | |
| **Inland navigation** | 6.6 | 6.7 | 5.4 | 5.0 | 5.0 | 5.7 | 5.0 | -23% |
| **% share** | 2.4% | 2.3% | 1.6% | 1.5% | 1.5% | 1.6% | 1.4% | |

*Source*: Eurostat (Energy)

## Energy consumption climbed fastest in air transport

The increased criss-crossing of jet trails in the skies - referred to in previous chapters - reflects most probably the fastest rise in energy consumption of all transport modes (including maritime transport - see box on page 148). As illustrated in Table 7.4 and Figure 7.3, between 1990 and 2004 energy consumption rose by 67 % in aviation, which was considerably greater than the 27 % growth recorded for road transport. Energy consumption in rail transport went up only marginally by 1 %. By contrast, the only decrease observed - and one which was quite significant - was in inland navigation (-23 %). In absolute terms however, road transport consumed an extra 62 million toe (mtoe), rising from 228 mtoe to 290 mtoe.

**Figure 7.3 Evolution of energy consumption of main fuels by transport mode, EU-25 (in thousand toe)**




*Source*: Eurostat (Energy)

These changes in energy consumption reflect chiefly growths or declines in the popularity of transport modes, but also partly the development of more fuel-efficient traction technology. In rail transport for instance, the consumption of electricity for rail traction is generally increasing due to the growing share of electrified lines (see Chapter 2), which has been displacing diesel fuel usage (see box opposite).

The EU patterns reflect the global situation of all Member States, but there were some national particularities (Table 7.3). Growths in energy consumption of around 100 % or above between 1990 and 2004 were reached in one or more transport modes in several countries (Czech Republic, Spain, Ireland, Italy, Luxembourg, the Netherlands, Portugal), with these high growths being most often in either road or air transport. Energy consumption in air transport grew by as much as 224 % in Luxembourg; an increase that was in fact overtaken by Turkey (288 %). In the other modes, Spain and Finland were the only Member States to stand out, with energy consumption growths of 97 % in Spain for rail transport and of 115 % in Finland for inland navigation.

## More electrons running rail

**Table 7.5** Evolution of the share of electricity in total rail energy consumption, 1996-2004 (in % of thousand toe)

| | 1996 | 2004 |
|---|---|---|
| **EU-25** | **62.7** | **66.1** |
| **BE** | 59.6 | 76.2 |
| **BG** | 60.8 | 55.7 |
| **CZ** | 61.5 | 67.2 |
| **DK** | 18.7 | 31.6 |
| **DE** | 66.0 | 74.2 |
| **EE** | 19.4 | 17.8 |
| **IE** | 2.1 | 10.3 |
| **EL** | 22.9 | 33.6 |
| **ES** | 45.8 | 43.3 |
| **FR** | 73.0 | 81.9 |
| **IT** | 79.1 | 87.1 |
| **LV** | 13.8 | 10.7 |
| **LT** | 7.1 | 6.0 |
| **LU** | 81.7 | 89.9 |
| **HU** | 46.7 | 56.6 |
| **NL** | 81.1 | 75.5 |
| **AT** | 86.5 | 85.4 |
| **PL** | 63.6 | 69.2 |
| **PT** | 35.7 | 59.4 |
| **RO** | 40.7 | 40.7 |
| **SI** | 52.7 | 57.4 |
| **SK** | 100.0 | 100.0 |
| **FI** | 43.0 | 55.5 |
| **SE** | 87.0 | 92.4 |
| **UK** | 52.2 | 47.4 |
| **HR** | 42.4 | 42.7 |
| **TR** | 14.0 | 22.3 |
| **NO** | 85.9 | 89.3 |

*Source*: Eurostat (Energy)

Note: Excluding Cyprus and Malta which do not have any rail network (see Chapter 2).

Linked with the increasing electrification of tracks, the share of electricity in rail energy consumption has been rising over time. Based on comparable data between 1996 and 2004, electricity consumption in railway transport rose by 8 % in the EU-25, while consumption of diesel in rail transport decreased by 7 %. These evolutions meant that by 2004 electricity accounted for a 66 % share of rail energy consumption (or 6.2 million toe), representing an increase of well over 3 percentage points on the 63 % share in 1996.

The share of electrical traction in total rail energy increased in most Member States between 1996 and 2004, and most remarkably in Portugal where the share increased by around 24 percentage points respectively. Interestingly, the share of electrical power decreased in seven of them (of the EU Member States including Bulgaria and Romania but excluding Malta and Cyprus), and most notably in the Netherlands (5.6 percentage points) and Bulgaria (5.1 points) and the UK (4.8 points) (Table 7.5). Electrical traction was clearly most important in Slovakia, where its share was as much as 100 %.

Increases in road fuel consumption were not necessarily higher in the new Member States of Eastern Europe, apart from the Czech Republic (140 %). Moreover, energy consumption in road transport was not necessarily driven upwards: in Estonia and Lithuania, consumption actually went down, by -20 % and -30 % respectively.

## Energy consumption in maritime transport

**Table 7.6** Evolution of energy consumption in maritime transport (marine bunkers*), 1990-2004** (in thousand toe)

| | 1990 | 2004 | % change 1990-2004 | Share in EU-25 consumption |
|---|---|---|---|---|
| **EU-25** | **35 354** | **48 407** | **37%** | 100.0% |
| **BE** | 4 090 | 7 706 | 88% | 15.9% |
| **BG** | 56 | 116 | 107% | - |
| **DK** | 952 | 791 | -17% | 1.6% |
| **DE** | 2 472 | 2 629 | 6% | 5.4% |
| **EE** | 179 | 149 | -17% | 0.3% |
| **IE** | 18 | 149 | 728% | 0.3% |
| **EL** | 2 526 | 3 212 | 27% | 6.6% |
| **ES** | 3 808 | 7 136 | 87% | 14.7% |
| **FR** | 2 517 | 2 982 | 18% | 6.2% |
| **IT** | 2 654 | 3 343 | 26% | 6.9% |
| **CY** | : | 56 | : | 0.1% |
| **LV** | 466 | 200 | -57% | 0.4% |
| **LT** | 93 | 112 | 20% | 0.2% |
| **MT** | 30 | 23 | -23% | 0.0% |
| **NL** | 10 822 | 14 589 | 35% | 30.1% |
| **PL** | 422 | 250 | -41% | 0.5% |
| **PT** | 603 | 650 | 8% | 1.3% |
| **FI** | 560 | 506 | -10% | 1.0% |
| **SE** | 658 | 1 875 | 185% | 3.9% |
| **UK** | 2 486 | 2 051 | -17% | 4.2% |
| **HR** | : | 23 | : | - |
| **TR** | 119 | 1 332 | 1019% | - |
| **IS** | 31 | 71 | 129% | - |
| **NO** | 442 | 509 | 15% | - |

*Source*: Eurostat (Energy)

*The quantities delivered from the marine bunkers of the individual countries. The energy consumed in maritime transport consists entirely of hydrocarbons. The main types of fuels used are residual fuel oil and gas/diesel oil.
**Data for 1990 may not always be reliable for some countries.

The attribution of fuel consumption to a country with a maritime transport sector is even more problematic than in aviation. A large vessel might for instance bunker fuel in the port of Antwerp, but then travel quickly out of Belgian territorial waters. Unlike other transport modes (including aviation), when looking at energy balances, marine bunkers do not constitute an element of final consumption, but should rather be considered as an export.

Within the EU-25, the Netherlands - with Rotterdam as the EU's largest port - was clearly the largest user of marine bunkers, with its share in EU-25 energy consumption amounting to 30 %, or 14.6 million toe in 2004 (Table 7.6). This was double the shares accounted for by Belgium (16 %) and Spain (15 %). Between 1990 and 2004, energy consumption from marine bunkers increased by 37 % in the EU-25, with consumption rising to 48.4 mtoe in 2004. This growth was mainly because of substantial increases among the largest consumers: 35 % in the Netherlands, 88 % in Belgium and 87 % in Spain. Ireland was followed by Sweden (+185 %) and Bulgaria (+107 %).

Readers should note that 2004 data reflect new reporting specifications for international marine bunkers. These cover oil quantities delivered to ships of all flags engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption in domestic navigation, or by fishing and military vessels is however excluded. The domestic/international split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship.

# Diesel share grows to 64 % of road fuel mix

**Table 7.7** Balance between diesel and petrol fuel in sales*, 1996-2006** (in %)

| | 1996 | | 2006 | |
|---|---|---|---|---|
| | Petrol*** | Diesel | Petrol*** | Diesel |
| **EU-25** | **:** | **:** | **36.1** | **63.9** |
| **EU-15** | **53.1** | **46.9** | **36.1** | **63.9** |
| **BE** | 38.7 | 61.3 | 19.0 | 81.0 |
| **BG** | : | : | 30.1 | 69.9 |
| **CZ** | : | : | 33.9 | 66.1 |
| **DK** | 48.2 | 51.8 | 42.9 | 57.1 |
| **DE** | 57.8 | 42.2 | 42.9 | 57.1 |
| **EE** | : | : | 34.9 | 65.1 |
| **IE** | 58.5 | 41.5 | 41.6 | 58.4 |
| **EL** | 53.0 | 47.0 | 59.4 | 40.6 |
| **ES** | 52.3 | 47.7 | 22.9 | 77.1 |
| **FR** | 40.8 | 59.2 | 23.4 | 76.6 |
| **IT** | 56.0 | 44.0 | 33.8 | 66.2 |
| **CY** | : | : | 50.6 | 49.4 |
| **LV** | : | : | : | : |
| **LT** | : | : | 29.7 | 70.3 |
| **LU** | 48.6 | 51.4 | 21.7 | 78.3 |
| **HU** | : | : | 34.5 | 65.5 |
| **NL** | 48.0 | 52.0 | 39.6 | 60.4 |
| **AT** | 42.9 | 57.1 | 25.1 | 74.9 |
| **PL** | : | : | 33.2 | 66.8 |
| **PT** | 44.8 | 55.2 | 28.8 | 71.2 |
| **RO** | : | : | 34.4 | 65.6 |
| **SI** | : | : | : | : |
| **SK** | : | : | 36.0 | 64.0 |
| **FI** | 57.3 | 42.7 | 49.3 | 50.7 |
| **SE** | 70.5 | 29.5 | 68.6 | 31.4 |
| **UK** | 60.8 | 39.2 | 47.8 | 52.2 |
| **HR** | : | : | 34.9 | 65.1 |
| **NO** | 54.7 | 45.3 | 42.6 | 57.4 |

*Source*: Eurostat (Energy)

* Sales within the EU-25 based on internal market deliveries.
** Data as at third quarter.
*** Unleaded petrol and a very small amount (0.5 %) of leaded petrol. Also includes a small amount of fuel used for air transport.

In most EU Member States, the balance between diesel and petrol consumption has gradually been tipping more in favour of diesel. In 2006 diesel accounted for close to 64 % of consumption, leaving 36 % for petrol consumption in the EU-25 (Table 7.7). Based on data available for the EU-15, which recorded almost exactly the same balance as the EU-25 in 2006, and which thus gives some indication of evolution in the EU-25, the diesel share increased by 17 percentage points compared with the situation in 1996. The best part of this rise can also probably be explained by the increase in road goods transport which is almost entirely diesel-powered, together with the rising popularity of diesel-powered cars.

Based on data available for the EU-15 Member States only, this shift in favour of diesel, based on data for 1996 and 2006, is particularly noticeable for Spain (with a difference of 29 percentage points) and Luxembourg (27). Greece was the only EU-15 Member State to register a drop (of 6.5 percentage points).

The share of diesel was highest (around 70 % and above) in Belgium (81 %), Luxembourg (78 %), Austria (75 %), Spain and France (both 77 %), Portugal (71 %) and Bulgaria (70 %).

### Rising pump prices would fuel change in car habits

According to a Eurobarometer survey 'Attitudes towards Energy'*, when it comes to changing car-use habits, a rise in fuel prices seems to have an impact only if a certain price is reached (around 2€/litre, but adapted to national living standards).

More than two out of ten Europeans stated that they would use their car "a lot less often" while three out of ten declared that they would do so "a bit less often". However, a quarter of them would go on driving as before.

Such a situation, it seems, would have a more notable effect on citizens in the Czech Republic, Slovakia, Poland and Austria, with almost one third of the population stating that they would be prepared to significantly reduce the use of cars or other vehicles. On the other hand, Irish, Cypriots, Maltese, Dutch, and particularly Slovenians (between 36% and 47%) would use their cars as often.

Overall, based on the survey, the impact of a significant rise in fuel prices would be widest in Belgium, Sweden, Austria, Germany, the Czech Republic and Italy where at least 6 out of 10 citizens said that they would use their vehicles less often.

*For more information, visit: http://ec.europa.eu/public_opinion/index_en.htm*

** Special Eurobarometer 247 / Wave 64.2.*

## Diesel costs less, except for UK motorists

The price range for 1000 litres of automotive fuel varies considerably across the Member States. On the basis of average prices on 1 July 2006, the range for unleaded petrol was between EUR 955 (in Latvia) and EUR 1 535 (in the Netherlands). For diesel, the price ranged between EUR 884 (in Estonia) and EUR 1 436 (in the United Kingdom).

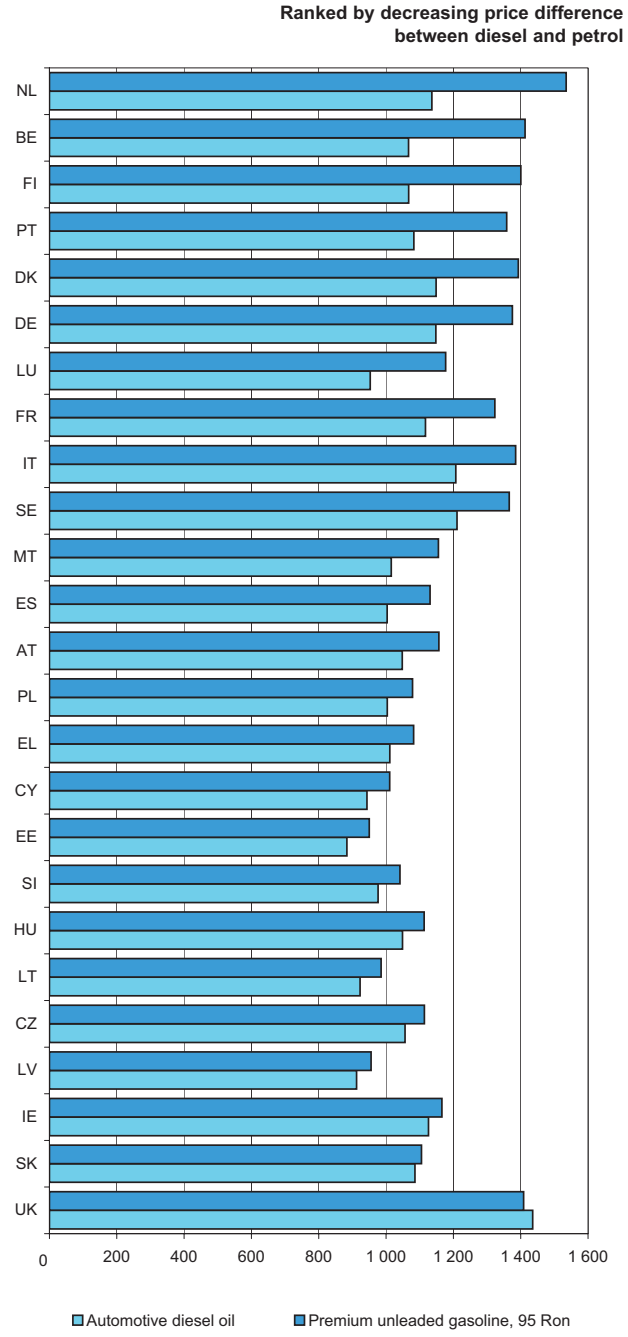
As illustrated in Figure 7.4 and Table 7.8, there was also great variety in the price differences between unleaded petrol and diesel around the EU. In several Member States, the price of diesel was more than 20 % cheaper than unleaded petrol, with the saving in the Netherlands amounting to as much as 26 %. At the other end of the spectrum came Slovakia where motorists were only saving 2 %, and the United Kingdom - the only Member State - where filling up with diesel meant in fact 2 % more expense.

A closer look at Figure 7.4 also reveals that the price differences between unleaded gasoline and diesel were generally highest in those countries where unleaded petrol was the most expensive, such as the Netherlands, Belgium and Finland. Luxembourg and Malta, with low prices for both fuels, were clearly the exception. Apart from Greece and Ireland, most of the other Member States, with similarly low prices, were the new Member States showing the smallest price differences.

So much for the price in euro, but what was the real pressure on motorists' pockets? If one considers the sales price of fuels (inclusive of all taxes) expressed in purchasing power standards, a radically different picture emerges. The Purchasing Power Standard (PPS) is an artificial common reference currency unit that eliminates price level differences between countries; thus one PPS would buy the same volume of goods or services in all countries.

Based on this measure, those countries displaying some of the lowest prices in euro were actually some of the most expensive for motorists' budgets. This was especially the case for all the Eastern European Member States (that joined in 2004). Unleaded petrol weighed most heavily on Hungarians' pockets (1 992 PPS) and most lightly on those in Ireland (942 PPS); diesel was dearest for Slovaks (1 893 PPS) and cheapest for motorists filling up in Luxembourg (835 PPS). Meanwhile, the country where the difference between the euro price and PPS changed least was Italy, with values of EUR 1 385 and 1 349 PPS respectively for unleaded petrol and values of EUR 1 207 and 1 176 PPS for diesel).

**Figure 7.4** **Average sales price (all taxes included) of unleaded petrol and diesel fuel, per 1000 litres, 2006* (in EUR)**




*Source*: Eurostat (Energy)

* Prices as at 1 July 2006.
BG and RO: no data available.

## Price differences fuelled by taxes to some degree

When looking at price differences between fuels, readers should of course note that taxation can have quite an influence. In fact, the base price for fuels does not vary much between the various national markets; it is the taxes (VAT and other taxes) that make the difference. Although the basic fuel price is set by oil production and the world market, excise duties and VAT rates are established by individual countries.

Based on the same price data as at 1 July 2006 (as shown in Table 7.8), for unleaded gasoline the proportion of taxes in the total price ranged from as much as 66 % in the UK to as little as 42 % in Malta. Similarly, for diesel, taxes accounted for as much as 60 % in the UK and for as little as 39% in Cyprus and Malta.

Furthermore, prices at the petrol stations often suggest that the basic price of diesel must be inferior to those of gasoline, but you would be mistaken. The price of diesel before tax was higher than those of gasoline in 11 Member States, and most remarkably in the United Kingdom (21 % higher) and Sweden (15 %). The lower pump prices can largely be attributed to a far more favourable tax regime, except for the United Kingdom.

Table 7.8 Average sales prices of unleaded petrol and diesel in euro and purchasing power standards (PPS), per 1000 litres, 2006*

| Euro | | | | | | Purchasing power standards (PPS) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unleaded | | | Diesel | | | Unleaded | | | Diesel | | |
| 1 | NL | 1 535 | 1 | UK | 1 436 | 1 | HU | 1 992 | 1 | SK | 1 893 |
| 2 | BE | 1 413 | 2 | SE | 1 211 | 2 | PL | 1 954 | 2 | HU | 1 877 |
| 3 | UK | 1 409 | 3 | IT | 1 207 | 3 | SK | 1 927 | 3 | PL | 1 817 |
| 4 | FI | 1 400 | 4 | DK | 1 149 | 4 | LT | 1 904 | 4 | LT | 1 784 |
| 5 | DK | 1 393 | 5 | DE | 1 148 | 5 | CZ | 1 866 | 5 | CZ | 1 770 |
| 6 | IT | 1 385 | 6 | NL | 1 136 | 6 | LV | 1 765 | 6 | LV | 1 686 |
| 7 | DE | 1 375 | 7 | IE | 1 126 | 7 | MT | 1 626 | 7 | EE | 1 465 |
| 8 | SE | 1 366 | 8 | FR | 1 117 | 8 | PT | 1 599 | 8 | MT | 1 430 |
| 9 | PT | 1 358 | 9 | SK | 1 086 | 9 | EE | 1 575 | 9 | SI | 1 308 |
| 10 | FR | 1 323 | 10 | PT | 1 083 | 10 | NL | 1 424 | 10 | UK | 1 299 |
| 11 | LU | 1 177 | 11 | FI | 1 067 | 11 | SI | 1 395 | 11 | PT | 1 275 |
| 12 | IE | 1 166 | 12 | BE | 1 067 | 12 | IT | 1 349 | 12 | IT | 1 176 |
| 13 | AT | 1 157 | 13 | CZ | 1 056 | 13 | BE | 1 342 | 13 | GR | 1 155 |
| 14 | MT | 1 155 | 14 | HU | 1 049 | 14 | DE | 1 293 | 14 | DE | 1 079 |
| 15 | ES | 1 131 | 15 | AT | 1 048 | 15 | UK | 1 275 | 15 | ES | 1 068 |
| 16 | CZ | 1 114 | 16 | MT | 1 016 | 16 | GR | 1 236 | 16 | NL | 1 054 |
| 17 | HU | 1 113 | 17 | GR | 1 011 | 17 | FI | 1 232 | 17 | FR | 1 030 |
| 18 | SK | 1 105 | 18 | PL | 1 003 | 18 | FR | 1 220 | 18 | CY | 1 015 |
| 19 | GR | 1 082 | 19 | ES | 1 003 | 19 | ES | 1 203 | 19 | BE | 1 013 |
| 20 | PL | 1 079 | 20 | SI | 976 | 20 | SE | 1 125 | 20 | SE | 997 |
| 21 | SI | 1 041 | 21 | LU | 953 | 21 | AT | 1 095 | 21 | AT | 992 |
| 22 | CY | 1 011 | 22 | CY | 943 | 22 | CY | 1 088 | 22 | FI | 939 |
| 23 | LT | 985 | 23 | LT | 923 | 23 | LU | 1 031 | 23 | IE | 910 |
| 24 | LV | 955 | 24 | LV | 912 | 24 | DK | 1 022 | 24 | DK | 843 |
| 25 | EE | 950 | 25 | EE | 884 | 25 | IE | 942 | 25 | LU | 835 |

*Source*: Eurostat (Energy)

* Prices as at 1 July 2006.
BG and RO: no data available.

# Petrol cars most popular

When it comes to road transport, pump prices can influence consumer choice, both in terms of the quantities and the type of fuel purchased. More than this, persistent price differences can influence decisions on the type of vehicle purchased, leading to changes in the vehicle stock and fuel mix over time. In addition, although the cost of purchasing a diesel car is generally higher, a diesel-fuelled car can be less expensive in the long run.

Based on data available for 19 Member States (Table 7.9), the vast majority of passenger cars calling in at petrol stations were running on petrol, with shares of this energy type reaching around 80 % and above in at least two thirds of the EU-25 Member States, and attaining as much as 95% of the car stock in Sweden. Moreover, many of these Member States were also the ones to show some of the lowest price differences between petrol and diesel fuels, making a switch to a diesel-fuelled car perhaps less immediately appealing.

However, diesel-powered cars accounted for as much as 49 % of the car stock in Austria, 47% in Belgium and 43% in France, 35% in Spain and 33% in Luxembourg. These were also the Member States where the differences between unleaded petrol and diesel fuel were some of the widest, possibly making the purchase of a diesel-fuelled a more financially attractive option for motorists.

Road transport is by far the largest consumer of petroleum products, and although future developments will probably result in a greater use of alternative fuels, if not their predominance, a wholesale switch to their use is still some way off. The trend towards cars with more powerful engines as well as increased road haulage has generally retarded the development of alternatively powered vehicles.

As shown in Table 7.9, the only Member States with any significant share of alternative-fuelled cars were Poland (7 %), the Netherlands (3.5%) and Belgium (1.7 %). Readers should note however that these data, collected in national vehicle registers, include not only vehicles powered purely by alternative fuels, but also hybrid models that can function on both traditional fuels and alternative ones.

LPG plays a very limited role in the EU, and in 2004 amounted to just 1.3 % of petroleum fuel in road transport. While it played a similarly small role in most Member States, shares were highest in some of the new Member States from Eastern Europe (including Bulgaria and Romania), reaching as much as almost 17% in Lithuania, 15 % in Bulgaria, and 13 % in Poland.

Given the small level of consumption at EU level, compressed natural gas (CNG) has been disregarded.

**Table 7.9 Breakdown of passenger car stocks by type of motor energy, 2004 (in %)**

| | Total passenger cars (1000s) | Petrol-powered (% share) | Diesel powered (% share) | Alternative fuels (% share) |
|---|---|---|---|---|
| BE | 4 874 | 51.1 | 47.2 | 1.72 |
| CZ* | 3 706 | 84.3 | 15.5 | 0.17 |
| DK** | 1 888 | 92.6 | 7.4 | 0.00 |
| DE* | 45 023 | 81.5 | 18.4 | 0.06 |
| EE | 471 | 85.8 | 14.2 | 0.00 |
| IE | 1 582 | 86.0 | 14.0 | 0.00 |
| EL* | 3 840 | : | : | : |
| ES | 18 688 | 64.7 | 35.3 | 0.00 |
| FR* | 29 560 | 56.9 | 43.1 | 0.51 |
| IT** | 33 706 | 76.4 | 19.0 | 0.00 |
| CY | 335 | 90.1 | 10.1 | 0.00 |
| LV | 686 | : | : | : |
| LT | 1 316 | : | : | : |
| LU*** | 281 | 67.3 | 32.7 | 0.00 |
| HU | 2 828 | 85.6 | 13.9 | 0.53 |
| MT**** | 189 | 80.0 | 20.0 | 0.00 |
| NL | 6 992 | 81.4 | 15.3 | 3.46 |
| AT | 4 109 | 50.8 | 49.2 | 0.00 |
| PL | 11 975 | 78.4 | 14.6 | 7.02 |
| PT** | 5 788 | : | : | : |
| SI | 911 | : | : | : |
| SK | 1 197 | : | : | : |
| FI | 2 347 | 87.6 | 11.7 | 0.00 |
| SE | 4 113 | 95.0 | 5.0 | 0.07 |
| UK***** | 27 765 | 79.2 | 18.0 | 2.80 |
| IS* | 167 | 88.6 | 11.4 | 0.00 |
| LI | 24 | 87.8 | 12.1 | 0.00 |
| NO | 1 977 | 87.1 | 12.9 | 0.06 |
| CH* | 3 800 | 91.9 | 6.9 | 0.03 |

*Source*: Eurostat (Transport)

*2003, **2002, ***2001, ****2000, ***** UK excludes Northern Ireland.
BG and RO: no data available.

Liquid biofuels accounted for only minute proportions of total fuel consumption in transport. Against an EU-25 average of 0.5 % in 2004, Germany recorded the highest share (1.6 %) which reflects the relative importance of notably biodiesel in this Member State (Table 7.10). This was between two and three times as much as the shares in France (0.7%), Italy and Spain (each with 0.6 %). Although the share of biofuels is increasing, it would seem to be a long way off the targets set by the Biofuels Directive (see box); Germany was the only Member State nearest the 2 % target for 2005.

**Table 7.10** **Evolution of the share of liquid biofuels* in transport's total fuel consumption**, available data, 1990-2004 (in %)**

| | 1990 | 1995 | 2000 | 2004 |
|---|---|---|---|---|
| **EU-25** | **0.0** | **0.1** | **0.2** | **0.5** |
| **BE** | 0.0 | 0.0 | 0.0 | 0.0 |
| **CZ** | 0.0 | 0.4 | 0.0 | 0.0 |
| **DK** | 0.0 | 0.0 | 0.0 | 0.0 |
| **DE** | 0.0 | 0.0 | 0.3 | 1.6 |
| **ES** | 0.0 | 0.0 | 0.2 | 0.6 |
| **FR** | 0.0 | 0.4 | 0.6 | 0.7 |
| **IT** | 0.0 | 0.0 | 0.0 | 0.6 |
| **LT** | 0.0 | 0.0 | 0.0 | 0.0 |
| **LU** | 0.0 | 0.0 | 0.0 | 0.0 |
| **AT** | 0.0 | 0.1 | 0.1 | 0.1 |
| **PL** | 0.0 | 0.0 | 0.0 | 0.2 |
| **SK** | 0.0 | 0.0 | 0.0 | 0.0 |
| **FI** | 0.0 | 0.0 | 0.0 | 0.1 |
| **SE** | 0.0 | 0.0 | 0.0 | 0.0 |

*Source*: Eurostat (Sustainable development indicators)

*Liquid biofuels cover biogasolines and biodiesels: Biogasoline: This category includes bioethanol (ethanol produced from biomass and/or the biodegradable fraction of waste), biomethanol (methanol produced from biomass and/or the biodegradable fraction of waste), bioETBE (ethyl-tertio-butyl-ether produced on the basis of bioethanol: the percentage by volume of bioETBE that is calculated as biofuel is 47%) and bioMTBE (methyl-tertio-butyl-ether produced on the basis of biomethanol: the percentage by volume of bioMTBE that is calculated as biofuel is 36%). Biodiesels: This category includes biodiesel (a methyl-ester produced from vegetable or animal oil, of diesel quality), biodimethylether (dimethylether produced from biomass), Fischer Tropsch (Fischer Tropsch produced from biomass), cold pressed bio-oil (oil produced from oil seed through mechanical processing only) and all other liquid biofuels which are added to, blended with or used straight as transport diesel.

## Buses don't just run on diesel

Based on a survey of the International Association of Public Transport (UITP) on the EU's urban bus fleet (in about 170 cities of over 100 000 inhabitants), around 90 % of urban buses surveyed ran on diesel in 2005. The remainder was made up of mainly CNG (compressed natural gas), LPG (liquified petroleum gas), bio-diesel and bio-gas, and full-electric vehicles. Other fuels (ethanol, various diesel/bio-diesel mixtures, fuel cells) amounted to about 0.5 %.

Looking around the EU-25, buses running on CNG accounted for almost 20 % of the bus fleets surveyed in Helsinki and Athens, while 100 % of buses surveyed in Vienna ran on LPG. Bio-diesel powered 29% of Luxembourg's bus fleet, 18 % of Austria's (mainly Graz) and 6 %'s of Spain's. The use of bio-gas was negligible, except in Sweden. When it came to electric buses, the number in Italy was five times higher than the average.

While hybrid buses (mainly diesel-electric, with also some other technologies) accounted for 0.25% of the EU's total bus fleet, Luxemburg and Italy emerged as forerunners in their use, with shares of respectively 8% and 1%.

*For more information, visit: http://www.uitp.org/mos/pics/stats/survey_bus_fleet.pdf*

## STEERing towards sustainability

The transition to a sustainable transport sector will require a significant amount of innovation, not only in technology development, but also in implementation issues and in the impact of policy instruments on choices among alternative transport modes. STEER, one of four components of the Intelligent Energy for Europe programme, aims to promote innovative approaches to transport, including biofuels, hydrogen, fuel cells, and other technology platforms. The STEER projects promote more sustainable energy use in transport, including increased energy efficiency, new and renewable fuel sources, and the take-up of alternatively propelled vehicles.

*For more information, visit: http://ec.europa.eu/energy/intelligent/projects/steer_en.htm*

## Filling up with greener fingers

Since the start of the millennium, greener energies for transport have been taking root. In 2001, the Commission launched its policy to promote biofuels for transport, which is market-based, but includes targets and financial incentives. The EU Directive on biofuels came into force in 2003, under which Member States had to ensure a minimum 2% share for biofuels by 2005 and 5.75% by 2010. The targets are indicative, i.e. not binding, and in fact nearly all Member States have had difficulty meeting the 2005 target.

Production of biofuels has been on an upward course in recent years. According to the TERM 2006 report, 3.9 million tonnes of biofuels were produced in the EU in 2005, meaning a 66 % growth in production from the previous year. Biodiesel accounted for 81.5 % of the total production.

The feedstocks used for ethanol production are predominantly cereals and sugar beet, while biodiesel is manufactured mainly from rapeseeds, accounting for over 25% of the EU rapeseed crop. The EU is by far the world's biggest producer of biodiesel, while the EU accounts for about 3% of global production of bioethanol. Germany produces over half of EU biodiesel, while Spain is the EU's leading bioethanol producer, accounting for about one-third of EU bioethanol production.

Another component of EU biofuel legislation relates to fuel quality. In 2003, the previous Fuel Quality Directive was amended to include environmental specifications, which apply to biofuels as well as to petrol and diesel. The European Committee for Standardization (CEN) has set limits on biodiesel blending to no more than a 5 percent share by volume for technical reasons. This strict technical requirement represents an obstacle to achieving the targets set in the Biofuels Directive. Consequently, it is proposed that the Fuel Quality Directive be revised again in order to remove this technical barrier and address other constraints on use of biofuels.

EU biofuels production is generally not internationally cost-competitive, due mainly to high-priced feedstocks: rapeseed for biodiesel, and sugar beet, corn, or wheat for bioethanol. With fairly recent oil prices rocketing to USD 70 a barrel, biofuels in general have become more competitive, but EU-produced biofuels are still not cost competitive with petrol. However, since ethanol is considered an agricultural product and most EU countries continue to charge customs duties based on higher agricultural tariffs, imported ethanol can sometimes be more expensive than EU-produced ethanol on a final cost basis.

In early 2006, the EC released a biofuels strategy, in which the overall aims of the biofuels initiatives were reviewed, progress was assessed and specific implementation issues were addressed in terms of meeting future targets. It was recognised that only about half of the target for 2010 could be met through production within the EU, and the remainder should be met through imports. To meet the 5.75% target, the Commission is thus envisioning a scenario in which internal production and imports each account for about half the total.

*For more information, visit: http://ec.europa.eu/environment/air/transport.htm#2 and http://reports.eea.europa.eu/eea_report_2007_1/en*

## 7.2 EMISSIONS

Nearly the entire energy consumption of the transport sector consists of fossil fuels. In fact, according to the European Environment Agency, the EU-25 is 98 % dependent on them[1]. Fossil fuel combustion produces carbon dioxide ($CO_2$) and other anthropogenic (manmade) 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 engine maintenance.

Greenhouse gas (GHG) emissions result from burning petrol, diesel and kerosene in internal combustion engines. $CO_2$, the biggest contributor to global warming, accounted for 97 % of greenhouse gas emissions in 2004 in the EU-25, but although it is the most important anthropogenic GHG - and often the main focus of public debate - it is not harmful as such but is the main cause of the 'greenhouse effect'.

Industrialised countries that are signatories to the Kyoto Protocol, adopted in 1997, are required to reduce their emissions of six greenhouse gases (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride) to on average 5.2 % below their 1990 level, by 2008 to 2012. However, the Kyoto Protocol does not provide for emissions from international flights and maritime transport - which are fast becoming major polluters.

For its part, the European Union agreed to an 8 % reduction in its greenhouse gas emissions, with reductions for the EU-15 Member States agreed under the so-called burden sharing agreement, which allows some countries to increase their emissions, provided that these are offset by reductions in other Member States.

Emissions of the 'Kyoto basket' (6 greenhouse gases) covered by the Protocol are weighted by their global warming potentials (GWPs) and aggregated to give total emissions in CO2 equivalent tonnes. Excluded are ozone-depleting substances with global warming properties, as covered by the Montreal Protocol.

Readers should also note that the figures presented in the following section do not include greenhouse gases from international aviation and maritime transport. Moreover, rail transport data cover emissions from diesel and coal combustion only and not from electric traction. This is important to note as electric traction accounts for two thirds of final energy consumption in rail transport (see previous section on energy consumption).

### Transport and Environment Reporting Mechanism

As part of the EU's response to tackling environmental issues arising from transport, a transport and environment reporting mechanism (TERM) was set up by the Commission and the European Environmental Agency (EEA), to monitor the progress and effectiveness of transport and environment integration strategies on the basis of a core set of 40 indicators.

These indicators cover the most important aspects of the transport and environment system (driving forces, pressures, state of the environment, impacts and societal responses - the 'DPSIR framework'). They cover not only transport demand and intensity, but also aspects like land use, access to basic transport services and expenditure on personal mobility. The indicators feed into regular TERM reports, which offer guidelines for the development of EU policies.

Formally established in 1998, TERM has been developed for many years in the framework of a steering group bringing together the Commission's DGs TREN (Energy and Transport), ENV (Environment) and Eurostat, along with the EEA and the participation of a network of national EEA contact points from each Member State.

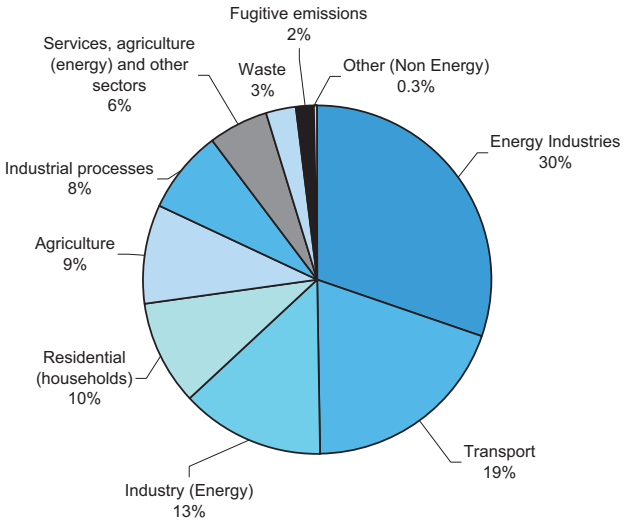
*For more information, visit: http://reports.eea.europa.eu*

[1] European Environment Agency, TERM 2006 02 Factsheet.

As illustrated in Figure 7.5, 19 % of total greenhouse gas emissions (or 967 million tonnes) were attributable to the transport sector in 2004, making it the second largest emitter after the energy industries (30 %). And if one were to add international aviation and maritime shipping, this total would arrive at around 1.2 billion tonnes (with international maritime shipping accounting for the largest share).

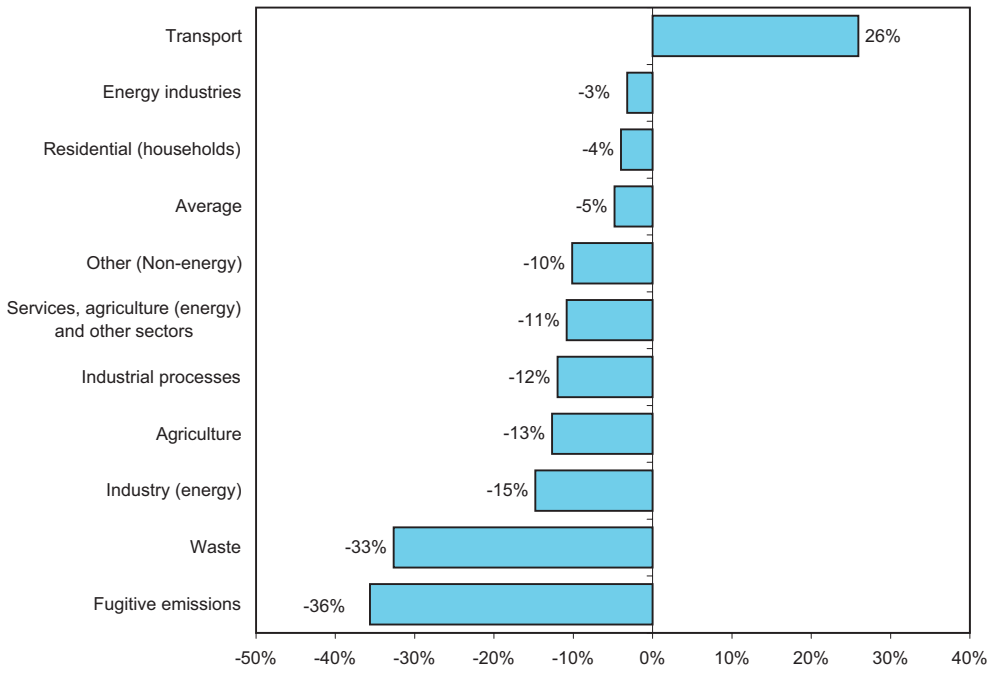
While the transport sector was not the largest emitter, it was the only one to increase its share of greenhouse gas emissions between 1990 and 2004. Against an average decrease of -5 %, transport emissions increased by 26 %, thus offsetting much of drop in other sectors, such as energy production, industry and services for example (Figure 7.6).

**Figure 7.5 Share of transport in total greenhouse gas emissions, EU-25, 2004 (in %)**




*Source*: European Environment Agency

**Figure 7.6 Evolution of total greenhouse gas emissions by source, EU-25, 1990-2004 (in %)**




*Source*: European Environment Agency

Table 7.11 Growth in greenhouse gas emissions from transport, 1990-2004 (in million tonnes)

| | 1990 | 2004 | % change 1990-2004 |
|---|---|---|---|
| LU | 2.7 | 7.1 | 157% |
| IE | 5.2 | 12.6 | 144% |
| CZ | 7.4 | 15.9 | 114% |
| PT | 10.1 | 20.0 | 99% |
| RO | 8.7 | 17.0 | 95% |
| AT | 12.7 | 23.8 | 87% |
| CY | 1.0 | 1.8 | 80% |
| ES | 57.5 | 102.0 | 77% |
| MT | 0.3 | 0.6 | 69% |
| SI | 2.7 | 4.3 | 57% |
| TR | 26.3 | 41.2 | 57% |
| EL | 15.6 | 22.3 | 43% |
| HR | 4.1 | 5.5 | 35% |
| BE | 20.4 | 27.3 | 34% |
| NL | 26.4 | 35.4 | 34% |
| IT | 104.0 | 132.6 | 28% |
| NO | 11.3 | 14.4 | 28% |
| DK | 10.5 | 13.3 | 27% |
| HU | 8.4 | 10.6 | 26% |
| **EU-25** | **767.6** | **966.7** | **26%** |
| FR | 121.5 | 146.8 | 21% |
| IS | 0.6 | 0.7 | 20% |
| PL | 29.7 | 34.5 | 16% |
| LI | 0.1 | 0.1 | 13% |
| UK | 119.2 | 134.2 | 13% |
| LV | 2.6 | 2.9 | 12% |
| FI | 12.8 | 14.1 | 10% |
| SE | 18.5 | 20.1 | 9% |
| SK | 5.2 | 5.7 | 9% |
| CH | 14.6 | 15.6 | 7% |
| DE | 164.4 | 172.8 | 5% |
| EE | 2.7 | 2.2 | -20% |
| BG | 11.0 | 7.5 | -32% |
| LT | 5.9 | 4.0 | -33% |

*Source*: European Environment Agency

Behind the EU-25's 26 % increase in greenhouse gas emissions from transport lies a broad spectrum of national growths, including also decreases in three new Member States from Eastern Europe (including Bulgaria), ranging from -33 % to -20 % (Table 7.11). Some other new Member States from Eastern Europe also showed lower emission growths: a trend that can be explained by economic re-structuring and resulting decreases in transport intensity, notably with regard to freight transport.

The fastest growing emitters were clearly led by Luxembourg (157 %), a rate reflecting both the country's particular geographic location and attractive fuel prices leading again to fuel tourism. It was followed by Ireland (144 %), a position which can be explained mostly by the country's very high economic growth over the same period, as well as fuel tourism, i.e. motorists in Northern Ireland filling up across the border in Ireland.

# Harmful emissions decline, but not enough in some places

Based on the Commission's Clean Air for Europe programme, around 370,000 people in Europe die prematurely every year from diseases linked to air pollution, and 350,000 of them because of particulate matter (under a certain size) emitted either directly, (e.g by cars, diesel especially) or formed by a chemical reaction of other 'primary' pollutants ($SO_2$, NOx, $NH_3$). These are emitted by vehicles - the growing proportion of diesel vehicles is a significant problem in this respect - but also by combustion processes in industrial plants and agriculture.

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. Moreover, in a number of cities, and in particular hotspots such as certain streets, air quality generally falls short of EU limits. About 80 % of EU citizens live in urban areas, and based on data endorsed by the EEA, around 9 % of citizens live closer than 200 meters from a road with a traffic of more than 3 million vehicles per year, and as many as 25 % live within 500 meters.

## Air pollutant emissions in a few words

Emissions of air pollutants impact on public health and ecosystems in various ways. Acidifying substances ($SO_2$, NOx, $NH_3$) bring about changes in soil and water quality, and damage to forests, crops and other vegetation as well as damage to buildings and cultural monuments. Ammonia ($NH_3$) and nitrogen oxides (NOx) can cause an excess input of nutrient nitrogen (eutrophication), leading to a loss of biodiversity and nitrogen leaching into water courses.

Particles ($SO_2$, NOx, PM10, $NH_3$) may increase the frequency and severity of a number of respiratory and other health problems. Ozone precursors (CO, NOx, NMVOC, $CH_4$) contribute to the formation of ground level (i.e. tropospheric) ozone, which is a powerful oxidant and can have a range of adverse impacts on both health and ecosystems.

*For more information, visit: http://www.eea.europa.eu*

Between 1990 and 2004, while greenhouse gases from transport were clearly on the rise, emissions of more harmful substances from transport - acidifying substances, particulate matter and ozone precursors - decreased. For example, emissions of ozone precursors (CO, NOx, NMVOC, $CH_4$) from transport - which accounted for close to 45 % of total ozone precursor emissions because of NOx emissions - dropped by 46 % over the period, particularly as a result of a 52 % decrease in emissions from road transport (Table 7.12). Catalytic converters are mainly responsible for this decrease (see below).

**Table 7.12** **Emissions of acidifying substances, tropospheric ozone precursors and particles from transport, EU-25, 1990-2004**

| | Acidifying substances | | Tropospheric ozone precursors | | Particles | |
|---|---|---|---|---|---|---|
| | % change 1990-2004 | % share in 2004 total | % change 1990-2004 | % share in 2004 total | % change 1990-2004 | % share in 2004 total |
| **Economic average** | -51% | 100% | -40% | 100% | -48% | 100% |
| **Transport** | -36% | 22% | -46% | 45% | -32% | 34% |
| **Road** | -42% | 15% | -52% | 34% | -38% | 24% |
| **Other transport** | -15% | 6% | -7% | 11% | -9% | 9% |

*Source*: European Environment Agency

In road traffic, lead emissions have been reduced to zero following the introduction of unleaded petrol, and since 2002 all petrol sold in the Member States has been unleaded. Based on comparable data for the EU-15, this situation compares with a share of unleaded petrol in petrol sales of 71 % in 1996, and of course less before then.

However, the burning of diesel fuel raises the question of particulate emissions, and as seen in Section 7.1, the share of diesel fuel sales clearly exceeds those of unleaded petrol in most Member States.

Vehicle emission standards have regulated the mass of particulates emitted, and these have been, and will continue to be 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-particles are emitted as a by-product. Particulate filters (or traps) can however reduce the mass and number of particles emitted. Technologically speaking, the emission standards under Euro V effectively make these filters compulsory (see box).

The widespread availability of low-sulphur fuels is important for the introduction of cars equipped with direct fuel injection (already widely introduced for diesel engines), which offer considerable potential for fuel efficiency and allow a further reduction of NOx emissions. Fuels with reduced sulphur content (both gasoline and diesel) - of less than 50 ppm (parts per million) - have been mandatory in the EU since 2005; a level which will be further reduced to less than 10 ppm by 2009, which is considered to have 'zero' content.

According to the EEA, of the countries with data available, all of them had already met the 2005 limit value for low sulphur content in road transport fuels, while others were expected to do so. Some countries had even achieved the 2009 target on zero sulphur fuels. Moreover, steps towards sulphur reduction were being taken in other modes.[2]

## Road transport: largest emitter

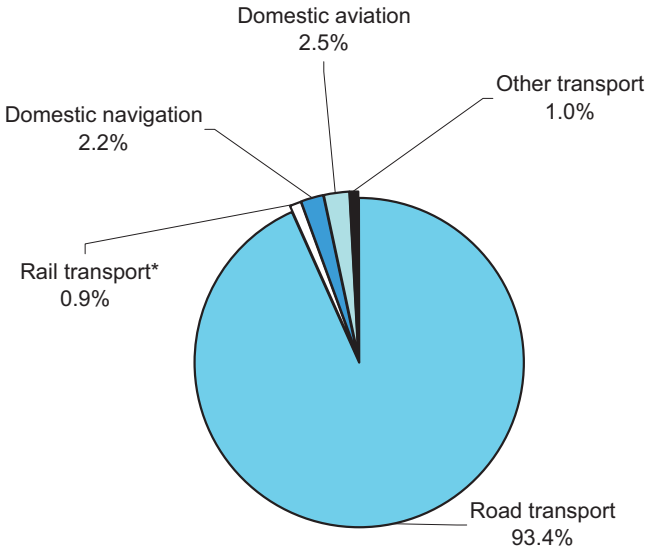
As one could have suspected with the 83 % share of energy consumed by road transport, mentioned in Section 7.1, road transport remains by far the largest single emitter. According to the European Environment Agency, 93 % of greenhouse gas emissions came from road transport in 2004 (Figure 7.7).

Readers should note however that although the modal share in emissions was proportionally higher than the share of energy consumed, this also reflects methodological differences, among which is the exclusion of international aviation and maritime transport from the emission data, which artificially increases the share of road transport. Indeed, this exclusion of international aviation explains why the share of air transport emissions (domestic only) only reached 2.5 %, not much more than inland waterway transport (2.2 %), a similarity which would otherwise come as quite unexpected.

Moreover, although rail transport seems to have been the smallest polluter, with an apparent share of 0.9 %, the true proportion would be larger than this if electric traction were also taken into consideration. As shown in the previous section (Table 7.5 on page 147), the share of electricity in total rail energy consumption was 66 %, twice the share of diesel energy.

Perhaps not surprisingly, road transport also accounted for 76 % of ozone precursors, 72 % of particulate matter and 71 % of acidifying substances emitted in transport (shares which can be deduced from Table 7.12). However, here again, these shares are artificially inflated with a view to the remarks made earlier.

**Figure 7.7** **Greenhouse gas emissions from transport by transport mode, EU-25, 2004 (in %)**



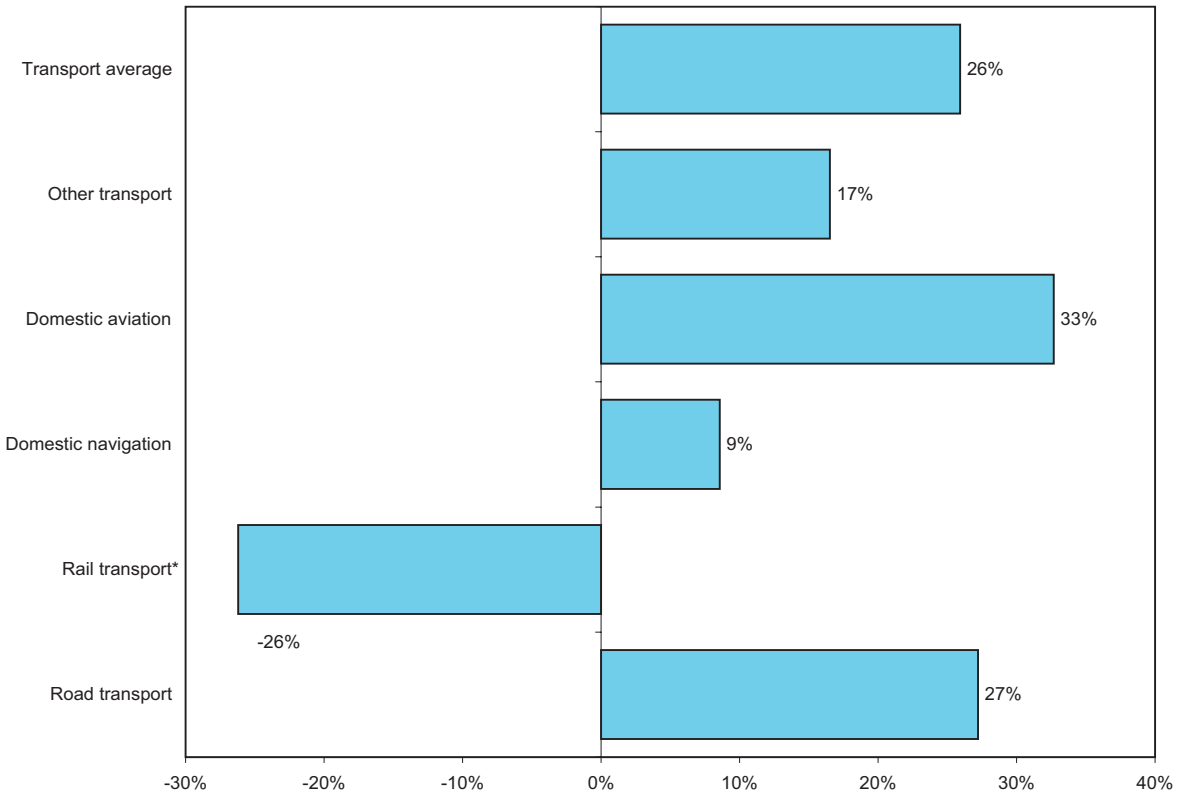

*Source*: European Environment Agency

* Data cover diesel (and some coal-powered) trains only; electric traction is therefore excluded.

[2] European Environment Agency, TERM 2005 Report.

Looking at the evolution of greenhouse gas emissions over the 1990-2004 period (Figure 7.8), domestic aviation recorded the fastest growth (33 %). It was followed by road transport (27 %), other transport (17 %) and domestic navigation (9 %). The only drop (among the transport modes covered) was in rail transport (-26 %), but readers are reminded that these data reflect a drop in diesel (and some coal) rail energy only. See also page 147, Table 7.5.

**Figure 7.8 Evolution of total greenhouse gas emissions by transport mode, EU-25, 1990-2004 (in %)**




*Source*: European Environment Agency

* Data cover diesel (and some coal-powered) trains only; electric traction is therefore excluded.

## Marco Polo II 2007-2013

In the mid-term review of the White Paper on Transport, the European Commission proposed to continue measures to promote environmentally friendly modes of transport. To achieve this objective, the Marco Polo Programme supports actions in freight transport, logistics and other relevant markets. These actions should contribute to shifting the increase in international road freight traffic to short sea shipping, rail and inland waterways or to a combination of modes of transport in which road journeys are as short as possible.

There are three main action types: start-up support for new non-road freight transport services; support for launching freight services or facilities of strategic European interest ('catalyst actions'); and finally, stimulating co-operative behaviour in the freight logistics market ('common learning actions').

*Further details, also on the selected actions, are available at the Marco Polo website: http://ec.europa.eu/transport/marcopolo/projects/index_en.htm*

# Improved car technology: key to lower emissions

Catalyst technology has brought a constant reduction in the quantities of nitrogen oxides (NOx), carbon monoxides (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 application of new EU emission standards have had and will continue to have positive effects.

Since 2000, new models of petrol-engined cars have been fitted with on-board diagnostics (OBD) which ensure that the catalytic converter functions properly. OBD became 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, ensuring emissions are minimised throughout the vehicle's operating life.

Clearly, emission reduction for road vehicles has come a long way, and the proportion of cars that comply with the latest and most stringent emission standards is - thankfully - higher than that for lorries or aircraft generally principally because of their shorter lifespan. This not only concerns the level of $CO_2$ emitted (the reduction of which is mainly linked to the use of more fuel-efficient vehicles) but also the levels of noxious substances.

## Euro 5 (...and 6) to reduce vehicle emissions

Reduced emissions from road transport are an important factor in improving air quality in urban areas, particularly because the numbers of diesel vehicles is increasing in many parts of the EU. Air quality limit values for NOx are often exceeded in densely populated areas close to major roads

With the aim of improving air quality, cars have to comply with certain standards for exhaust emissions before being sold on the EU market. Successive 'Euro' emission standards for passenger cars and light vehicles - typically referred to as Euro 1, Euro 2, etc. - have already helped to reduce air pollution from cars, for example by obliging carmakers to equip exhaust pipes with catalyst filters.

Emissions from new cars and light commercial vehicles (vans) are currently regulated by the Euro 4 standards which came fully into force in 2005. They set limits on the emissions of carbon monoxides (CO), hydrocarbons, oxides of nitrogen (NOx) and particulate matter.

The fifth wave of these standards - Euro 5 - proposes to set tighter emission limits of particles and of NOx for new petrol and diesel cars and vans sold in the EU market. For diesel vehicles, this would tighten limits of particulate matter by 80% or more, which would ultimately force the adoption of diesel particulate filters (DPFs) on all diesel vehicles. Petrol vehicles are also targeted, for although they have traditionally had negligible particulate emissions, new lean burn direct injection engines have been shown to emit significant quantities.

Euro 5 would also bring an end to the loopholes in current legislation for heavy sports utility vehicles (SUVs) and four-wheel drives weighing above 2 500 kg thus requiring these vehicles to meet the same standards as other passenger cars. Finally, to make the durability target for anti-pollution devices more consistent with the actual life-cycle of vehicles, the current target of 80 000km would be doubled to 160 000 km.

Currently on the table is also a further wave of standards 'Euro 6' which would set significantly lower emission limits for NOx emissions from diesel cars and would enter into force 5 years after Euro 5, i.e. around 2015.

Separate emissions regulations apply for heavy-duty trucks and buses, off-road diesel vehicles and motorcycles.

Cutting vehicle emissions is part of a more global strategy to tackle the negative health and environmental effects of air pollution created by economies in general, not just transport. This so-called 'thematic strategy on air pollution' was adopted by the Commission in 2005, together with a directive on ambient air quality, under the 6th Environmental Action Programme and its connected Clean Air for Europe (CAFE) programme initiated in 2001.

*For more information, visit: http://ec.europa.eu/environment/air/legis.htm*

EU legislation on emissions is the major reason why these decreases have taken place. Legislation first targeted road vehicles from the end of the 1980s via EU emission standards, while standards for two-wheelers, barges, diesel trains and mobile machinery came into force more recently. As a result, innovations have been made in exhaust gas treatment in road vehicles and improved fuel quality. Further reductions will take place as even stricter limits enter into force and older vehicles are replaced by new models.

## Euro standards target old 'stinkers'

**Table 7.13** Age breakdown of car stock, available years

| | Stock of passenger cars (1000) | Less than 2 years | 2 to 5 years | 5 to 10 years | More than 10 years |
|---|---|---|---|---|---|
| BE | 4 874 | 14.5 | 24.5 | 31.7 | 29.3 |
| CZ* | 3 706 | 10.2 | 15.7 | 0.0 | 74.1 |
| DK** | 1 888 | 16.2 | 22.9 | 28.9 | 31.9 |
| DE* | 45 023 | 14.4 | 21.9 | 33.1 | 30.6 |
| EE | 471 | 6.8 | 8.5 | 16.1 | 68.6 |
| IE | 1 582 | 17.3 | 31.7 | 37.2 | 13.8 |
| EL* | 3 840 | : | : | : | : |
| ES | 18 688 | 14.5 | 22.1 | 23.9 | 39.4 |
| FR* | 29 560 | 14.3 | 22.4 | 31.0 | 32.2 |
| IT** | 33 706 | 13.6 | 21.7 | 25.8 | 38.9 |
| CY | 335 | 8.7 | 11.9 | 34.3 | 45.1 |
| LV | 686 | : | : | : | : |
| LT | 1 316 | : | : | : | : |
| LU*** | 281 | 26.7 | 28.8 | 26.0 | 18.5 |
| HU | 2 828 | 20.4 | 15.7 | 18.2 | 45.6 |
| MT**** | 189 | : | : | : | : |
| NL | 6 992 | 13.5 | 22.1 | 33.3 | 31.1 |
| AT | 4 109 | 13.9 | 20.3 | 32.4 | 33.5 |
| PL | 11 975 | 7.2 | 12.2 | 24.6 | 56.0 |
| PT** | 5 788 | : | : | : | : |
| SI | 911 | : | : | : | : |
| SK | 1 197 | : | : | : | : |
| FI | 2 347 | 12.5 | 16.0 | 24.5 | 47.1 |
| SE | 4 113 | 11.6 | 18.6 | 29.2 | 40.5 |
| UK***** | 27 765 | 18.0 | 25.7 | 33.3 | 20.4 |
| IS* | 167 | 15.0 | 29.3 | 21.0 | 34.7 |
| LI | 24 | 16.3 | 27.5 | 32.2 | 24.0 |
| NO | 1 977 | 10.6 | 15.7 | 32.0 | 41.8 |
| CH* | 3 800 | 14.0 | 23.3 | 32.0 | 30.8 |

*Source*: Eurostat (Transport)

*2003, **2002, ***2001, ****2000, ***** UK excludes Northern Ireland.
BG and RO: no data available.

In effect, the age of the vehicle fleet notably has an influence on emissions, especially as since 1992 progressively stringent emission standards (see box) for new cars have been in force in the EU. For example, a car aged over 15 years in 2007 would have been manufactured before these emission standards came into force, and would therefore be more likely to emit more, while a car aged 12 years would have had to comply with Euro 1 standards, which were less restrictive than Euro 4 or 5 standards.

Most Member States from Eastern Europe displayed a relatively high proportion of old vehicles in 2004: in the Czech Republic, nearly three quarters of the registered passenger cars were more than 10 years old (Table 7.13). In Estonia and Poland, this proportion was of 69 % and 56 % respectively. By contrast, Luxembourg had the highest share of vehicles aged less than two years (27 %), followed by Hungary (20 %).

## Getting $CO_2$ off the road

An important component of the EU's strategy to reduce $CO_2$ emissions from cars is voluntary commitments by the European, Japanese and Korean car manufacturers' associations to reduce $CO_2$ emissions from their cars to an average of 140 g/km by 2008 (for European manufacturers) and 2009 (for Japanese and Korean producers). This is roughly equivalent to a fuel consumption of 5 litres of petrol or 4.5 litres of diesel over a journey of 100 km. Unlike the Euro 5 proposals, the carbon dioxide target does not apply to individual vehicles but is an average over all new cars sold in one year. The final EU target is to reach an average $CO_2$ emission figure of 120 g/km for all new passenger cars by 2012 at the latest.

The commitments by European, Japanese and Korean manufacturers are an important measure to help the EU reach its Kyoto Protocol target of cutting emissions of climate-changing greenhouse gases to 8% below 1990 levels by 2012. Cars are responsible for more than 10% of EU $CO_2$ emissions, according to the Commission.

According to the European Commission's annual report on $CO_2$ emissions from new cars*, in 2004 average emissions in the EU-15 were 163 g/km, 12.4 % below the 1995 level (186 g/km) when monitoring began. For the EU-25, this average was 162 g/km. Much of the improvement is due to the increasing popularity of diesel-powered transport.

The other two pillars of EU strategy are consumer information (chiefly through fuel efficiency labelling of cars) and fiscal measures to promote the most fuel-efficient cars.

*For more information, visit: http://www.ec.europa.eu/environment/co2/co2_home.htm*

* *'Implementing the Community Strategy to Reduce $CO_2$ Emissions from Cars: Sixth annual Communication on the effectiveness of the strategy'. COM(2006) 463 final.*

## Air: most aircraft-related emissions at critical altitude

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. 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 nitrogen oxides (NOx), volatile organic compounds and particulates.

Not only was air transport the fastest growing energy consumer between 1990-2004, but it was also the fastest climbing emitter in GHG emissions (33% growth over the same period), even if aircraft emissions are however low compared with other man-made emissions. And this is only considering emissions from national fuel deliveries: falling beyond the remit of the Kyoto Protocol, the international share of aviation emissions is not covered. Emissions from aeroplanes fuelled in a non-EU country therefore escape EU statistics.

### Watch this airspace

In the aviation industry, the 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. Standards recommended at ICAO level are used as benchmarks for EU legislation.

To counter the impact of air transport emissions, EU policy is starting to spread its wings. Among the various strategies tabled by the Commission is a legislative proposal that would integrate aviation into Europe's Emissions Trading Scheme (ETS) and allow airline companies to trade any surplus 'pollution credits' on the EU's 'carbon market'.

Another possible initiative is in the area of fuel taxation, whereby the tax exemption traditionally applied to the aviation sector would be removed; it is common practice for aircraft fuel to be exempted from taxes. Although EU legislation allows for a fuel tax to be imposed on domestic flights in Member States, it is often impossible to tax fuel for international flights (including between Member States) due to the legally binding commitments in air service framework agreements concluded between the Member States and third countries.

The Commission also suggests improving air traffic management, particularly through implementation of the Single European Sky and SESAME initiatives. More effective management of air traffic would, among other things, enable aviation fuel consumption to be reduced.

*For more information, visit: http://ec.europa.eu/transport/air_portal/environment/index_en.htm*

The main difference with other transport modes is the fact that aircraft emit gases and particles directly into the upper troposphere and lower stratosphere where they impact upon atmospheric composition. These gases and particles alter the concentration of atmospheric greenhouse gases, lead to the formation of condensation trails, and may increase cirrus-cloud formation, all of which contribute to climate change. Unless new, less-polluting engines and significantly more fuel-efficient aircraft technologies are introduced, the relative contribution of aviation to environmental changes will become even more significant.

# Maritime transport: single largest source of Sulphur

The overall environmental impact of maritime transport is low when compared alongside other transport modes - at least for now. Because shipping is comparatively a very energy efficient mode of transport, little attention has been paid to it so far, and maritime transport is not covered by the Kyoto Protocol. However, because the sector has lagged behind land transport in cleaning up its emissions, ships are fast becoming a worrying source of air pollution in the EU. According to the EEA, maritime transport is currently responsible for 13 % of the world's total transport greenhouse gas emissions.

## Sea change for maritime emissions

Emissions in the maritime sector have been regulated by the Marpol convention, Annex VI, stepwise since 2005. It sets limits for the sulphur content of fuel oil, and standards for NOX emissions. The general sulphur limit for marine fuel is 4.5 % (45 000 ppm), and 1.5 % in the three specific protection areas of the Baltic, North Sea and English Channel.

Most manufacturers have been building engines compliant with this standard for some time, so replacement of older technology has already been ongoing. The average fuel sulphur content in the EU for sea-going vessels is around 3.0 % in any case, but the 1.5 % emissions limit in the three specific protection areas will make a change for the better.

EU strategy seeks to implement the SOx emission control areas set out in Annex VI, and to press for tighter NOx standards. The EU has also applied the same 1.5% limit on fuel suplhur content for passenger vessels on regular services to or from EU ports.

While ships spend most of their time at sea, their time in ports can also add to pollution. This is why emissions from both inland vessels and seagoing vessels at berth in EU ports will be limited to 0.1 % from 2010. Building on this, the Commission recently recommended the more widespread use of shore-side electricity from the national grid instead of ships producing electricity using their own engines. This eliminates local air and noise emissions from ships' engines while at berth in port.

*For more information, visit: http://ec.europa.eu/environment/air/transport.htm*

The overall environmental impact of maritime transport is low when compared alongside other transport modes - at least for now. Because shipping is comparatively a very energy efficient mode of transport, little attention has been paid to it so far, and maritime transport is not covered by the Kyoto Protocol. However, because the sector has lagged behind land transport in cleaning up its emissions, ships are fast becoming a worrying source of air pollution in the EU. According to the EEA, maritime transport is currently responsible for 13 % of the world's total transport greenhouse gas emissions[3].

In addition to the continual emissions of maritime transport, there is also the occasional accident that can result in large oil spills or have other important ecological impacts. This is particularly true in the waters around the European Union that have a relatively dense maritime traffic (see Chapter 6).

[3] European Environment Agency, TERM Report 2006 No. 1/2007.

## Inland navigation: a small polluter

With a share of just over 2 % in transport greenhouse gas emissions, and presenting an emission growth of just 9 % between 1990 and 2004, inland navigation is of considerable interest from the environmental perspective, and still has potential for further development at EU level.

Although transport by inland waterways is of minor importance compared with other modes, it should be mentioned that the fleet of vessels has undergone substantial changes over the last decades: scrappage schemes in various countries have eliminated smaller, dirtier and less efficient vessels from the fleet.

## Transport noise: a plague of modern civilisation

Noise created by transport has been attracting increasing attention in recent years, and has lead to various measures at EU level on the harmonisation of noise assessment and management, market access requirements for certain vehicles and equipment, railway interoperability specifications and rules on operating restrictions at airports[4].

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.

Railway industry measures cover 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 built with noise barriers along sensitive areas.

Aircraft are particularly noisy birds that largely affect areas at and around airports, even if modern aircraft are 10 to 15 decibels quieter than previous generations of aircraft. As an example, a modern Airbus A320 has a considerably smaller noise 'footprint' (noise area contour measured on the ground) than the older Boeing 727.

Current legislation provides for the reduction of airplane noise at source, land-use planning and management measures, noise abatement operational procedures and operating restrictions. 'Chapter 4' - the ICAO - recommended technical design standard - has been applicable to new aircraft types submitted for certification since 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 the operation of aeroplanes.

Since most recently manufactured aircraft already comply with the Chapter 4 standard, its impact will only materialise over a longer period as fleets are modernised and renewed. Accompanying measures are therefore required to further improve the noise situation: it is now widely recognised that certain operating restrictions can be imposed on an airport-by-airport basis (mainly for so-called 'city airports').

Another area that offers potential for reducing the environmental impact of aviation concerns the improvement of air traffic management. There is a broad consensus from agencies, such as Eurocontrol (the European Organisation for the Safety of Air Navigation) that there is potential for improvement, not only with regard to fuel savings but also in increased safety, reliability and efficiency. Air traffic management delays and inefficient routings increase aircraft noise, fuel burn and gaseous emissions, as well as flight times. Moreover, much more could also be done to abate noise caused at take-off and landing.

[4] Report from the Commission to the European Parliament and the Council concerning existing Community measures relating to sources of environmental noise, pursuant to article 10.1 of Directive 2002/49/EC relating to the assessment and management of environmental noise, COM(2004) 160 final.

## More energy efficiency = fewer emissions

Apart from choice of vehicle and transport mode, a key to a further reduction of energy consumption and pollutant emissions is their efficient use. The more vehicles are efficiently used (higher occupancy rate, optimum volumes of goods transported, style of driving…), the less energy is consumed and the less pollution is caused per person per kilometre travelled.

Occupancy rates have generally tended to decline over time both for passenger cars and for buses and coaches, while they have remained more or less constant for rail transport. Air transport is somewhat an exception, where a steady increase in the occupancy rate has taken place. This can be explained, for example, by the increased demand in air travel, the further development of hub-and-spoke systems and the market penetration of low-cost carriers.

Regarding freight transport, efficiency has increased in road transport - also due to a further liberalisation of this sector such as cross-trade or cabotage (see Chapter 5) - but especially in rail and air transport over the last two decades, even if it seems that the efficiency of the latter mode has - for a number of years now - come to a limit which is difficult to improve.

The development of modern aircraft, road vehicles, rail and maritime fleets and new logistic concepts linked with the renewal of fleets can be considered the major determinants of increasing energy efficiency. However, external incentives - determined by either markets or policies - strongly affects the time span for fleet renewal and for modern logistic concepts to take root. Significant gains in efficiency can be expected if market and political incentives complement rather than compete with each other.

The Commission's moves to promote a market for greener vehicles, for example, might well stimulate demand for these cars, especially against mounting petrol prices. When it comes to rail transport, the political process of market opening and the push for interoperability goes hand in hand with rail carriers' aims to provide efficient (and thus competitive) transport services in an enlarged Europe.

# Background information

## GENERAL INFORMATION

### Geographical coverage

This publication covers the European Union (EU), and its 27 Member States:
Belgium (BE), Bulgaria (BG), the Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK).

Where data availability permits, information is also included for:

- the Candidate Countries (Croatia (HR), Former Yugoslav Republic of Macedonia (MK) and Turkey (TR);
- EEA/EFTA countries (Iceland (IS), Liechtenstein (LI) and Norway (NO)) and Switzerland (CH);
- the United States (US) and Japan (JP).

Unless otherwise stated, all data for Germany are provided on the basis of re-unified Germany.

### EU aggregates

At the time of data processing for this publication, EU aggregates had been compiled for the EU-25 only and therefore exclude Bulgaria and Romania. EU-25 aggregates include estimates for missing components where necessary. In the absence of data for some EU-25 Member States, aggregates are compiled and referred to as 'EU' with the exact country coverage footnoted.

Where EU-15 aggregates enable longer time series, they have been included where possible.

### Exchange rates

All data are reported in ECU/EUR terms, with national currencies converted using average exchange rates prevailing for the year in question.

### Estimates

All data in italics are estimated.

### Non-availability

The colon (:) denotes unavailable data (either because they are not available in the source used or are confidential). In specific cases, confidential data have been marked with a small 'c'. The hyphen denotes inapplicability.

## DATA SOURCES

### Billion

One billion equals 1000 million.

### Main sources

The main data sources used for this publication are Eurostat and DG Energy and Transport. With regard to Eurostat data, the main statistical datasets are transport statistics and Structural Business Statistics (SBS), which have been complemented by energy statistics, the Urban Audit and the Labour Force Survey (LFS).

Other main sources include Eurobarometer (European Commission), the European Environment Agency (EEA), the OECD and the International Energy Agency (IEA).

### Non-official sources

In some instances, data from professional organisations are used as a complement. Readers should note however that data from non-official sources may be based on different standards to those used in the European Statistical System, notably in that they reflect only the activities of members of the organisations providing the data, or be restricted in other ways. Users are therefore advised not to combine data from official and non-official sources.

## MAIN DEFINITIONS

### Transport

The following list is a selection of the main definitions used in the Panorama. For further information on definitions in connection with transport, readers are advised to consult the Glossary for transport statistics, third edition (2003) on Eurostat's webpages dedicated to transport (within transport under 'publications'): http://ec.europa.eu/eurostat.

### General definitions

#### Passenger-kilometre

Unit of measure representing the transport of one passenger by a given transport mode over one kilometre.

#### Tonne-kilometre

Unit of measure representing the transport of one tonne of goods by a given transport mode over one kilometre.

#### Goods loaded

Goods placed on a road or rail vehicle, sea or inland waterway vessel or aircraft and subsequently dispatched. With regard to road and inland waterway transport, trans-

shipment from one vehicle/vessel to another or change of tractive vehicle are regarded as loading after unloading; this is not the case for rail transport (see below).

**Goods unloaded**

Goods taken off a road or rail vehicle, sea or inland waterway vessel or aircraft.

Readers should note that in the case of rail transport, trans-shipments from one railway vehicle directly to another and change of tractive vehicle are not regarded as unloading/loading, as is however the case notably in road and inland waterway transport. However, if the goods are unloaded from a railway vehicle, loaded on another mode of transport and, again loaded on another railway vehicle, this is considered as unloading from the first railway vehicle followed by loading on the second railway vehicle.

**National transport**

Transport between two places (a place of loading/embarkation and a place of unloading/ disembarkation) located in the same country irrespective of the country in which the vehicle/vessel is registered. It may involve transit through a second country.

**International transport**

Transport between two places (a place of loading/ embarkation and a place of unloading/disembarkation) in two different countries. With regard to road and inland waterway transport, it may involve transit through one or more additional country or countries. For rail transport, transit is however not included. In addition, wagons loaded on a foreign railway network and carried by ferry to the reporting network are included.

**Dangerous goods**

The classes of dangerous goods carried by road are those defined by the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). The classes of dangerous goods carried by rail are those defined by the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID).

## Road transport

**Motorway**

Road, specially designed and built for motor traffic, which does not serve properties bordering on it, and which:

(a) is provided, except at special points or temporarily, with separate carriageways for the two directions of traffic, separated from each other, either by a dividing strip not intended for traffic, or exceptionally by other means;

(b) does not cross at level with any road, railway or tramway track, or footpath;

(c) is specially sign-posted as a motorway and is reserved for specific categories of road motor vehicles.

**Stock of road vehicles**

Number of road vehicles registered at a given date in a country and licensed to use roads open to public traffic. This includes road vehicles exempted from annual taxes or license fees; it also includes imported second-hand vehicles and other road vehicles according to national practices. The statistics should exclude military vehicles.

**Road cabotage transport**

National road transport performed by a motor vehicle registered in another country.

**'Regular' international road transport**

Road transport between two places (a place of loading/embarkation and a place of unloading /disembarkation) in two different countries. It may involve transit through one or more additional country or countries.

**Cross-trade road transport**

International road transport performed by a road motor vehicle registered in a third country (i.e. a country other than the country of loading/embarkation or than the country of unloading/disembarkation.

## Rail transport

**Railway network**

All railways in a given area. This does not include stretches of road or water even if rolling stock should be conveyed over such routes, e.g. by wagon-carrying trailers or ferries. Lines solely used for touristic purposes are excluded as are railways constructed solely to serve mines, forests or other industrial or agricultural undertakings and which are not open to public traffic.

**Track**

A pair of rails over which railway vehicles can run.

**Line**

One or more adjacent running tracks forming a route between two points. Where a section of network comprises two or more lines running alongside one another, there are as many lines as routes to which tracks are allotted exclusively.

**Dedicated high speed line**

A line specially built to allow traffic at speeds generally equal to or greater than 250 km/h for the main segments. High speed lines may include connecting lines, in particular junctions with town centre stations located on them, on which speeds may take account of local conditions. Not to

be confused with 'upgraded high speed lines', which are conventional lines specially upgraded to allow traffic at speeds of the order of 200 km/h for the main segments.

**International goods transport by rail - loaded (outgoing)**

Goods carried by rail between a place of loading located in the reporting country and a place of unloading in another country.

**International goods transport by rail - unloaded (incoming)**

Goods carried by rail between a place of loading located in a foreign country and a place of unloading in the reporting country.

## Air transport

In principle, information provided in this publication is based on On Flight Origin/Destination data rather than Flight Stage data. OFOD data have been used where available, but FS data have been used for those countries where no OFOD data were reported.

**Passengers on board**

All passengers on board of the aircraft upon landing at the reporting airport or at taking-off from the reporting airport. This includes direct transit passengers.

**Passengers carried**

All passengers on a particular flight counted once only and not repeatedly on each individual stage of that flight. This excludes direct transit passengers.

**Freight and mail loaded or unloaded**

All freight and mail loaded onto or unloaded from an aircraft. This excludes passenger baggage and direct transit freight and mail.

## Inland waterway transport

**Waterway**

River, canal, lake or other stretch of water which by natural or man-made features is suitable for navigation. Waterways of a maritime character (waterways designated by the reporting country as suitable for navigation primarily by seagoing ships) are included. Waterways also include river estuaries; the boundary being that point nearest the sea where the width of the river is both less than 3 km at low water and less then 5 km at high water.

**Navigable inland waterway**

A stretch of water, not part of the sea, over which vessels of a carrying capacity of not less than 50 tonnes can navigate when normally loaded. This term covers both navigable rivers and lakes and navigable canals. The length of rivers and canals is measured in mid-channel. The length of lakes and lagoons is measured along the shortest navigable route between the most distant points to and from which transport operations are performed. A waterway forming a common frontier between two countries is reported by both.

## Oil pipeline transport

**Oil pipelines**

Pipes for the movement of crude or refined liquid petroleum products by pumping. Branch lines are included as well as oil pipelines between the land and drilling platforms at sea. Excluded are oil pipelines whose total length is less than 50 km or whose inside diameter is less than 15 centimetres and oil pipelines used only for military purposes or located entirely within the site boundaries of an industrial operation, as well as oil pipelines that are entirely off-shore (i.e. located solely out in the open sea). International oil pipelines whose total length is 50 km or more are included even if the section in the reporting country is less than 50 km long. Oil pipelines consisting of two (or more) parallel pipelines are to be counted twice (or more). Only units which actually carry out an activity during the reference period should be considered. 'Dormant' units or those not yet having begun their activity are excluded.

## Maritime transport

**Deadweight (DWT)**

The deadweight of a ship is the difference in tonnes between the displacement of a ship on summer load-line in water with a specific gravity of 1,025 and the total weight of the ship, i.e. the displacement in tonnes of a ship without cargo, fuel, lubricating oil, ballast water, fresh water and drinking water in the tanks, usable supplies as well as passengers, crew and their possessions.

**TEU (Twenty-foot Equivalent Unit)**

Standard unit for counting containers of various capacities and for describing the capacities of container ships or terminals. One 20 Foot ISO container (see heading 17 below) equals 1 TEU.

## Structural Business Statistics

**Number of enterprises**

The number of enterprises active during at least part of the reference period.

**Number of persons employed**

The total number of persons who work in the observation unit, as well as persons who work outside the unit but who belong to and are paid by it. It includes employees, part-time workers, working proprietors, unpaid family workers, seasonal workers etc.

**Value added at factor cost**

The gross income from operating activities after adjusting for operating subsidies and indirect taxes (including value added tax).

**Turnover**

The totals invoiced by the observation unit during the reference period, and this corresponds to market sales of goods or services supplied to third parties.

**Apparent labour productivity**

This is a simple indicator of productivity calculated as value added divided by persons employed.

**Wage adjusted labour productivity (%)**

is obtained by dividing apparent labour productivity by average personnel costs.

**Average personnel costs**

Personnel costs are the total remuneration, in cash or in kind, payable by an employer to an employee for work carried out. This is divided by the number of employees (paid workers), which includes part-time workers, seasonal workers etc, but excludes persons on long-term leave.

**Purchases of goods and services**

All goods and services purchased for resale or consumption in the production process, excluding capital goods the consumption of which is registered as consumption of fixed capital.

**Gross operating surplus**

The gross operating surplus is a measure of the operating revenue left to compensate the capital factor input, after the labour factor input has been recompensed. The surplus is used by the unit to recompense the providers of own funds and debt, to pay taxes and eventually to finance all or a part of its investment (the consumption of fixed capital representing the amount of fixed assets used up, during the period under consideration, as a result of normal wear and tear and foreseeable obsolescence).

**Gross operating rate (%)**

This is an indicator of profitability where the gross operating surplus (above) is related to the turnover generated.

**Gross investment in tangible goods**

All new and existing tangible capital goods, whether bought from third parties or produced for own use, having a useful life of more than one year including non-produced tangible goods such as land.

**Investment rate**

An indicator of investment where gross investment in tangible goods is related to value added.

For further information on definitions or on Structural Business Statistics in general, readers should consult Eurostat's website pages dedicated to European Business: http://ec.europa.eu/eurostat.

## Labour Force Survey

Data are based on persons employed who are persons aged 15 years and over (16 and over in Spain and the United Kingdom; 15 to 74 years old in Denmark, Estonia, Hungary, Latvia, Finland and Sweden; 16 to 74 years old in Iceland and Norway) who during the reference week performed work, even for just one hour a week, for pay, profit or family gain or were not at work but had a job or business from which they were temporarily absent because of, for example, illness, holidays, industrial dispute and education and training.

Full-time/part-time breakdown refers to the main job. The distinction between full-time and part-time work is based on a spontaneous response by the respondent (except in the Netherlands, Iceland and Norway where part-time work is determined to be the case if the usual hours are fewer than 35 hours and fulltime if the usual hours are 35 hours or more, and in Sweden where this criterion is applied to the self-employed).

# ABBREVIATIONS

## Countries

| | |
|---|---|
| EU-25 | European Union of 25 Member States |
| EU-15 | European Union of 15 Member States |
| BE | Belgium |
| BG | Bulgaria |
| CZ | Czech Republic |
| DK | Denmark |
| DE | Germany |
| EE | Estonia |
| IE | Ireland |
| EL | Greece |
| ES | Spain |
| FR | France |
| IT | Italy |
| CY | Cyprus |
| LV | Latvia |
| LT | Lithuania |
| LU | Luxembourg |
| HU | Hungary |
| MT | Malta |
| NL | Netherlands |
| AT | Austria |
| PL | Poland |

| | |
|---|---|
| PT | Portugal |
| RO | Romania |
| SI | Slovenia |
| SK | Slovakia |
| FI | Finland |
| SE | Sweden |
| UK | United Kingdom |
| HR | Croatia |
| MK | Former Yugoslav Republic of Macedonia |
| TR | Turkey |
| IS | Iceland |
| LI | Liechtenstein |
| NO | Norway |
| CH | Switzerland |
| JP | Japan |
| US | United States (of America) |

### International organisations and EU agencies

| | |
|---|---|
| EEA | European Environment Agency |
| IEA | International Energy Agency |
| OECD | Organisation for Economic Development and Cooperation |

### Weights and measures

| | |
|---|---|
| DWT | Deadweight tonnes |
| EUR | euro |
| GRT | Gross tonnage |
| Km | Kilometre |
| Km² | Square kilometre |
| MTOE | Million tonnes of oil equivalent |
| PKM | Passenger-kilometre |
| TKM | Tonne-kilometre |
| TEU | Twenty-foot Equivalent Unit |
| TOE | Tonnes of oil equivalent |
| % | Percentage |

### Miscellaneous abbreviations

| | |
|---|---|
| NACE | Statistical Classification of Economic Activities in the European Community |
| n.e.c. | Not elsewhere classified |
| Ro-Ro | Roll-on Roll-off (ferries) |
| TEN-T | Trans-European transport network |

European Commission

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# Panorama of Transport

The "Panorama of Transport" presents a statistical analysis of transport in the European Union, which was recently enlarged to include Bulgaria and Romania, as well as in the EFTA and candidate countries. Some comparisons with the US and Japan have been made when possible.

Alongside traffic details (vehicle movements) and transport as such (movement of people and goods), the analysis also considers infrastructure, resources, transport as a separate sector of the economy, safety and the impact on energy consumption and the environment.

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