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Panorama of Transport, 1990-2006

Sixth edition

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Transport in the EU-27

Keeping Europe moving

Effective transportation

There were close to 491 million inhabitants in the EU-27 in 2006. From the schoolchild to the old-age pensioner, most will use transport to go to work or to school, to do shopping and to travel in their leisure time. An average of 34 km were travelled daily by EU-27 passengers in 2006, 26 km of which by passenger car. In fact, in 2006, there was nearly one car for two inhabitants (see Chapter 3). Ever-increasing mobility is part of everyday life in the EU-27.

When it comes to filling up the shelves in shops, to transporting fuels, building materials and other inputs for trade, industry and our homes, a tonne of goods travelled a daily average distance of 23 kilometres for every EU-27 citizen, 11 km of these by Road. The mobility of persons is an essential right of the citizen in the EU-27, and the mobility of goods is an essential component of the competitiveness of European industry and services.

Effective transportation is essential for the European Union's prosperity and well-being. The goal of the EU's sustainable transport policy is to ensure that our transport systems meet the citizen's economic, social and environmental needs, as highlighted by the mid-term review of the 2001 White Paper, 'Keep Europe moving' (see box, p. 4). Under the Seventh Research Framework Programme (FP7), for example, the central objective of transport research is to develop safer, 'greener' and 'smarter' pan-European transport systems that will benefit all citizens, respect the environment, and increase the comparative advantage of European industries in the global market.

An integral part of the Treaties

Transport was seen as a crucial element in the establishment of the Common Market, whose rules, especially those governing international transport, made possible the free trade of goods and the free movement of persons. This is why Transport forms an integral part of the Treaty establishing the European Community (see box below). Elements such as Transport Safety and the Trans-European Transport Networks (TEN-T) were, for example, added with the Treaty of Maastricht (1992).

The TEN-T play an important role in securing the free movement of passengers and goods in the European Union. They form a key element of the Lisbon strategy for competititveness and employment in Europe. Including major infrastructural projects, the TEN-T aim to ensure a free flow on major transport routes as well as the sustainability of transport (see Chapter 2).

Transport statistics have a central function in the implementation of transport policy in the EU. The liberalisation of international Goods transport has been a major concern from the outset and this is reflected in a number of legal acts' extensively covering this aspect of transport statistics. Legal acts governing international Passenger transport statistics were recently added, in the case of Rail and Air, in 2003.

The momentum for EU transport starts in the Treaties

[Extracts from the consolidated version of the Treaty on the Functioning of the European Union]

TITLE VI - TRANSPORT

Article 90 - (ex Art. 70 TEC[1])

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

Article 91 - (ex Art. 71 TEC)

1. For the purpose of implementing Article 90, and taking into account the distinctive features of transport, the European Parliament and the Council shall, acting in accordance with the ordinary legislative procedure 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 100 - (ex Art. 80 TEC)

1. The provisions of this Title shall apply to transport by rail, road and inland waterway.

2. The European Parliament and the Council, acting in accordance with the ordinary legislative procedure, may lay down appropriate provisions for sea and air transport. They shall act after consulting the Economic and Social Committee and the Committee of the Regions.

TITLE XVI - TRANS-EUROPEAN NETWORKS

Article 170 - (ex Art. 154 TEC)

1. To help achieve the objectives referred to in Articles 26 and 174 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 Union shall contribute to the establishment and development of trans-European networks in the areas of transport, telecommunications and energy infrastructures.

2. Within the framework of a system of open and competitive markets, action by the Union 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 islands, landlocked and peripheral regions with the central regions of the Union.

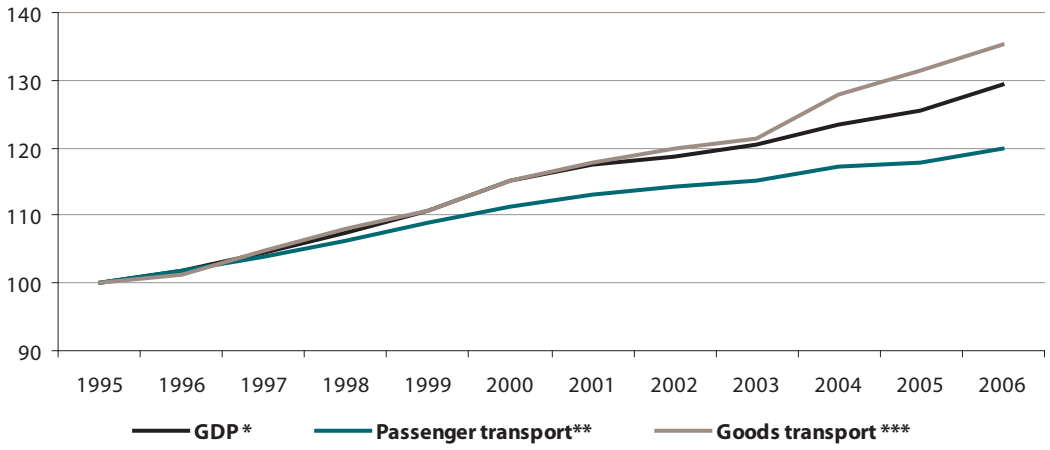
http://eur-lex.europa.eu/en/index.htm

[1] TEC: Treaty of the European Communities

Transport: a vital constituent of the economy

Trends in transport performance, especially those of goods transport, follow economic developments. While gross domestic product (GDP, measured at constant 1995 prices) grew at an average yearly rate of 2.4 % from 1995 to 2006, goods transport performance, measured in tonne-kilometres, grew at 2.8 % yearly. Over the period, passenger transport performance, measured in passenger-kilometres, grew at an average yearly rate of 1.7 %.

Figure 1.1: Passenger and goods transport compared to GDP, EU-27, 1995 to 2006 (index 1995 = 100)



* GDP at constant 1995 prices

** performance in passenger-kilometres of: passenger cars, powered two-wheelers, buses & coaches, trams & metros, railways, intra-EU-sea and intra-EU-air

*** performance in tonne-kilometres of: road, rail, inland waterways, oil pipelines, intra-EU-sea and intra-EU-air

Note: The steep increase in goods transport performance between 2003 and 2004 is partly due to methodological changes in the collection of Road freight transport statistics in some Member States (both EU-15 and NMS-12 - see definitions, p. 182)

Source: DG Energy and Transport

Changes in the structure and location of manufacturing industries, in production methods and distribution channels, influenced by the demand for 'just-in-time' shipments, growing requirements for staff mobility in the services sector, and the increase in private car ownership, are all factors that have contributed to overall developments.

'Keep Europe moving'

Building on the objectives of EU transport policy set out in 1992 as well as on the measures laid out in the 2001 White Paper 'European transport policy in 2010: time to decide'[2], a Communication[3] was issued in 2006.

The White Paper had identified as main challenges: the imbalance in the different transport modes' development, congestion in cities and on major routes, as well as in airspace, and transport's impact on the environment. It proposed policies aimed at adjusting the balance between the modes, stressed the need to do away with bottlenecks in trans-European transport networks and to reduce the number of road accidents, together with calling for an effective policy on infrastructure charging.

The measures envisaged by the White Paper however needed to be complemented in order to continue achieving the fundamental objectives of EU policy by, for example, containing negative external effects of transport growth while facilitating mobility as the quintessential purpose of transport. That is why, more recently, the publication of the IMPACT study offered a range of concrete instruments for the reduction of transport's external costs.[4]

A more flexible transport policy toolbox

Transport policy as outlined in the mid-term review builds upon the White Paper. It notably promotes sustainable mobility in the EU while offering a more flexible toolbox for tackling problems and for addressing new challenges arising from the different context of a larger European Union, rising fuel prices and Kyoto commitments.

The key policy objectives of the mid-term review rest upon four main pillars:

Mobility	the EU must offer the necessary level of mobility to people;
Protection	protect businesses, protect the environment, ensure energy security, promote minimum labour standards, protect the passenger and the citizen;
Innovation	increase the efficiency and sustainability of a growing transport sector, develop and 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 goods transport, additional instruments to achieve these objectives are foreseen.

Indeed, in a spirit of 'co-modality', each mode should be used in accordance with its own merits, alone and in combination with others. Measures include a freight logistics action plan to create better synergies between Road, Rail, River and Sea transport, and to achieve the transport modes' integration into logistics chains. This will give industry a competitive edge but also diminish the environmental impact per unit of freight. Other tools include intelligent transport systems to make mobility more efficient, safer and cleaner; a debate on how to improve the mobility of citizens in urban areas; an action plan to boost Inland waterways; and an ambitious programme for more environmentally friendly power for cars and lorries.

http://ec.europa.eu/transport/strategies/index_en.htm

[2] Communication from the Commission to the Council and the European Parliament - Keep Europe moving - Sustainable mobility for our continent - Mid-term review of the European Commission's 2001 Transport White paper, COM(2006)314

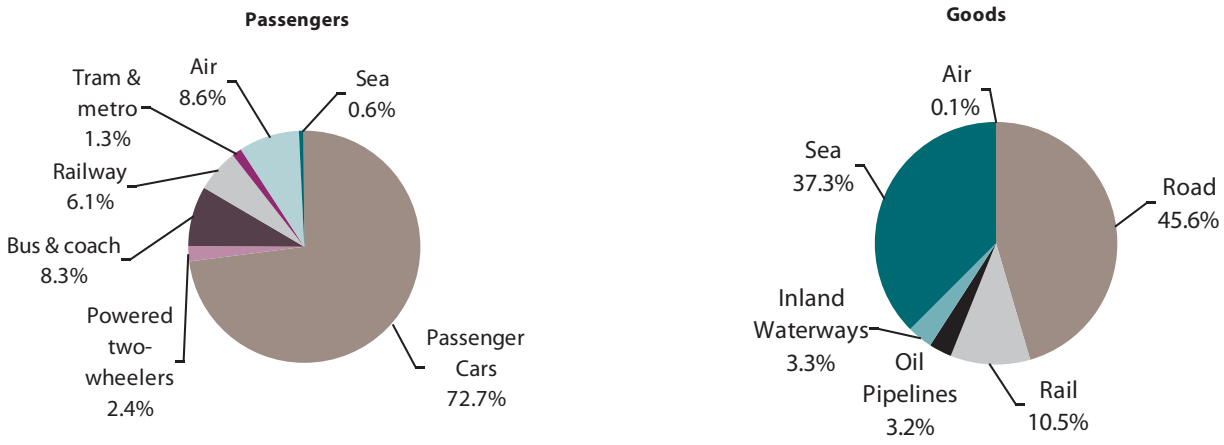
[3] White Paper 'European transport policy for 2010: time to decide', COM(2001) 370 final

[4] "Handbook on estimation of external costs in the transport sector – Produced within the study Internalisation Measures and Policies for All external Costs of Transport (IMPACT)", Delft, 2008]

Road predominant

Road clearly plays a predominant role in EU-27 transport, be it that of passengers or of goods. In 2006, Passenger cars, Powered two-wheelers and Buses & coaches together accounted for 83 % of total passenger transport performance. While Road made up the largest share of total goods transport performance (46 %), intra-EU Sea transport was second (37 %) (Figure 1.2).

Figure 1.2: Modal distribution of passenger and goods transport performance, EU-27, 2006 (% pkm and % tkm)



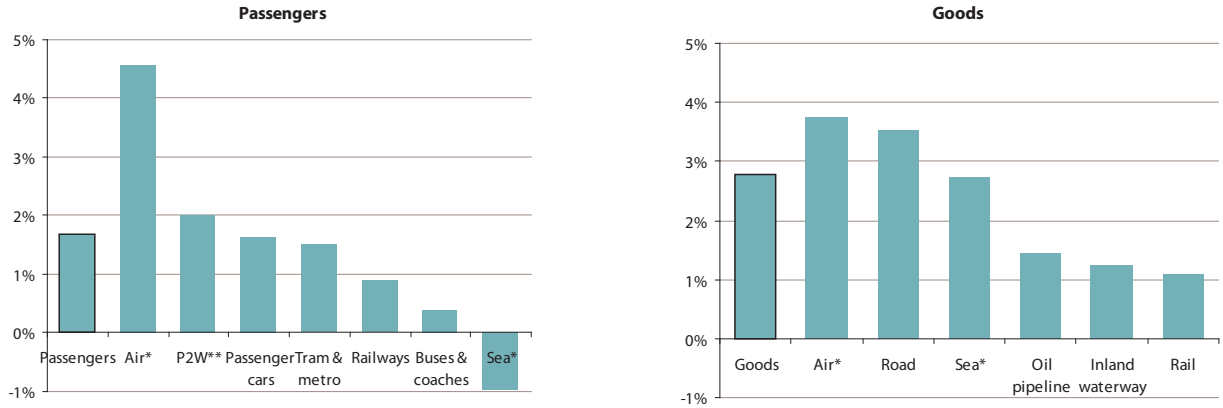
Passengers: Air and Sea - only domestic and intra-EU-25 transport; provisional estimates

Goods: Road - national and international haulage by vehicles registered in the EU-27
Air and Sea - only domestic and intra-EU-27 transport; provisional estimates

Source: DG Energy and Transport

Demand factors such as the increasing importance of door-to-door and just-in-time services have contributed to Road's growing modal share in goods transport performance over the 1995-to-2006 period. Especially due to the growing importance of low-cost carriers, the highest growth rate recorded in passenger transport was that of Air (4.6 %) (see Chapter 4).

Figure 1.3: Average annual growth rates, passenger and goods transport, EU-27, 1995 to 2006 (%)



* Sea and Air only include intra-EU traffic. Estimates are made by the Commission based on airport-to-airport data collected under Regulation (EC) 437/2003 and port-to-port data collected under Council Directive 95/64/EC.

** P2W: Powered two-wheelers

Source: DG Energy and Transport

Transport: an industry in its own right

Transport services (NACE 60 to 63) form an important industry in its own right in the EU-27. Making a vital contribution to the functioning of the economy as a whole, the sector generated EUR 380.1 billion value added and employed 8.7 million persons in 2005. Transport services thus accounted for close to 7 % of both the value added and the persons employed in the EU-27's non-financial economy (NACE C to I and K).

This is without counting the transport equipment industry (NACE 34 and 35), which employed 3.2 million persons in 2005, nor the numerous sectors which depend to varying degrees on transport. The tourist industry would be an obvious example (see Chapter 5).

44 400 persons killed in transport accidents in 2006

Transport safety is an important topic in this publication. In 2006, the death toll of transport accidents stood at upwards of 44 400. The relatively low level of fatalities in Rail, Sea and Air transport accidents stood in sharp contrast to the 42 950 Road fatalities that occurred that year.

Major progress has however been made in Road safety, having as a result a yearly 3.5 % decrease in Road fatalities from 1990 to 2006. With regard to Road safety, the Commission's target of halving the number of deaths over the period 2001 to 2010 remains valid. Numerous initiatives are underway, for example, to raise awareness and to make cars technically safer.

Progress has also been made in maritime and aviation safety resulting, for example, from the introduction of a blacklist of unsafe airlines. A broad set of common safety standards is enforced through the modal safety agencies ERA, EMSA and EASA (see Chapter 6).

Road transport: largest energy consumption and most emissions

Finally, but clearly not least importantly, energy consumption by transport - excluding that of extra-EU-27 maritime and air transport - and its impact on our environment are analysed. In 2006, Road transport was the mode covered that consumed most energy, accounting for 26 % of the EU-27's total final energy consumption. It was also the mode that emitted most greenhouse gases, contributing 93 % of transport total - excluding extra-EU-27 aviation and maritime transport, as well as electrical traction for Rail.

Thanks for example to the Euro Standards for new vehicles and to the growing share of fuel that is being made up by biofuels, serious progress has been made in this domain with, for example, cleaner (lead- and sulphur-free) fuels, reduced emissions of ozone precursors and particulate matter, and fewer CO_2 emissions per vehicle-kilometre (see Chapter 7).

2 Transport infrastructure

The arteries and connections to make transport go around

The European Union has one of the world's densest transport networks, with roads, rail- and waterways criss-crossing one another. In the case of rail and motorway networks, for example, the EU counts considerably more infrastructure per 1 000 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.

The EU-27's enlargement in 2004 followed by that of 2007 added to the transport network, spreading it principally eastwards. It continues developing through time, for example as the new Member States' infrastructures adapt to changing transport needs, together with the putting in operation of an increasing number of connections between eastern 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-27's transport network in 2005 – an estimated 4.5 million km comprising road, rail, oil pipelines and inland waterways (Table 2.1) – the road network (including motorways) represented about 93 % of total[(1)], leaving a 'modal share' of only around 5 % to rail, and the remainder to inland waterways and oil pipelines.

Of the the entire network's 3 % estimated growth over the 1990-2005 period, the most significant evolution concerned road infrastructure, and especially motorways, which grew by around 47 %. Other roads were lengthened by about 3 %, although readers should be aware that, given problems of data comparability, the percentage change is not watertight. It is a different picture however for rail, which saw around 6 % of its lines withdrawn from service. Pipelines carrying oil grew in length by 13 %.

(1) Care must be taken when interpreting the estimated total length of roads. Some Member States do not report the entire length of 'Other roads' and data are not comparable. "EU energy and transport in figures – Statistical pocketbook 2007/2008" (DG Energy and Transport, 2008, Table 3.1.11) estimates the total length of the Road network (paved) in the EU-27 at 5 million km in 2005. See:
http://ec.europa.eu/dgs/energy_transport/figures/pocketbook/doc/2007/2007_pocketbook_all_en.pdf

Table 2.1: Length of main transport networks*, EU-27, 1990 to 2005 (km)

	1990	2005	% change 1990-2005
Total network, of which:	4 397 867	4 520 013	3 %
Roads (excl. motorways)	4 051 756	4 164 433	3 %
Motorways	41 885	61 565	47 %
Railway lines	234 602	219 550	-6 %
Oil pipelines	29 672	33 479	13 %
Inland waterways	39 952	40 986	3 %

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

Source: Eurostat, DG Energy and Transport, Member States

Table 2.2: Length of main transport networks*, 1990 to 2005 (km)
EU-27, Member States, Candidate Countries, EFTA Members, USA and Japan

		EU-27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU
1990	Motorways	41 885	1 666	273	357	611	10 854	41	26	190	4 976	6 824	6 193	120	:	421	78	267
	Railways	234 602	3 479	4 299	:	2 838	44 001	1 026	1 944	2 484	14 539	34 070	16 066	:	2 397	2 007	271	7 838
	Oil pipelines	:	301	578	:	444	3 038	:	:	:	2 678	4 948	4 086	:	766	:	:	:
	Inland waterways	:	1 515	470	:	:	6 669	:	:	6	70	6 197	1 366	:	12	369	37	1 373
1995	Motorways	47 969	1 666	277	414	796	11 190	65	70	420	6 962	8 275	6 435	167	:	394	123	335
	Railways	230 779	3 368	4 294	9 430	2 843	45 118	1 021	1 954	2 474	14 291	31 939	16 003	:	2 413	2 002	275	7 988
	Oil pipelines	:	294	578	581	330	2 460	:	:	:	3 691	4 983	4 235	:	766	400	:	:
	Inland waterways	38 283	1 540	470	677	:	6 663	520	:	6	70	5 962	1 466	:	12	369	37	1 373
2000	Motorways	54 792	1 702	319	501	923	11 712	93	103	707	9 049	9 766	6 478	257	:	417	114	448
	Railways	221 501	3 471	4 320	9 444	2 756	41 681	968	1 965	2 385	13 868	29 272	16 187	:	2 331	1 905	274	8 005
	Oil pipelines	32 867	294	578	675	330	2 370	:	:	:	3 780	5 746	4 346	:	766	500	:	2 043
	Inland waterways	39 554	1 532	470	664	:	6 754	320	:	6	70	5 789	1 477	:	12	380	37	1 373
2003	Motorways	58 401	1 729	328	518	1 010	12 044	98	176	742	10 296	10 379	6 487	268	:	417	147	542
	Railways	220 395	3 521	4 316	9 602	2 779	41 531	967	1 834	2 414	14 387	29 269	16 287	:	2 270	1 774	275	7 950
	Oil pipelines	33 362	294	578	675	330	2 370	:	:	70	3 784	5 746	4 377	:	766	500	:	2 047
	Inland waterways	39 012	1 532	470	664	:	6 636	320	:	6	70	5 384	1 562	:	12	425	37	1 440
2005	Motorways	61 565	1 747	331	564	1 032	12 363	99	247	880	11 432	10 804	6 542	276	:	417	147	636
	Railways	219 550	3 544	4 154	9 614	2 644	38 206	959	1 912	2 576	14 452	29 286	16 545	:	2 270	1 771	275	7 950
	Oil pipelines	33 479	294	578	675	330	2 370	:	:	122	3 833	5 746	4 328	:	766	500	:	2 047
	Inland waterways	40 986	1 516	470	664	:	6 950	320	:	6	70	5 372	1 562	:	12	425	37	1 440

		NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	HR	TR	LI	NO	CH	US	JP
1990	Motorways	2 092	1 445	257	316	113	228	192	225	939	3 181	291	281	:	73	1 148	84 880	:
	Railways	2 798	5 624	26 228	3 064	11 348	1 196	:	5 867	11 193	16 914	2 429	8 429	9	4 044	3 215	192 732	:
	Oil pipelines	391	777	2 039	:	3 694	:	:	:	:	2 462	865	:	:	521	239	335 954	:
	Inland waterways	5 046	351	3 997	124	1 782	:	:	6 072	390	1 631	720	:	:	:	1 217	41 843	:
1995	Motorways	2 208	1 596	246	687	113	293	198	394	1 262	3 383	302	:	:	107	1 197	88 054	:
	Railways	2 739	5 672	23 986	2 850	11 376	1 201	3 668	5 880	10 925	17 069	2 726	8 549	9	4 023	3 232	174 234	27 258
	Oil pipelines	391	777	2 278	:	:	:	:	:	:	3 470	601	:	:	:	:	292 759	:
	Inland waterways	5 046	351	3 980	124	1 782	:	172	6 120	390	1 153	720	:	:	:	1 208	41 843	:
2000	Motorways	2 265	1 633	358	1 482	113	427	296	549	1 499	3 581	411	1 773	:	144	1 270	89 426	:
	Railways	2 802	5 665	21 575	2 814	11 015	1 201	3 662	5 854	11 037	17 044	2 726	8 671	9	4 179	3 216	159 727	27 501
	Oil pipelines	418	777	2 278	147	3 350	:	:	:	:	3 954	601	2 112	:	:	108	284 847	:
	Inland waterways	5 046	351	3 813	124	1 779	:	172	7 842	390	1 153	720	:	:	:	1 244	41 843	:
2003	Motorways	2 308	1 670	484	2 002	113	477	313	653	1 591	3 609	554	1 881	:	194	1 351	90 732	:
	Railways	2 811	5 787	19 900	2 818	11 077	1 229	3 657	5 851	11 037	17 052	2 726	8 697	9	4 077	3 231	159 528	27 512
	Oil pipelines	418	777	2 293	147	3 350	:	:	:	:	4 325	601	2 112	:	:	108	257 316	:
	Inland waterways	5 046	351	3 643	124	1 779	:	172	7 884	390	1 065	720	:	:	:	1 244	41 843	:
2005	Motorways	2 342	1 677	552	2 341	228	569	328	693	1 684	3 634	792	1 775	:	270	1 361	92 003	8 800
	Railways	2 811	5 691	19 507	2 844	10 948	1 228	3 658	5 732	11 017	19 956	2 726	8 697	9	4 087	3 399	154 223	27 634
	Oil pipelines	418	777	2 278	147	3 350	:	:	:	:	4 405	610	2 112	:	1 189	108	256 710	:
	Inland waterways	6 595	351	3 638	124	1 779	:	172	8 028	390	1 065	804	:	:	:	1 240	41 843	:

MT: none of these transport modes apply

* 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 2.4

Source: Eurostat, DG Energy and Transport, Member States North American Transportation Statistics Database, Japan Statistics Bureau, Landesverwaltung Fürstentum Liechtenstein

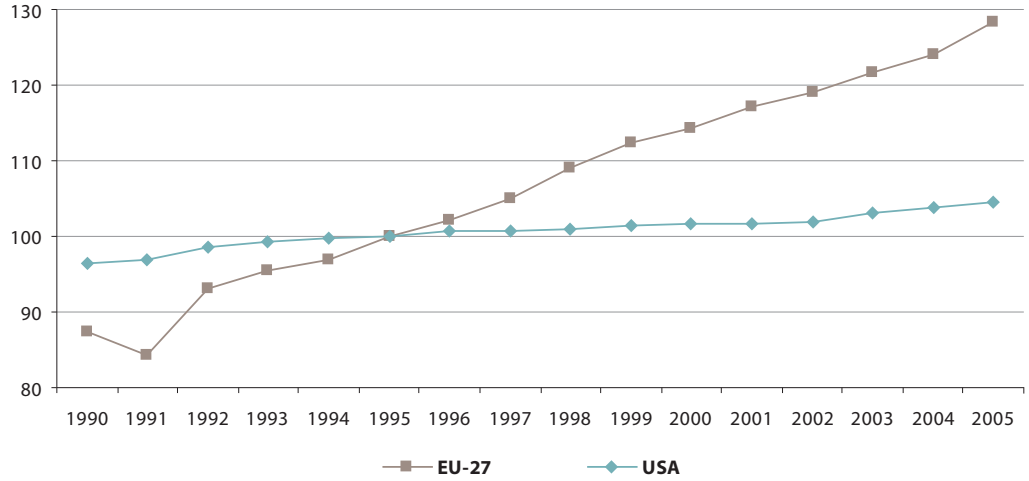
Road network: big and still growing

As could be expected, of all the transport networks, the road network (comprising motorways, state roads, provincial roads and communal roads) is the densest. Based on the latest available data, it is possible to reasonably estimate that roads in the EU-27 formed a network of about 4.2 million km in 2005 (Table 2.4). Given such a length, with a bit of imagination, one could drive at least 106 times around the Earth, although drivers in the United States would get to do some 55 round-trips more with their network of 6.4 million km. This said, in terms of network density, the EU-27 counted about 978 km per 1 000 km^2, considerably more than the USA (650 km per 1 000 km^2), but much less than Japan (about 3 320 km per 1 000 km^2).

Readers must note that, given that the statistical definitions of different types of roads are open to varying interpretations by Member States, problems of comparability arise between Member States and when comparing different years. For example 'communal roads' are sometimes taken to include roads without a hard surface.

Motorways: in the fast lane

Figure 2.3: Length of motorways, EU-27 and USA, 1990 to 2005, Index 1995 = 100



Source: Eurostat, DG Energy and Transport, US Department of Transportation

Motorways are continually extending across the EU. There is no single definition of what a motorway is, which makes country comparisons somewhat tentative. As shown in Figure 2.3, between 1990 and 2005, the length of the EU-27's motorway network grew by approximately 47 %. Averaging 2.6 % annually, growth was fairly constant over the period.

Moreover, when compared with the slower increase in infrastructure in the United States the growth of motorways in the EU-27 was in the fast lane. Of course, this does not mean that motorways were more important in the EU, as is shown below, but rather that growth in the US was probably slowing down after previous records of similar expansion.

A total of 25 Member States owned motorway networks – i.e. excluding Latvia and Malta. All of these displayed increases between 1990 and 2005, apart from Lithuania, for which the slight decrease of 1 % can be explained by part of the motorway being reclassified as a normal road at the beginning of the nineties.

Ireland recorded the most spectacular increase as its network was nine and a half times as long in 2005 (247 km) as it was in 1990 (26 km) (+850 %). Ranking sixth in the EU-27 in 2007 in terms of the share of motorways in total reported road network length, Portugal (640 %) came second for motorway growth, ahead of Greece (360 %) and Finland. (210 %). In Turkey, the length of motorways grew strongly during the 1990s, rising from 281 km in 1990 to 1 775 km in 2005.

Totalling some 61 565 km in 2005, motorways made up approximately 1.5 % of the total road network in the EU-27, based on available country data (Table 2.4). This was somewhat above double the share held by motorways in total in Japan (0.7 %), and slightly more 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 1.5 % share of motorways in total road network length in the EU-27 was 0.3 percentage points less than the 1.8 % share in the former EU-15, reflecting the smaller shares – of around 0.5 % and below – of motorway networks in eight of the NMS-12, of which those with the longest road networks: Poland, Hungary and the Czech Republic. Of the EU-15, only Ireland (0.3 %) and Sweden (0.4 %) displayed a motorway share of less than 0.5 %. In contrast, Spain had the highest share of motorways in its road network (6.9 %).

When relating the length of the entire motorway network to the territory of the EU-27 (Table 2.5), the result is a network density of 14 km per 1000 km^2 in 2005, which was approximately half way between the density in the United States of 9 km per 1 000 km^2 (for a network of close to 92 000 km) and that in Japan of 23 km per 1 000 km^2 (for a network of around 8 800 km). Here as well, these differences reflect the large differences in the size of the territory.

Germany displayed the largest network in the EU: totalling 12 363 km it accounted for over 20 % of EU-27 total. The second and third highest shares of the EU-27 motorway network were made up by Spain (18.6 %) and France (17.5 %).

Table 2.4: Share in total road network*: motorways and other roads, 2005

	Total road network (km)	Of which motorways (km)	Other roads (km)	% share of motorways
EU-27	4 225 998	61 565	4 164 433	1.5 %
BE	152 240	1 747	150 493	1.1 %
BG	19 288	331	18 957	1.7 %
CZ	128 437	564	127 873	0.4 %
DK	72 257	1 032	71 225	1.4 %
DE	231 480	12 363	219 117	5.3 %
EE	57 016	99	56 917	0.2 %
IE	96 507	247	96 260	0.3 %
EL	117 533	880	116 653	0.7 %
ES	165 646	11 432	154 214	6.9 %
FR	1 005 943	10 804	995 139	1.1 %
IT	175 430	6 542	168 888	3.7 %
CY	7 845	276	7 569	3.5 %
LV	69 829	0	69 829	0.0 %
LT	79 497	417	79 080	0.5 %
LU	2 875	147	2 728	5.1 %
HU	189 442	636	188 806	0.3 %
MT	2 227	0	2 227	0.0 %
NL	134 218	2 342	131 876	1.7 %
AT	106 987	1 677	105 310	1.6 %
PL	253 781	552	253 229	0.2 %
PT	78 882	2 341	76 541	3.0 %
RO	79 903	228	79 675	0.3 %
SI	38 485	569	37 916	1.5 %
SK	43 745	328	43 417	0.7 %
FI	78 189	693	77 496	0.9 %
SE	425 383	1 684	423 699	0.4 %
UK	412 933	3 634	409 299	0.9 %
HR	28 436	792	27 644	2.8 %
TR	349 346	1 775	347 571	0.5 %
IS	13 029	:	13 029	:
LI	380	:	380	:
NO	93 133	270	92 863	0.3 %
CH	71 299	1 361	69 938	1.9 %
US	6 430 351	92 003	6 338 348	1.4 %
JP	1 253 000	8 800	1 244 200	0.7 %

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

Source: Eurostat, DG Energy and Transport, Member States, US Department of Transportation, Japan Statistics Bureau, Landesverwaltung Fürstentum Liechtenstein

Table 2.5: Motorway density by population and by area, 2005

	km	km/100 000 inhab.	km/ 1 000 km^2
EU-27	61 565	13	14
BE	1 747	17	57
BG	331	4	3
CZ	564	6	7
DK	1 032	19	24
DE	12 363	15	35
EE	99	7	2
IE	247	6	4
EL	880	8	7
ES	11 432	27	23
FR	10 804	17	20
IT	6 542	11	22
CY	276	37	30
LT	417	12	6
LU	147	32	57
HU	636	6	7
NL	2 342	14	56
AT	1 677	20	20
PL	552	1	2
PT	2 341	22	25
RO	228	1	1
SI	569	28	28
SK	328	6	7
FI	693	13	2
SE	1 684	19	4
UK	3 634	6	15
HR	792	18	14
TR	1 775	2	2
NO	270	6	1
CH	1 361	18	33
US	92 003	31	9
JP	8 800	7	23

Note: LV, MT, IS and LI do not have any motorway network

Source: Eurostat, DG Energy and Transport, national statistics

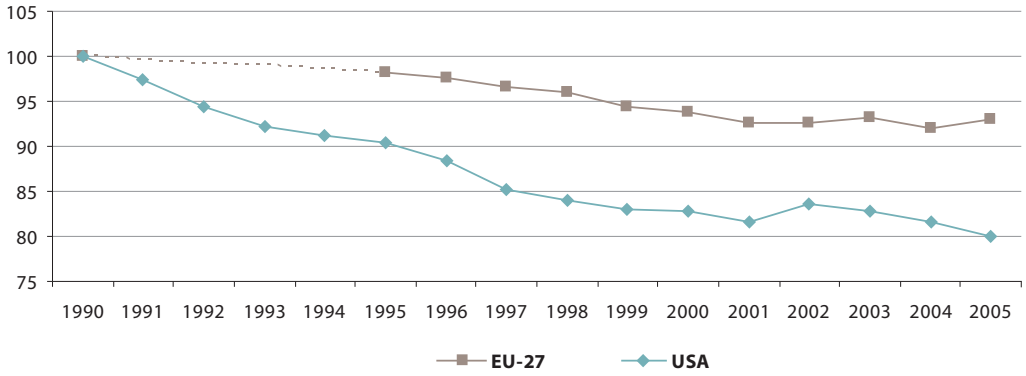
However, in terms of density – i.e. the number of kilometres per 1 000 km^2 – the Benelux countries had the densest motorway networks with values between 56.4 km per 1 000 km^2 and 57.3 km per 1 000 km^2, densities which were around four times the EU-27 average of 14.2 km per 1 000 km^2.

Compared to the 12.5 km length of motorway per 100 000 inhabitants in the EU-27, it was in fact Cyprus that displayed the highest value with 36.8 km per 100 000 inhabitants, followed by Luxembourg (31.9 km) and Slovenia (28.5 km).

Railway network stable

The length of railways in the EU-27 decreased by 7 % between 1990 and 2005 (Figure 2.6), a reduction which was somewhat above one third of that recorded by the United States: 20 %. Data available for the 1995-2005 period show that the EU-27 infrastructure decreased fairly steadily in length between 1995 and 2001, at an average annual rate close to 1 %, compared to an annual decline of 1.7 % in the United States over that period. The length of the EU-27's railways then stabilised from 2001 to 2005, in fact growing at a small annual rate of 0.1 %. After a rise from 2001 to 2002, the reduction in railway length continued in the United States from 2002 to 2005 at 1.5 % annually.

Figure 2.6: Length of railways*, EU-27 and USA, 1990 to 2005**, Index 1990 = 100



* length of line in km, as opposed to track extent

** no data available for EU-27 between 1991 and 1994

Source: Eurostat, US Department of Transportation

In 2005, the total length of railways – in terms of line length – in the EU-27 spanned close to 219 550 km, and nearly half of these were electrified (Table 2.7). With regard to network density, the EU-27 counted 51 km of railway lines per 1 000 km^2 in 2005, around three times the density in the United States (16 km per 1 000 km^2) but only two-thirds that in Japan (73 km per 1 000 km^2). When interpreting these differences, readers should take into account the large differences in the size of territory. The EU-27 is well over 11 times the size of Japan, and only four-ninths as large as the United States.

With 38 206 km, Germany had the longest network, representing a share of 17.4 % of the EU-27 total. The next longest networks were those of France (13.3 %), the United Kingdom (9.1 %) and Poland (8.9 %). From the angle of network density however, the Czech Republic ranked first with 122 km per 1 000 km^2, ahead of Belgium (116 km), Germany (107 km) and Luxembourg (106 km).

Interestingly, the lowest density in Finland (17 km per 1 000 km^2) illustrates the typical situation of a country with a large territory and a relatively lower population. When one replaces the parameter of area by the number of inhabitants, Finland recorded 109 km of track per 100 000 inhabitants, second to Sweden, which had the highest ratio with 122 km. Although one could expect an area ratio similar to Finland's in neighbouring Sweden, its network density of 24 km per 1 000 km^2 was not far behind that in slightly larger Spain (29 km per 1 000 km^2), ratios which reflect these countries' sizeable network lengths of respectively 11 017 km and 14 452 km.

Table 2.7: Railways: key indicators, 2005

	km*	% electrified	km/100 000 inhab.	km/1000 km²
EU-27	219 550	49	45	51
BE	3 544	84	34	116
BG	4 154	69	54	37
CZ	9 614	31	94	122
DK	2 644	24	49	61
DE	38 206	52	46	107
EE	959	14	71	21
IE	1 912	3	47	27
EL	2 576	3	23	20
ES	14 452	57	34	29
FR	29 286	50	47	54
IT	16 545	70	28	55
LV	2 270	11	98	35
LT	1 771	7	52	27
LU	275	95	60	106
HU	7 950	36	79	85
NL	2 811	73	17	68
AT	5 691	62	69	68
PL	19 507	61	51	62
PT	2 844	50	27	31
RO	10 948	36	51	46
SI	1 228	41	61	61
SK	3 658	43	68	75
FI	5 732	46	109	17
SE	11 017	70	122	24
UK	19 956	25	33	82
HR	2 726	36	61	48
TR	8 697	22	12	11
LI	9	:	26	56
NO	4 087	62	89	13
CH	3 399	100	46	82
US	154 223	:	52	16
JP	27 634	:	22	73

Note: CY and MT do not have any railway networks

* length of line, as opposed to track extent

Source: Eurostat, DG Energy and Transport, Member States, North American Transportation Statistics Database, Japan Statistics Bureau, Landesverwaltung Fürstentum Liechtenstein

The low rail network density in Greece (20 km per 1 000 km²), second to Finland's, is mainly due to the country's geographical characteristics: numerous islands and extensive mountainous regions.

When it comes to the share of electrified tracks, approximately half the lines in the EU-27 used this power in 2005. The Benelux countries had the highest shares of electrified lines: Luxembourg (95 %), Belgium (84 %) and the Netherlands (73 %). Five countries had less than a fifth of their network thus powered, including the Baltic states, Ireland and Greece, where shares were both 3 %.

The 6 % reduction in the length of railway lines in the EU-27 from 1990 to 2005, was the net result of reductions in three of the four longest networks over the same period: in Germany (13 %), France (14 %) and Poland (26 %). Setting aside a large increase in length in the United Kingdom (18 %), attributable to a change in statistical methodology, the decreases observed were offset by only small increases in eight Member States, that ranged between around 0.5 % and 3.7 %. Of note also is the relative stability recorded in the rail networks of the the Netherlands and Spain, for example, with changes of around +/- 0.5 %.

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

Europe's longest lorry-trailer carrying railway freight service started operating commercially in July 2007. The 1 050 km-long 'piggy-back' transit line transports trailers from Bettembourg in Luxembourg to Le Boulou (near Perpignan) in the south of France, close to the Spanish border.

The rail service requires about 14 hours to make the journey. Not only does it help to reduce road congestion and cut journey times (down from 20 hours), the service also reduces transport costs.

Echoing the drive-on capability of EuroShuttle – the tunnel train carrying cars under the Channel – the Perpignan - Luxembourg rail-freight line allows lorry drivers to load their vehicles directly onto the train using a system of pivotal rail trailers. The initial capacity of some 30 000 trailers per year is expected to increase rapidly.

The Perpignan - Luxembourg LORRY-RAIL, which represents a perfect marriage between road and rail transport, is a prime example of how to make intermodality reality. The line is about 2.5 times as long as the similar service in operation across Switzerland, between Freiburg in Germany and Novara in northern Italy.

http://www.lorryrail.com/home

Putting 'interoperability' onto the lines through ERTMS

For locomotives, crossing a frontier still remains somewhat exceptional and only a few of them are equipped with the multiple systems required to easily cross national borders. This is because rail systems around the EU-27 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 is necessary for it to 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, then automatically slowing down the train if necessary. Other initiatives include the development of locomotives which can be adapted to lines with different voltages or even run on several voltages, and of course the move away from different gauges.

http://ec.europa.eu/transport/rail/interoperability/ertms_en.htm
http://www.ertms.com

High-speed rail stretches out

Aided in recent years by the Trans-European Networks in Transport, known more familiarly as 'TEN-T' (see below), the length of dedicated high-speed railway lines – lines on which trains can go faster than 250 km/h at some point during the journey – increased between 1990 and 2007 to reach a total length of 5 540 km (Table 2.8).

Pioneered by Japan in the mid-sixties, high-speed trains have increasingly been bolting across parts of Europe. High-speed lines were present in six EU-27 countries in 2007: France (34 % of total), Spain (28 %), Germany (23 %), Italy (10 %), Belgium and the United Kingdom (both: 2 %).

A pioneer in European high-speed rail, France has been the main contributor to the network between 1990 and 2007, and the length of France's high-speed rail network was greater than that of all the other Member States together until 1997. An additional 320 km, due to the completion of the Paris-Strasbourg TGV Est in 2007, kept France in the lead. Spain and Germany rapidly developed their networks between 1990 and 2005, competing for the second position in this ranking.

Table 2.8: Length of EU-27 high-speed rail network*, 1990 to 2007 (km at year end)

	EU-27	Belgium	Germany	Spain	France	Italy	United Kingdom
1990	1 013	:	90	:	699	224	:
1995	2 386	:	447	471	1 220	248	:
2000	2 691	58	636	471	1 278	248	:
2001	2 986	58	636	471	1 573	248	:
2002	3 245	120	833	471	1 573	248	:
2003	3 911	120	875	1 021	1 573	248	74
2004	4 238	120	1 202	1 021	1 573	248	74
2005	4 480	120	1 202	1 043	1 573	468	74
2006	4 845	120	1 291	1 225	1 573	562	74
2007	5 540	120	1 300	1 552	1 893	562	113

* length of lines or of sections of lines on which trains can go faster than 250 km/h at some point during the journey

Source: Eurostat, DG Energy and Transport

The Eurostar network is present in the United Kingdom and the opening of the new track to Saint Pancras Station in 2007 has reduced the duration of a London-to-Paris trip to just two and a quarter hours.

Tilting trains – such as the X2000 in Sweden and the Pendolino in Italy – are equipped with a mechanism enabling increased speed on regular railway tracks. Some are in the process of being upgraded for operation above 250 km/h.

Around 1 225 km of high-speed railway lines are currently under construction, more are at the planning stage. The longest line is the one that, in the near future, will link up Portugal's two largest cities Lisbon and Porto (312 km). Other major lines will connect Portugal and Spain as well as Milan to Bologna in Italy. While the EU-27's high-speed network only counted six Member States in 2007, this number is soon set to grow to include the Netherlands, Portugal and Sweden.

Table 2.9: EU-27 high-speed rail lines currently under construction

	High-speed rail line	Length (km)	Start of operation
BE	Liège - German border	42	2008
BE	Antwerpen - Dutch border	35	2008
NL	Amsterdam / Schiphol - Belgian border	120	2008
ES	Barcelona - Figueras	135	2009
FR/ES	Perpignan - Figueras	45	2009
IT	Milano - Bologna	196	2008
IT	Bologna - Firenze	77	2009
IT	Novara - Milano	55	2009
PT	Lisboa - Spanish border	207	2013
PT	Lisboa - Oporto	312	2015

Note: The length indicated is the length of the line under construction and not necessarily the distance between the places named.

Source: Union Internationale des Chemins de Fer, Community of European Railways

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 the analysis of, for example, their density.

Measuring a total 50.45 km, the Channel Tunnel between France and England is currently the second longest tunnel in the world. Japan's Seikan Tunnel (53.85 km) connecting the islands of Honshū and Hokkaidō 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 third-longest suspension bridge (main span: 1 624 metres), after Japan's Akashi-Kaikyo bridge (1 991 m) and China's Xihoumen Bridge (1 650 m).

Oil pipelines: half the length of motorways

In addition to the road, rail and inland waterway transport modes, coverage of pipelines has its place here, as 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 is not considered here as a main inland transport mode, as oil pipelines are only dedicated to the transport of a very restricted groups of goods (liquid oil products). However, it becomes obvious that this mode is far from negligible, when considering the volumes transported (see Chapter 5).

Based on available data, oil pipelines in the EU-27 extended to around 33 500 km in 2005, more than half the length of the motorway network for example. Compared to the estimated length in 1990, this represented an increase by about one eighth (12.8 %).

However, the EU-27's density of oil pipelines of approximately 7.7 km per 1 000 km^2 is smaller when compared, for example, with that in the United States of around 26.1 km per 1 000 km^2. The total length of the United States' network was nearly eight times as long.

France had the longest oil pipeline network of 5 746 km, contributing a 17 % share of the EU-27 total. The other longest networks could be found in the United Kingdom, Italy, Spain and Romania, while pipeline length in Germany[(2)], Hungary and Poland also stood above 2 000 km. The length of oil pipelines in the EFTA country Norway was 1 189 km in 2005.

[(2)] Note: Statistics for Germany only include crude oil pipelines.

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 the data of national statistical offices.

The world's longest oil pipeline – measuring around 4 000 km – reaches from Russia to the EU. Starting in Siberia, the 'Druzhba' pipeline runs to Mozyr in Belarus, where it splits into a northern and a southern branch. While the northern branch extends to Poland and Germany, the southern branch carries its oil to the Ukraine, Slovakia, Hungary and Croatia.

Of the numerous gas pipelines spanning Europe, several important ones run into the EU: two from Norway (one to continental Europe and one to the United Kingdom); two from Algeria (one via Tunisia through Sicily to mainland Italy, and one via Morocco to Spain) and one from Russia via the Ukraine forming a line connecting the Siberian fields through Belarus with Poland and Germany. One may also note that Langeled, the gas pipeline running from Norway to the United Kingdom, which was opened in 2006, is the world's longest underwater pipeline.

Russia's growing role as an energy provider to the EU-27 is demonstrated by the ongoing construction of another main pipeline – the North European gas pipeline – which is planned to 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 the Gelsenkirchen football stadium in Germany, they can enjoy beer literally on tap, as it is piped along a 5 km-long pipeline which supplies the stadium's numerous bars!

Inland waterways: from Constanta to Rotterdam

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. The transport of passengers is less widespread and usually takes place for leisure as, for example, scheduled passenger lines on the North Italian lakes, transport in and around Venice or along the Danube. Inland waterways offer a unique transport system with considerable potential, especially since the opening of the Main-Danube canal which effectively linked up south-eastern with north-western Europe along this medium.

Ten of the 27 Member States recorded inland waterways measuring 1 000 km or above in 2003 (see Table 2.2), together accounting for close to 93 % of the length of the inland waterway network in the EU-27. Finland boasted the longest inland waterway with 8 018 km, making up about a fifth of EU-27 total, an extent which is mostly explained by Finland's numerous lakes. It was followed by the waterway networks in Germany (6 950 km), the Netherlands (6 595 km) and France (5 372 km). Reflecting the fact that some of them have small networks, which are mostly used only as through-channels for sea-going vessels, the total number of Member States reporting inland waterways was 22 in 2005.

The estimated total length of inland waterways in the EU-27 was 40 986 km in 2005, implying a density of 9.5 km per 1 000 km^2. This appears to have grown a little compared to 1990 and was more than twice as much as the ratio in the United States of about 4.3 km per 1 000 km^2, based on an approximate length of 41 800 km.

The core network of waterways with rivers and canals of international importance (Class IV and higher[3]) is made up of more than 12 000 kilometres of interconnected waterways, close to 450 locks and several hundred inland ports and transhipment sites[4]. Smaller waterways (Classes I – III) make up the remainder. Although their density is clearly lower than that of the road and rail networks, waterways connect most European economic centres.

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

[4] Communication from the Commission on the Promotion of Inland Waterway Transport 'NAIADES': an Integrated European Action Programme for Inland Waterway Transport, COM(2006) 6 final 17.1.2006.

'NAIADES': revitalising inland waterways

The EU's inland waterway network offers considerable potential, notably for the transport of freight within 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 Oder/Odra. These include for example low bridges on the river Main and on the 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 navigate – as well as unsuitable lock dimensions.

Enter the 'NAIADES' action plan. Standing for 'Navigation and Inland Waterway Action and Development in Europe', NAIADES aims to reinforce inland waterways in the EU-27 by focussing on five strategic areas: (1) Increasing market share, (2) Fleet modernisation, (3) Attracting skilled labour, (4) Image-building, and (5) the Building of new infrastructure. The programme runs between 2006 and 2013. The First progress report on the 'NAIADES' Action Programme presented in December 2007 registers advancement in all five of the action plan's main areas.

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 along which insufficient draught makes the navigation of large-tonnage vessels problematic. The Seine-Scheldt river link forms part of a vital transport route, connecting in particular the ports of Le Havre, Rouen, Dunkirk, Antwerp and Rotterdam. This will work thanks to the construction of a wider gauge canal to the north of Paris. Further information is provided in the section on TEN-T.

http://ec.europa.eu/transport/iw/prospect/index_en.htm

Seaports: harbours of potential

Table 2.10: Main seaports* together handling at least 80 % of country's cargo traffic, 2006

Belgium (4 main ports)	**Rank**
Antwerp	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
Rødby (Færgehavn)	5
Enstedværkets Havn	6
Helsingør (Elsinore)	7
Esbjerg	8
Kalundborg	9
Aalborg	10
Frederikshavn	11
Aalborg Portland	12
Odense	13
Asnæsværkets Havn	14
Aabenraa	15
Gedser	16
Hirtshals	17
Rønne	18
Germany (17)	**Rank**
Hamburg	1
Wilhelmshaven	2
Bremerhaven	3
Lübeck	4
Rostock	5
Bremen	6
Estonia (6)	**Rank**
Tallinn	1
Ireland (7)	**Rank**
Dublin	1
Limerick	2
Cork	3
Rosslare Harbour	4
Greece (26)	**Rank**
Piraeus	1
Thessaloniki	2
Agii Theodori	3
Eleusis	4
Volos	5
Megara	6
Almyros Volou	7
Patras	8
Heraklion	9
Larymna	10
Igoumenitsa	11
Milos Island	12
Aliverio	13
Rio	14
Chalkida	15
Perama	16
Antirio	17
Kavala	18
Greece: other ports	19
Paloukia Salaminas	20
Antikyra	21
Lavrion	22
Spain (29) ***	**Rank**
Algeciras	1
Valencia	2
Barcelona	3
Bilbao	4
Tarragona	5
Cartagena	6
Huelva	7
Gijón	8
Las Palmas, Gran Canaria	9
Santa Cruz De Tenerife	10
Palma Mallorca	11
La Coruña	12
France (20) **	**Rank**
Marseille	1
Le Havre	2
Dunkerque	3
Nantes Saint-Nazaire	4
Rouen	5
Calais	6
Italy (46) **	**Rank**
Taranto	1
Trieste	2
Genova	3
Augusta	4
Venezia	5
Gioia Tauro	6
Ravenna	7
Livorno	8
Santa Panagia	9
Porto Foxi	10
Milazzo	11
Savona - Vado	12
La Spezia	13
Napoli	14
Brindisi	15
Cagliari	16
Gela	17
Piombino	18
Cyprus (3) **	**Rank**
Lemesos	1
Larnaka	2
Vassiliko	3
Latvia (4)	**Rank**
Ventspils	1
Riga	2
Lithuania (2)	**Rank**
Klaipéda	1
Butinge	2
Malta (2)	**Rank**
Valetta	1
Marsaxlokk	2
Netherlands (11)	**Rank**
Rotterdam	1
Amsterdam	2
Poland (5)	**Rank**
Gdansk	1
Gdynia	2
Swinoujscie	3
Portugal (8)	**Rank**
Sines	1
Leixões	2
Lisboa	3
Setúbal	4
Romania (3)	**Rank**
Constanţa	1
Slovenia (1)	**Rank**
Koper	1
Finland (23)	**Rank**
Sköldvik	1
Helsinki	2
Kotka	3
Naantali	4
Rauma	5
Raahe	6
Pori	7
Kokkola	8
Hamina	9
Hanko	10
Turku	11
Oulu	12
Kemi	13
Sweden (30)	**Rank**
Göteborg	1
Brofjorden Scanraff	2
Trelleborg	3
Malmö	4
Karlshamn	5
Helsingborg	6
Luleå	7
Oxelösund	8
Stockholm	9
Gävle	10
Norrköping	11
Stenungsund	12
Ystad	13
Kappelskär	14
Slite	15
Nynäshamn	16
Halmstad	17
Storugns	18
Husum	19
Sundsvall	20
United Kingdom (47)	**Rank**
Grimsby & Immingham	1
Tees & Hartlepool	2
London	3
Southampton	4
Milford Haven	5
Liverpool	6
Forth	7
Felixstowe	8
Dover	9
Sullom Voe	10
Medway	11
Clydeport	12
Belfast	13
Hull	14
Bristol	15
Kirkwall	16
Rivers Hull & Humber	17
Iceland (2)	**Rank**
Reykjavik	1
Grundartangi	2
Norway (23)	**Rank**
Bergen	1
Norway: other ports	2
Narvik	3
Haugesund, Tysvær, Karmøy/Kårstø, Skudeneshavn, Kopervik	4
Tønsberg/Slagentangen/Valløy	5
Grenland/Skien/Porsgrunn/Bamble	6
Oslo	7
Molde	8
Kristiansund	9
Stavanger	10

* ports handling over one million tonnes of goods per year ** 2004 *** including El Ferrol and Molina de Segura (2005 data)

Source: Eurostat (Transport)

With its sizeable coast – which makes up 85 % of the EU-27's boundaries and is the world's second-longest – 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 belongs to the priorities of the TEN-T (see below).

Table 2.10 provides an overview of the number of main seaports in the individual Member States. It shows those individual seaports that together are responsible for at least 80 % of a country's total traffic (both national and international). The 22 EU-27 Member States with seaports totalled 313 '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 Italy (46) and the United Kingdom (45). 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 similarly populated France, the port structure and concentration was different. France only had 20 main ports and the 80 % threshold was reached by only six of them. The larger number of main ports in the United Kingdom and Italy can be explained by a number of reasons. In the case of the United Kingdom, maritime routes are important notably for connecting the island with mainland Europe as well as with neighbouring Ireland and more distant Scandinavia. Italy, in addition to being a peninsula, serves as a maritime gateway for EU-27 trade with countries in south-eastern Europe and beyond.

Unlike is the situation with airports, only in one Member State with several main seaports did one port absorb at least 80 % of traffic: Estonia (Tallinn)[5]. In terms of passenger infrastructure, the main passenger ports correspond to those that offer major European ferry connections (see Chapter 5).

[5] Data are presented at the level of "statistical ports". A statistical port consists of one or more ports, normally controlled by a single port authority, able to record ship and cargo movements. The port of Tallinn is a statistical port which consists of five ports.

Airports: intermodal nodes by nature

The EU's airspace is one of the 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 somewhat virtual nature – is in any case variable, as it adapts 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 little *en-route* surface infrastructure.

Instead, the most suitable and readily available indicator of air network infrastructure is the number of airports and their volumes handled. In 2006, the EU-27 counted close to 380 airports with a passenger volume of over 15 000, of which 274 were 'main' airports handling at least 150 000 passengers per year, of which again 125 were large and very large airports handling at least 1.5 million passengers yearly.

Table 2.11: Main airports* together handling at least 80 %** of country's total passenger traffic, 2006

Belgium (3 main airports)	**Rank**
Bruxelles / Brussel	1
Bulgaria (3)	**Rank**
Sofia	1
Burgas	2
Varna	3
Czech Republic (3)	**Rank**
Praha Ruzyně	1
Denmark (7)	**Rank**
København Kastrup	1
Germany (25)	**Rank**
Frankfurt am Main	1
München	2
Düsseldorf	3
Hamburg	4
Berlin Tegel	5
Stuttgart	6
Estonia (1)	**Rank**
Tallinn Ülemiste	1
Ireland (6)	**Rank**
Dublin / Baile Átha Cliath	1
Cork	2
Greece (19)	**Rank**
Athens	1
Irakleion	2
Thessaloniki	3
Rodos	4
Spain (34)	**Rank**
Madrid Barajas	1
Barcelona	2
Palma De Mallorca	3
Malaga	4
Las Palmas Gran Canaria	5
Alicante	6

France (41)	**Rank**
Paris Charles de Gaulle	1
Paris Orly	2
Nice Côte d'Azur	3
Italy (32)	**Rank**
Roma Fiumicino	1
Milano Malpensa	2
Milano Linate	3
Venezia Tessera	4
Catania Fontanarossa	5
Bergamo Orio Al Serio	6
Cyprus (2)	**Rank**
Larnaka	1
Pafos	2
Latvia (1)	**Rank**
Riga International Airport	1
Lithuania (2)	**Rank**
Vilnius	1
Luxembourg (1)	**Rank**
Luxembourg Findel	1
Hungary (1)	**Rank**
Budapest Ferihegy	1
Malta (1)	**Rank**
Malta Luqa	1
Netherlands (4)	**Rank**
Amsterdam Schiphol	1
Austria (6)	**Rank**
Wien Schwechat	1
Poland (8)	**Rank**
Warszawa Okęcie	1
Kraków Balice	2
Katowice Pyrzowice	3

Portugal (8)	**Rank**
Lisboa	1
Faro	2
Romania (4)	**Rank**
Bucuresti Otopeni	1
Timişoara Giarmata	2
Slovenia (1)	**Rank**
Ljubljana Jože Pučnik	1
Slovakia (2)	**Rank**
Bratislava Ivanka	1
Finland (9)	**Rank**
Helsinki Vantaa	1
Sweden (18)	**Rank**
Stockholm Arlanda	1
Göteborg Landvetter	2
United Kingdom (32)	**Rank**
London Heathrow	1
London Gatwick	2
London Stansted	3
Manchester	4
London Luton	5
Birmingham	6
Glasgow	7
Iceland (4)	**Rank**
Keflavik	1
Norway (16)	**Rank**
Oslo / Gardermoen	1
Bergen / Flesland	2
Switzerland (4)	**Rank**
Zürich	1
Genève / Genf	2

* airports handling at least 150 000 passengers per year

** The 80 % share has been calculated without compensating the double-counting effect of domestic passengers reported as departures by one national airport and as arrivals by the national partner airport.

Source: Eurostat (Transport)

Table 2.11 provides an overview of the number of main airports in the individual Member States, furthermore showing those individual airports that together made up at least 80 % of a country's total traffic (both national and international) in 2006. In just over half of the EU-27 Member States, one main airport alone absorbed at least 80 % of passenger volume. This was the case, for example, in the Benelux countries and the Baltic states 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 (41).

Also noteworthy is the fact that similar-sized countries display different characteristics reflecting the dominance of certain airports because of hub importance, and aspects such as tourism and the general level of income. Spain and Poland, for example, have around 40 million inhabitants each. But, whereas Poland only had eight main airports, of which three accounted for at least 80 % of passenger traffic, Spain had 34 main airports, of which six were needed to reach the same threshold. Spain's attractiveness as a tourist destination in both its mainland and island territory is understood to contribute strongly to these higher numbers.

For details on passengers and cargo handled in air transport at the various European airports, please see Chapter 4.

Some regional airports boosted by low-cost carriers

With the liberalisation of the EU's air transport market, low-cost carriers have been increasing their market share of air transport in recent years. In fact, it would not be exaggerated 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 Travel Statistics, 28 % of intra-European seat capacity for scheduled flights was accounted for by low-cost carriers in 2007, or 233.1 million seats out of a total of 819.3 million. This compares strikingly with a share of only 6 % in May 2001.

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, or Frankfurt-Hahn for Frankfurt. Point-to-point flights-turnaround tends to be faster, not only because the routes' generally being under two hours' duration is of help, but also because these airports have comparatively less flights to handle.

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

Extra capacity, low overheads and location also explain the importance of some regional airports to air freight (see Chapter 4).

http://www.oag.com/oagcorporate/pdf/OAGStatisticalReview2007.pdf

Opening up the skies with SESAR

Today's Air Traffic Management (ATM) systems are operated very much as they have been 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.

The 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 flying, if nothing is done to improve the situation.

This is where the European air traffic control infrastructure modernisation programme comes in. SESAR – the Single European Sky industrial and technological programme – is 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).

http://ec.europa.eu/transport/air_portal/sesame/index_en.htm

Other infrastructure: from undergrounds to cycle paths

Apart from the infrastructure of the main means of transport seen above, one must also mention especially urban networks that connect with other modes of transport. These include underground systems, tramways, trolley bus lines, tram-train rails, bus lanes or tracks (eg. for guided buses), cycle paths, etc. In fact, the possibilities for inventory-making seem to grow with technological development.

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 the 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.

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. Other benefits of course derive from the fact that the rails are effectively shared, thus reducing the need for additional infrastructure, and that tram-trains are cleaner than most diesel-powered trains.

Other cities have built up networks such as the RijnGouweLijn in the Netherlands, Kassel and Saarbrücken in Germany. Five new tram-trains running along the Peninstone line that links up Huddersfield and Sheffield in the United Kingdom will be trialled starting in 2010. There are also examples of railway trains which are able to run on tram lines, making the potential for two-way interoperability very real.

Urban mobility of passengers

The Urban Audit provides data enabling the comparison of urban mobility in the cities of 14 Member States of the EU-27 as well as Switzerland and Norway. Those countries' capitals are included in Figure 2.12 together with other representative cities.

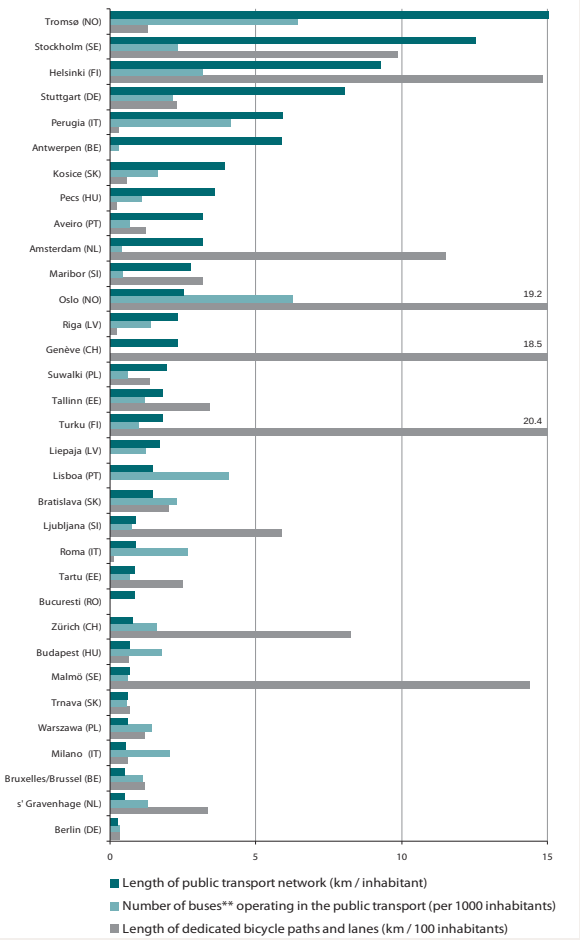
The main indicator is the length of public transport infrastructure that is available to each user on average. The Urban Audit distinguishes between the length of public transport network on fixed infrastructure (that of: tramway, light rail, metro rail or suburban-regional rail) and on flexible routes (that of: buses, minibuses, trolleybuses or ferries) (detail not shown).

Generally, in the countries with data available, the average length of public transport network per inhabitant was less in the capital cities due to their large populations. This was however not the case in Stockholm and Helsinki, where citizens and visitors enjoy extensive networks. Together with Tromsø, they suggest that the urban public transport networks available may be longer in northern European cities.

The number of buses operating in public transport per 1 000 inhabitant represents one form of urban public transport. This indicator provides an idea of the popularity of buses in a number of cities.

The length of infrastructure dedicated to bicycles in certain cities reflects how widespread this non-polluting personal means of transport has become.

Figure 2.12: Urban transport infrastructure, selected indicators, 2004*



* or closest year

** or bus equivalents

Source: Eurostat, Urban Audit

Cycling through town and country in the EU-27

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 length of the road network (excluding motorways) of 4.2 million km mentioned above (Table 2.1), and certainly much more, if one includes dirt tracks, canal paths etc.

Measuring the length of designated paths for bicycles offers a better idea of the development of cycle paths and their co-habitation 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 entire European continent. According to the European Cyclists' Federation, the current length of those routes is approximately 66 200 km.

As well as offering large potential within multimodal transport solutions, cycling is a clean and non-congesting alternative to other forms of transport in the EU-27's towns and cities. The European Commission's recent Green Paper on urban mobility[6] details these and other points such as the need for safe infrastructure for urban cycling.

www.eurovelo.org and http://ec.europa.eu/transport/clean/green_paper_urban_transport

[6] Green Paper "Towards a new culture for urban mobility" COM(2007) 551 final, 25.9.2007

'TEN-T' for Trans-European Networks in transport

Supporting the implementation and development of the Internal Market, as well as re-enforcing economic and social cohesion, the construction of the Trans-European Transport Networks (TEN-T) is a major element that contributes to the economic competitiveness and the balanced and sustainable development of the European Union.

TEN-Ts joined Community policy over a decade ago with the Maastricht Treaty and they aim to improve economic and social cohesion, amongst other 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, and including GALILEO, the European satellite navigation system.

There are currently 30 infrastructure projects (Decision 884/2004/EC), which are outlined below. A recent report from the Directorate General for Energy and Transport[7] confirms the completion of Priority Projects (PP) 9, 10 and 11 (see box further) in 2001. Measured by investment, PP 2, PP 5 and PP 14 were complete to 80 % or above in 2008.

A specific novelty of the TEN-T networks 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.

[7] TEN-T – Implementation of the Priority Projects, Progress Report, Directorate General for Energy and Transport, May 2008

TEN-T in figures

As shown in Table 2.13, 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. Network length estimates as at April 2008 and a forecast for 2020, the foreseen date of completion of all the current TEN-T projects, are shown.

Table 2.13: Length of TEN-T networks*: 2003 to 2020 (km)

	2003	Apr. 2008**	2020**
Rail	83 300	95 140	116 975
Road	74 500	76 842	80 708
Inland waterways	14 100	15 881	17 763

* results from a broader definition than that applied in Tables 2.6 and 2.7

** estimates based on DG-Tren "TEN-T, Implementation of the Priority Projects, Progress Report" May 2008

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 on reducing journey time for passengers and goods.

The TEN-STAC[8] study prepared for the European Commission in 2004 indicated that significant time savings would be gained from completing the 30 priority axes forming the 'backbone' of TEN-T, through a substantial reduction in road congestion and improved rail performance.

Freight transport between Member States is expected to show the largest overall increase through the completion of the TEN-T networks, and important dividends are foreseen for the environment, notably by reducing the amount of CO_2 emissions expected from transport in 2020.

[8] "TEN-STAC: Scenarios, traffic forecasts and analysis of corridors on the Trans-European Network", D6 Deliverables Part I & II, 2004

Growing beyond the EU

The EU's success depends on how it gets on with its neighbours, and this gives the TEN-T an important external dimension. The latest waves of enlargement (2004 and 2007) having made the Western Balkans entirely contiguous with the territory of the EU Member States, for example, has made the coordinated development of the transport sector one of the key issues of on-going discussions. In another example, the EU-Russia strategic partnership aims to promote the complementarity of transport sectors. The gradual integration of transport networks is planned by removing bottlenecks and ensuring transport infrastructures and interoperability.

The Commission Communication "Strengthening the European Neighbourhood Policy (ENP)"[9] highlighted the need to enhance multilateral dialogue with the EU-27's partner countries on major themes such as energy, transport and environment. A key element of the ENP drive is the importance of close cooperation between the EU-27 Member States and ENP partners to cooperate closely in the completion of a number of major trans-European transport axes.

These 'transport corridors' extending the TEN-T networks beyond the EU-27's external borders are important for trade between all participants. Detailed discussions are progressing on the following major axes: Pan-European corridors/ areas; Motorways of the seas; the Northern axis (with Russia, Belarus, Norway and Iceland); the Central axis (with the Ukraine and other Black Sea countries); the South-eastern axis (with the countries of the Western Balkans); the South-western axis (with the Mediterranean countries and Switzerland) and the TRACECA[10] corridor.

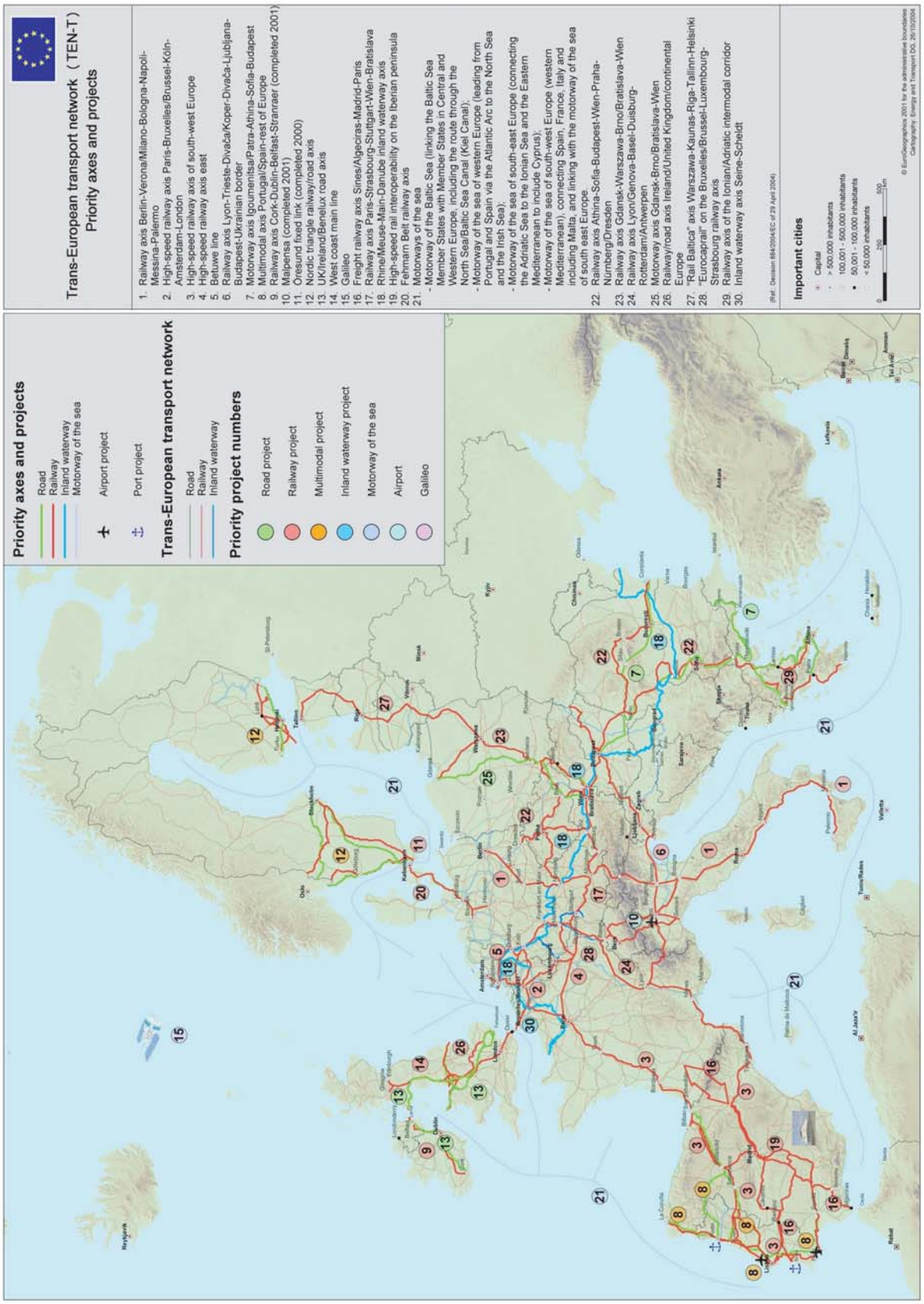
[9] "Networks for Peace and Development – Extension of the major trans-European transport axes to the neighbouring countries and regions", Report from the High Level Group chaired by Loyola de Palacio, COM(2006) 726, 4.12.2006. Also see: Progress Report COM(2008)125, 5.3.2008.

[10] TRACECA: Transport Corridor Europe-Caucasus-Asia. Signatories are: Afghanistan, Armenia, Azerbaijan, Georgia, Kazkhstan, the Kyrgyz Republic, the Republic of Moldova, Tajikistan, Turkey, Ukraine and Uzbekistan as well as the EU Member States Bulgaria and Romania. Pakistan and the Islamic Republic of Iran have applied for membership.

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-Stanraer – Completed: 2001
10. Malpensa airport – Completed: 2001
11. Øresund fixed link – Completed: 2001
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 2.14)
22. Railway axis Athens-Sofia-Budapest-Vienna-Prague-Nuremberg / Dresden
23. Railway axis Gdańsk-Warsaw-Brno / Bratislava-Vienna
24. Railway axis Lyons / Genoa-Basle-Duisburg-Rotterdam / Antwerp
25. Motorway axis Gdańsk-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

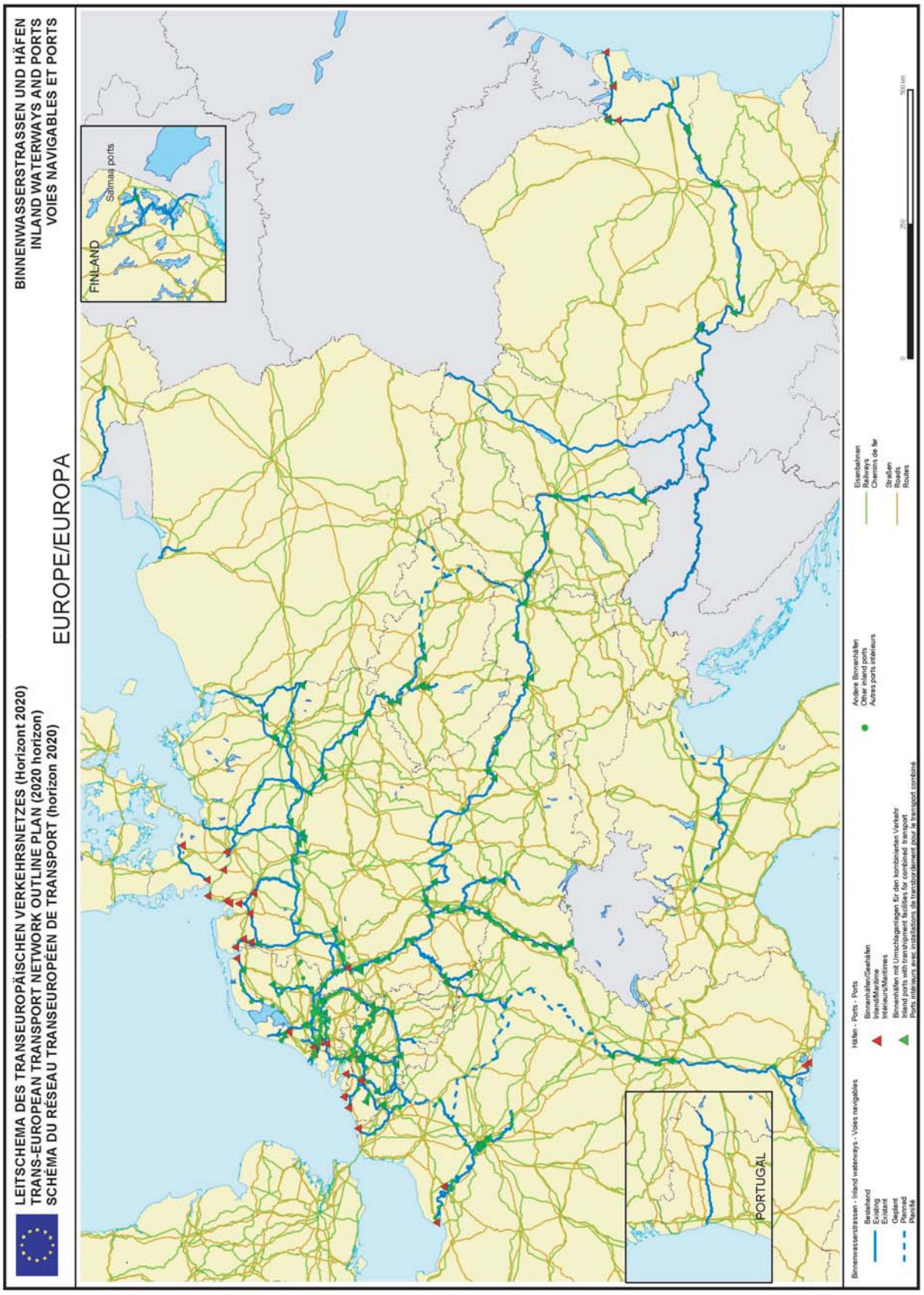
Map 2.14: 30 priority axes and projects of the Trans-European Transport Network (TEN-T)



Map 2.15: Outline plan for Roads in the Trans-European Transport Network (TEN-T)

Map 2.16: Outline plan for Railways in the Trans-European Transport Network (TEN-T)

Map 2.17: Outline plan for Inland Waterways and Ports in the Trans-European Transport Network (TEN-T)

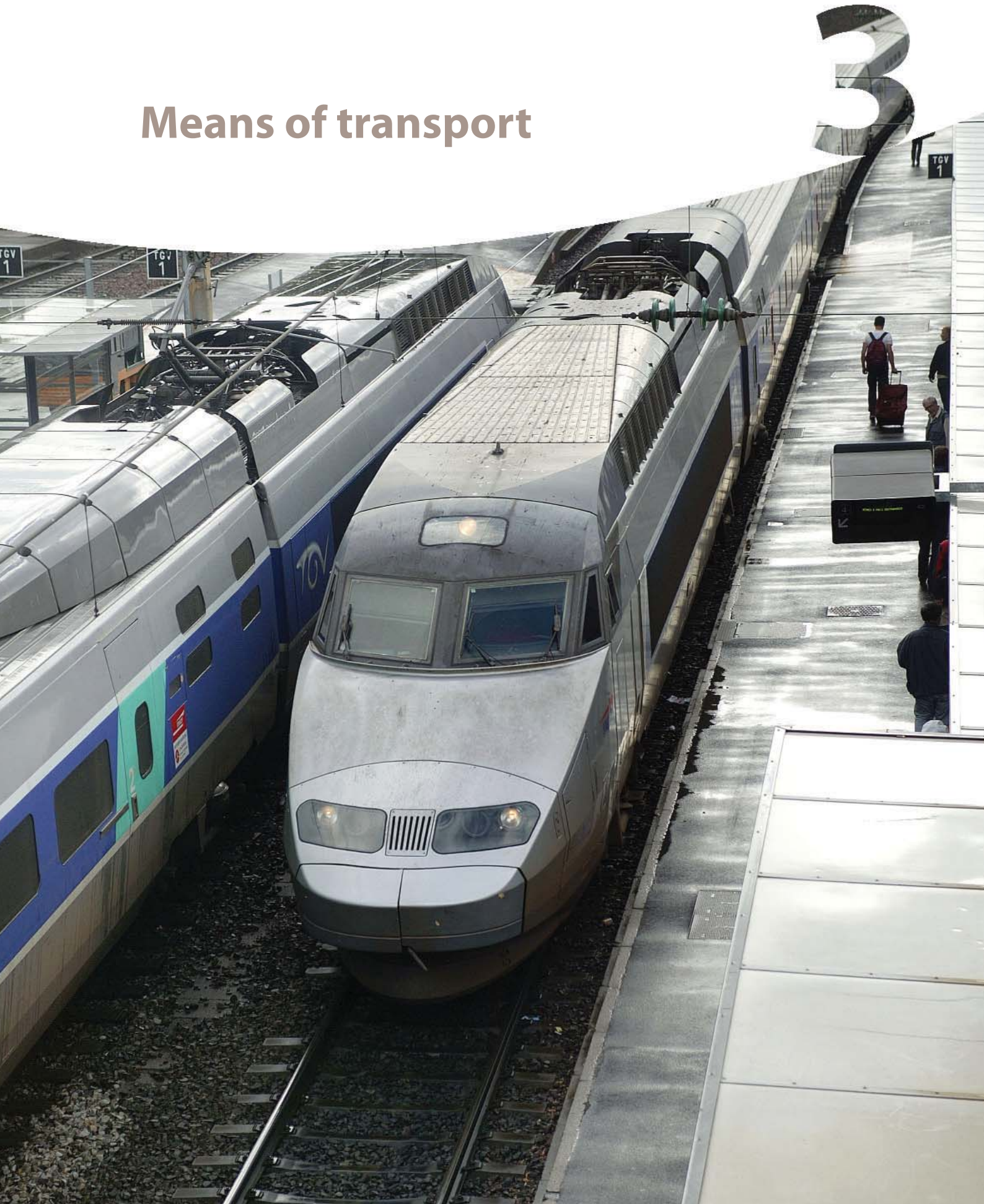


Map 2.18: Outline plan for Sea Ports in the Trans-European Transport Network (TEN-T)

Map 2.19: Outline plan for Airports in the Trans-European Transport Network (TEN-T)

3

Means of transport



The wheels and the wings

Chapter 2 provided an overview of the EU-27's infrastructure that is suggestive of the different sizes of vehicle stock in the various transport modes. This chapter looks in detail at the size of the main transport modes' fleets and, where possible, it analyses their recent trends. Enabling the transport of persons and goods, the means of transport covered include passenger cars, buses and coaches, road goods vehicles, rail vehicles (locomotives and railcars, passenger- and goods transport wagons), inland waterway vessels, the sea-going merchant fleet, aircraft as well as 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*. It allows people to get from A to B when and how they want, a growing independence that has meant concomitantly an impressive increase in the number of passenger cars. The number of cars in the EU-27 grew from 1990 to 2006, at an average yearly rate of 2.4 %. The size of the other road vehicle fleets also grew, that of road goods vehicles gaining 3.1 % annually, powered two-wheelers (from 1995 to 2006) 2.7 % and the number of buses and coaches 0.7 % yearly on average.

Fleets of passenger cars and road goods vehicles displayed significantly less growth in the EU-15 (respectively: 1.8 % and 2.8 %) mirroring strong growth in the central-European new Member States of the 2004 and 2007 enlargements. In contrast, the number of buses and coaches grew more in the EU-15 (1.4 %) as fleets were rationalised and private cars have increasingly emerged as a transport alternative in the new Member States. From 1995 to 2005, the number of powered two-wheelers rose more rapidly in the EU-15 Member States (3.3 %), perhaps suggesting that they are taking on a more important role compared to cars.

Rail and waterway fleets smaller

Another fundamental change in the way passengers, but especially goods are transported over longer distances in the EU-27 is apparent when one looks at the trends in rail transport, for which data are available from 1990 to 2005. Care must however be taken when interpreting the rolling stock figures as they primarily refer to material owned by railway companies that are members of the International Union of Railways (UIC), and as changes in the statistics' coverage may in fact lead to overestimating downward trends. The figures do however reflect technical improvements with, for example, more efficient transport and scheduling.

While the total number of rail traction vehicles was reduced at an average annual rate of 2.1 %, that of passenger transport wagons fell at a rate of 1.6 %. The most impressive change was apparent in the number of goods transport wagons in the EU-27, which fell at an estimated yearly rate of 4.4 % from 1990 to 2005. The central European Member States witnessed sharper annual drops in their numbers of all types of rail vehicles, reflecting more drastic changes in the role played by rail transport in their economies.

Based on data from a smaller number of Member States, it appears that, while the length of inland waterways grew after 1990, the number of vessels decreased at an estimated yearly rate of more than 1.5 % until 2004. Smaller fleets may in large part be assigned to scrapping policies introduced in the mid-1990s to reduce overcapacity, and to the fact that vessels have grown larger and faster.

Air increasingly popular

Air travel has become an increasingly popular means of transport within the EU, driven for example by the rising number of services offered by low-cost airlines. More than doubling between 1990 and 2007, the total fleet of civil aircraft in the EU-25 rose by 4.7 % annually, thus displaying the highest growth rate among all transport modes.

Table 3.1: Number of passenger cars*, 1990-2006 (thousand)

	1990	1995	2000	2005	2006	AAGR 1990 to 2006	Cars per 1000 inhabitants, 2006
EU-27	158 210	182 232	205 567	225 632	229 931	2.4 %	466
EU-15	143 203	162 020	180 212	195 020	198 240	2.1 %	508
BE	3 864	4 273	4 678	4 919	4 976	1.6 %	470
BG	1 317	1 648	1 993	2 538	1 768	1.9 %	229
CZ	2 410	3 043	3 439	3 959	4 109	3.4 %	399
DK	1 590	1 679	1 854	1 965	2 020	1.5 %	371
DE	32 088	40 988	43 772	46 090	46 570	2.4 %	565
EE	241	383	464	494	554	5.3 %	413
IE	796	990	1 319	1 662	1 779	5.2 %	412
EL	1 736	2 205	3 195	4 303	4 543	6.2 %	407
ES	11 996	14 212	17 449	20 250	20 637	3.4 %	464
FR	27 072	27 872	29 808	30 497	31 002	0.9 %	504
IT	27 416	30 301	32 584	34 667	35 297	1.6 %	597
CY	179	220	268	355	373	4.7 %	479
LV	283	332	557	742	822	6.9 %	360
LT	493	718	1 172	1 455	1 592	7.6 %	470
LU	183	229	273	307	315	3.4 %	661
HU	1 944	2 245	2 365	2 889	2 954	2.6 %	293
MT	120	181	189	213	218	3.8 %	535
NL	5 509	5 633	6 539	7 092	7 230	1.7 %	442
AT	2 991	3 594	4 097	4 157	4 205	2.2 %	507
PL	5 261	7 517	9 991	12 339	13 384	6.0 %	351
PT	1 700	2 560	3 443	4 200	4 290	6.0 %	405
RO	1 292	2 197	2 778	3 364	3 603	6.6 %	167
SI	587	711	866	960	980	3.3 %	488
SK	880	1 016	1 274	1 304	1 334	2.6 %	247
FI	1 939	1 901	2 135	2 430	2 506	1.6 %	475
SE	3 601	3 631	3 999	4 154	4 202	1.0 %	461
UK	20 722	21 951	25 067	28 326	28 667	2.0 %	471
HR	795	711	1 125	1 385	1 436	3.8 %	323
TR	:	3 059	4 422	5 773	6 141	:	84
IS	120	119	159	187	197	3.2 %	641
LI	17	19	22	24	24	2.3 %	696
NO	1 613	1 685	1 852	2 029	2 084	1.6 %	445
CH	2 985	3 229	3 545	3 864	3 900	1.7 %	519
US	181 975	194 125	212 706	231 905	:	1.6 % *	782 **
JP	32 436	39 103	42 365	42 747	42 229	1.7 %	331

* stock at year end (except BE: 1st Aug. and CH: 30th Sep.)

BG: new, more reliable data as from 2006 (vehicles needed new number plates by end-2006; those which had not done so not counted)

Source: Eurostat, DG Energy and Transport, Member States Liechtenstein: Landesverwaltung, USA: North American Transport Statistics Database, Japan: Ministry of Land and Transport

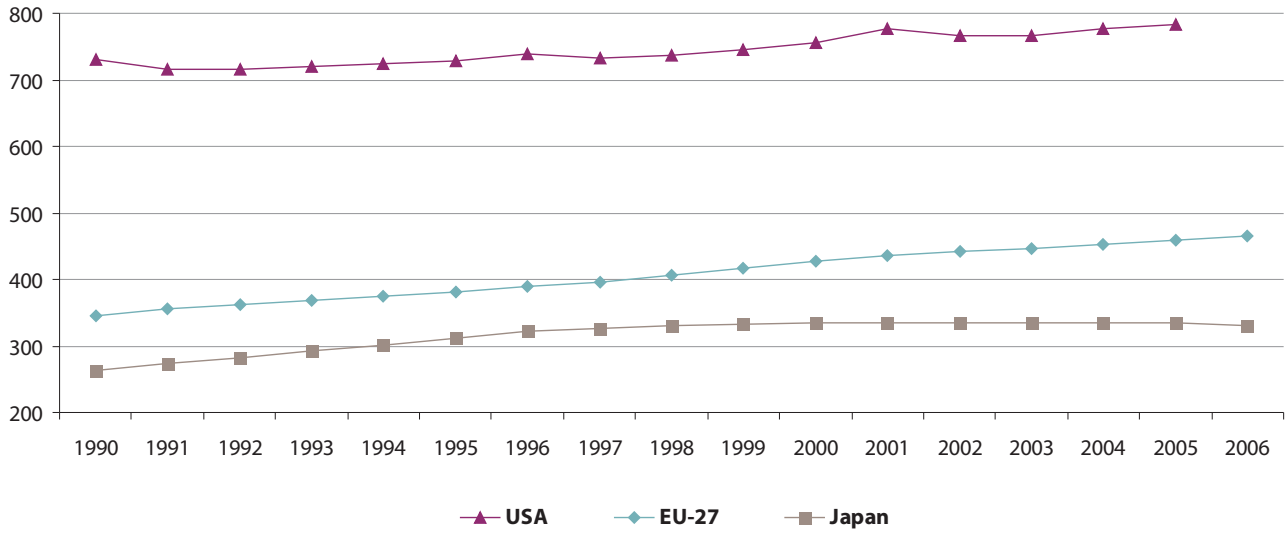
Table 3.1 shows that close to 230 million passenger cars were registered in the EU-27 in 2006. That number grew at an average annual rate of 2.4 % from 1990 to 2006. While, in most of the 'older' Member States, growth in the number of passenger cars was more subdued, it reached rates of 7 % and above in Lithuania, Latvia and Romania. In fact, in all of the EU-27's new Member States (2004 and 2007 enlargements) except Bulgaria, as well as in Greece (6.2 %), Portugal (6.0 %), Ireland (5.2 %) Spain and Luxembourg (both: 3.4 %), the number of passenger cars grew at annual rates above the EU-27 average.

Nearly one car per two inhabitants in the EU-27

In terms of car density in the population, in 2006 there were 466 passenger cars for 1 000 inhabitants in the EU-27 (Table 3.1), somewhat less than one car for every two inhabitants. Based on comparable 2005 data, the EU-27's motorisation rate (459) was below that of the USA (782) yet significantly above that of Japan (335). Readers should note that the figure for the USA takes into account not only the category 'passenger cars' but also the impressive number of pick-up trucks, light vans and sports utility vehicles that are often used for private transportation. In the EU-27, such vehicles may be considered as 'commercial vehicles'. As only certain Member States classify vans and pick-ups as 'passenger cars' this may in fact make comparison between Member States difficult.

From 1990 to 2005, the number of cars per 1 000 inhabitants in the EU-27 grew at an average annual rate of 1.9 %, exceeding the rate of 1.6 % in Japan over that period, and more especially the rate of growth of 0.4 % in the USA (Figure 3.2). It is interesting to note that, in Japan, the motorisation rate in fact remained constant after the year 2000. In the EU-15, a noticeable reduction in the year-on-year growth rate of the motorisation rate took place after 2001.

Figure 3.2: Number of passenger cars per 1000 inhabitants, EU-27, USA* and Japan, 1990 to 2006



* includes light pick-up trucks

Note: passenger car stock at end of year n divided by the population on 1 January of year n+1

Source: Eurostat, national statistics, DG Energy and Transport, USA: North American Transport Statistics Database, Japan: Ministry of Land and Transport

Widespread car use and its alternatives

Based on a survey carried out in May 2007, a recent Eurobarometer publication provides an insight into EU citizens' widespread use of cars, but also their views on what may make them prefer other transport modes such as public transport or non-motorised means including walking and cycling. While 81 % of EU citizens declared that they have a car in their household, the majority (51 %) named the car as their main mode of transport, followed by public transport (21 %), walking (15 %), cycling (9 %) and the motorbike (2 %).

Among the citizens who primarily use their cars for daily mobility, improvements to public transportation such as a better schedule (29 %) and better connections to regular destinations (28 %) were perceived as factors encouraging them to drive their cars less often. An important majority of EU citizens (78 %) share the opinion that the type of car and the way people use cars have an important impact on the environment.

http://ec.europa.eu/public_opinion/flash/fl_206b_en.pdf

Looking more closely at the average number of cars per 1 000 inhabitants in the EU-27 in 2006, it is worth noting that 15 of the EU-27 Member States displayed motorisation rates below the EU average. Indeed, if the latter 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 (565) and Italy (597) and, to a lesser extent France (504) and the United Kingdom (471). Those four Member States had the largest stocks and together accounted for 62 % of the EU-27's total stock of cars in 2006. Of the 15 Member States with motorisation rates below the EU-27 average, more than half were new Member States, whose stocks of cars also grew noticeably more between 1990 and 2006. Romania (167), Bulgaria (229) and Slovakia (247) displayed the lowest motorisation rates. Looking beyond the EU-27, in the candidate countries Croatia and Turkey there were 323 and 84 cars respectively per 1 000 inhabitants in 2006.

Luxembourg – the Member State with the second smallest stock of cars after Malta – displayed the highest motorisation rate (661) which as such came closest to the rate in the United States. However, when looking at the EFTA members, Liechtenstein, had a motorisation rate of 696 cars per 1 000 inhabitants.

More goods transport vehicles on the road

If the transport of goods by road has increased (see Chapter 4), it comes as no surprise that the number of goods vehicles – lorries, road tractors and sometimes vans and pick-ups – carrying those goods has also risen.

EU-27 data reveal an average yearly increase of 3.1 % in the number of goods vehicles from 1990 to 2006, the total stock of these vehicles expanding by 12.4 million to 32.2 million in 2006 (Table 3.3). Close to 60 % of this increase was due to growth in fleet size of around 2 million units in Spain, 1.6 million in Italy and around 1 million in both Poland and the United Kingdom.

Based on available data, the Member States with the highest average yearly growth rates in the number of road goods vehicles from 1990 to 2006 were Luxembourg (6.5 %), Slovenia (5.3 %), Ireland (5.1 %), Romania (4.8 %) and Spain (4.7 %). The Czech Republic (7.6 %), Latvia and Poland (both: 5.3 %) also displayed high growth rates, between 1995 and 2006. Annual growth in the number of goods vehicles was also strong over that period in the candidate countries Turkey (10.2 %) and Croatia (7.9 %).

In 2006, the EU-27 fleet of road goods vehicles was made up to nearly three quarters by those of France (17 %), Spain (16 %), Italy (13 %), the United Kingdom (11 %), Germany[1] (9 %) and Poland (7 %).

[1] DE: Figures for road goods vehicles exclude lorries < 3.501 t load capacity, military vehicles, vehicles of public administrations and agricultural tractors.

Table 3.3: Number of road goods vehicles, 1990 to 2006 (thousand)

	1990	1995	2000	2005	2006	AAGR 1990 to 2006
EU-27	19 859**	22 812	27 395	31 439	32 249	3.1 %
EU-15	17 536	19 849	23 552	26 715	27 379	2.8 %
BE	380	442	548	652	670	3.6 %
BG	162	223	259	334	226	2.1 %
CZ	:	219	298	439	491	:
DK	287	334	385	470	509	3.7 %
DE	1 653	2 379	2 782	2 765	2 804	3.4 %
EE	68	66	82	86	93	2.0 %
IE	143	142	206	287	319	5.1 %
EL	766	884	1 057	1 186	1 220	2.9 %
ES	2 401	3 024	3 923	4 850	5 033	4.7 %
FR	4 670	4 926	5 152	5 347	5 345	0.8 %
IT	2 349	2 709	3 378	4 180	4 332	3.9 %
CY	74	101	115	118	116	2.8 %
LV	:	69	97	113	121	:
LT	91	109	99	122	136	2.5 %
LU	11	16	25	30	31	6.5 %
HU	262	292	366	428	444	3.4 %
MT	:	41	51	44	46	:
NL	553	654	899	1 005	996	3.7 %
AT	262	303	344	358	364	2.1 %
PL	:	1 354	1 879	2 305	2 393	:
PT	781	912	1 313	1 308	1 320	3.3 %
RO	259	343	427	494	545	4.8 %
SI	31	43	54	66	70	5.3 %
SK	92	103	114	174	189	4.6 %
FI	264	252	304	364	376	2.2 %
SE	310	308	374	461	480	2.8 %
UK	2 706	2 565	2 861	3 454	3 582	1.8 %
HR	:	73	123	163	170	:
TR	:	830	1 352	2 152	2 405	:
IS	13	15	19	26	28	4.9 %
NO	308	350	414	465	489	2.9 %
CH	252	262	279	307	314	1.4 %

stock at year end (except BE: 1st Aug. and CH: 30th Sep.)

BG: new, more reliable data as from 2006 (vehicles had to get new number plates until end-2006; those which hadn't done so, have been taken out of the database)

** estimate

Source: Eurostat, DG Energy and Transport, Member States

Buses and coaches: trends vary

Given the increase in the number of cars, one would expect less growth in the case of buses and coaches, if not a reduction, yet the figures reveal a mixed picture. Between 1990 and 2006, the number of buses and coaches in the EU-27 actually grew at an estimated average annual rate of 0.7 %, to reach 798.4 thousand (Table 3.4). This rate was 1.7 percentage points below that at which the average number of cars grew over the period.

The number of buses and coaches in the EU-27 expanded by close to 89 500 over the period, fleet sizes especially growing by 34 600 in the United Kingdom, by 18 500 in France, 18 400 in Italy, 12 900 in Germany, 12 500 in Spain and 12 100 in Romania.

Of the 12 Member States that recorded decreases in their numbers of vehicles from 1990 to 2006, eight were central European new Member States. When looking at the annual average growth rates of the Member States' fleets, 9 of the 13 with rates below the EU-27 average were central European Member States.

When read alongside the data on passenger cars and the particularly strong growth rates in the number of cars in the central European Member States (Table 3.1), these figures hint at cars, in part, replacing buses and coaches. Although this may suggest a shift away from buses and coaches as means of transport, it should be noted that public transport was relatively more important in the central European Member States and their fleets were in any case relatively large in the early nineties, while car motorisation rates were low. In many cases, other than showing the effects of major rationalisation drives in public transport, reductions in bus and coach fleets in fact also reflect fleet renewal together with the move towards vehicles with higher capacities and more efficient services, for example through optimised scheduling.

Looking at the Member States' shares in the number of buses and coaches there were in the EU-27 in 2006, six main contributing Member States accounted for two thirds of total: the United Kingdom (14 %), Italy (12 %), France (12 %), Germany (10 %), Poland (10 %) and Spain (7 %).

Table 3.4: Number of buses and coaches, 1990 to 2006 (thousand)

	1990	1995	2000	2005	2006	AAGR 1990 to 2006
EU-27	708.9*	752.5	786.2	799.0	798.4	0.7 %
EU-15	450.3	483.3	532.8	557.2	565.9	1.4 %
BE	15.6	14.6	14.7	15.4	15.3	-0.1 %
BG	34.6	41.8	43.0	37.8	22.8	-2.6 %
CZ	20.5	20.5	19.0	20.9	21.1	0.2 %
DK	8.1	13.7	14.0	14.4	14.6	3.7 %
DE	70.6	85.0	86.7	83.9	83.5	1.1 %
EE	7.9	7.0	6.1	5.2	5.4	-2.4 %
IE	4.0	5.3	7.0	7.6	8.0	4.3 %
EL	21.4	24.6	27.0	26.8	26.9	1.4 %
ES	45.8	47.4	54.7	58.2	58.3	1.5 %
FR	73.7	81.8	85.7	90.1	92.2	1.4 %
IT	77.7	75.0	88.0	94.4	96.1	1.3 %
CY	2.3	2.7	2.9	3.2	3.2	2.1 %
LV	12.1	16.5	11.5	10.6	10.6	-0.8 %
LT	15.7	17.6	15.5	15.3	15.6	0.0 %
LU	0.8	0.9	1.1	1.3	1.4	3.8 %
HU	26.4	20.5	17.9	17.5	17.7	-2.5 %
MT	1.0	1.0	1.1	1.1	1.1	1.0 %
NL	12.1	11.6	11.4	11.0	10.8	-0.7 %
AT	9.4	9.8	9.9	9.3	9.3	-0.1 %
PL	92.4	85.4	82.6	79.6	83.5	-0.6 %
PT	12.1	15.0	19.8	14.7	15.0	1.4 %
RO	28.3	42.0	40.7	39.3	40.4	2.3 %
SI	3.1	2.5	2.3	2.3	2.3	-1.9 %
SK	14.3	11.8	10.9	9.1	8.8	-3.0 %
FI	9.3	8.1	9.9	10.9	11.2	1.1 %
SE	14.6	14.6	14.4	13.5	13.6	-0.4 %
UK	75.0	75.9	88.6	105.6	109.6	2.4 %
HR	5.8	3.9	4.7	4.9	4.9	-1.1 %
TR	188.1	263.2	354.3	501.9	533.5	6.7 %
IS	1.3	1.3	1.7	1.9	1.9	2.4 %
NO	21.2	32.5	36.7	28.8	27.0	1.5 %
CH	31.2	36.5	40.3	45.8	46.4	2.5 %

stock at end of year (except BE: 1st Aug. and CH: 30th Sep.)

Trolleybuses are usually included in the data.

* estimate

Source: Eurostat, DG Energy and Transport, Member States

Railway rolling stock: fewer goods transport wagons

As highlighted in the previous chapter, in terms of infrastructure, railway transport appears to have generally been losing out in recent years to road and air transport, a phenomenon which is further underlined here and in following chapters. One would expect the stock of rail vehicles – locomotives, railcars, passenger transport vehicles and goods wagons – to either stagnate or decrease. However, a causal link is difficult to establish with the available data.

Readers should note that the figures on rolling stock presented here primarily refer to material owned by railway companies that are members of the International Union of Railways (UIC). Leased or otherwise outsourced rolling stock may therefore be overlooked by the statistics. This is an important consideration when interpreting reductions in rolling stock, as these may be somewhat overestimated given the recent years' trends in railway privatisation and the outsourcing or leasing of rail equipment. It also helps to understand why apparent trends may become erratic when rolling stock changes hands.

Table 3.5: Number of locomotives and railcars, 1990 to 2005

	1990	2000	2003	2005	AAGR 1990 to 2005
EU-27	65 801	:	51 750	47 849	-2.1 %
EU-15	43 444	:	36 349	33 062	-1.8 %
BE	1 727	1 670	1 522	1 518	-0.9 %
BG	1 205	765	681	673	-3.8 %
CZ	:	3 802	3 455	3 354	:
DK	524	415	458	464	-0.8 %
DE	14 437	9 656	10 363	7 742	-4.1 %
EE	300	194	241	170	-3.7 %
IE	166	172	268	412	6.2 %
EL	400	244	237	289	-2.1 %
ES	1 922	1 693	1 911	1 946	0.1 %
FR	7 279	7 158	7 240	7 354	0.1 %
IT	4 818	4 697	4 937	4 674	-0.2 %
LV	739	433	386	358	-4.7 %
LT	:	341	314	314	:
LU	97	124	141	145	2.7 %
HU	2 040	1 453	1 458	1 385	-2.5 %
NL	2 372	1 965	2 118	2 078	-0.9 %
AT	1 543	1 530	1 556	1 500	-0.2 %
PL	6 801	5 293	4 975	4 723	-2.4 %
PT	530	589	506	439	-1.2 %
RO	4 515	3 440	2 173	2 186	-4.7 %
SI	358	300	277	264	-2.0 %
SK	:	1 570	1 441	1 360	:
FI	669	735	731	702	0.3 %
SE	1 350	887	773	622	-5.0 %
UK	5 610	:	3 588	3 177	-3.7 %
HR	563	480	393	377	-2.6 %
TR	897	849	755	735	-1.3 %
NO	502	299	266	289	-3.6 %
CH	1 254	1 528	2 164	2 198	3.8 %

Data relate to main railways (UIC members).

CY and MT: not applicable

Source: Eurostat, DG Energy and Transport, Member States

Table 3.6: Number of passenger transport vehicles*, 1990 to 2005

	1990	2000	2003	2005	AAGR 1990 to 2005
EU-27	126 112**	:	:	98 263	-1.6 %
EU-15	90 804**	:	:	75 305	-1.2 %
BE	3 286	3 494	3 358	3 251	-0.1 %
BG	2 026	1 754	1 384	1 385	-2.5 %
CZ	:	5 284	5 121	4 929	:
DK	1 594	1 590	1 538	1 473	-0.5 %
DE	24 139	21 097	20 992	20 169	-1.2 %
EE	*596*	241	251	183	-7.6 %
IE	314	421	405	581	4.2 %
EL	810	505	457	564	-2.4 %
ES	3 839	3 765	4 408	5 239	2.1 %
FR	15 748	15 656	15 553	15 879	0.1 %
IT	14 025	11 914	10 813	10 066	-2.2 %
LV	1 226	702	579	490	-5.9 %
LT	:	563	480	467	:
LU	114	149	150	185	3.3 %
HU	4 385	3 232	3 015	2 787	-3.0 %
NL	2 268	2 742	2 758	852	-6.3 %
AT	3 689	3 468	3 175	3 112	-1.1 %
PL	11 928	9 761	8 818	7 725	-2.9 %
PT	1 232	1 303	1 203	1 125	-0.6 %
RO	6 352	6 234	3 629	3 310	-4.3 %
SI	606	454	426	396	-2.8 %
SK	:	2 005	1 597	1 286	:
FI	957	1 003	1 060	1 084	0.8 %
SE	1 747	1 000	879	791	-5.1 %
UK	:	:	:	10 934	:
HR	1 052	720	640	579	-3.9 %
TR	1 443	1 415	1 294	1 312	-0.6 %
NO	900	918	231	191	-9.8 %
CH	4 136	3 333	4 076	4 293	0.2 %

Data relate to main railways (UIC members).

DE: includes DE-E: 1990 = 9 635; CY and MT: not applicable

* Coaches, railcars and trailers

** estimate

Source: Eurostat, DG Energy and Transport, Member States

The interpretation problem is compounded by the decommissioning of stock, which is sometimes also replaced by more efficient wagons. Although this has 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 obvious change does appear to have taken place in the number of 'goods transport wagons'.

The EU-27 total number of locomotives and railcars (i.e. vehicles that carry passengers or freight and do not use a separate locomotive) decreased by around 17 950 units from 1990 to 2005, at an average yearly rate of 2.1 % (Table 3.5). Among the Member States with data available, Germany saw the most impressive reduction, as nearly one half (46 %) of the 14 450 units in that Member State in 1990 had been withdrawn by 2005, a large share of which during the nineteen-nineties. Large reductions also took place in the United Kingdom (-2 450 units), Romania (-2 350) and Poland (-2 100). Sweden, Latvia and Romania saw the largest annual percentage reductions in stock (all three: -5 %). Stock increases were registered in five countries, of which the largest in Ireland (+246 units) and in France (+75 units).

Based on available data, the number of passenger transport vehicles in the EU-27 – including coaches, railcars (some of which, it should be noted, are already counted under 'locomotives and railcars') and trailers – appear to have decreased by slightly under one quarter, from 1990 to 2005, to reach 98 250 (Table 3.6). The stock of passenger transport vehicles decreased in 16 of the Member States for which data are available. The biggest reductions took place in Poland (-4 203), Germany (-3 970), Italy (-3 959) and Romania (-3 042). Numbers also fell in Slovakia, the Czech Republic and Lithuania after 2000. From 1990 to 2005, the stock of passenger transport vehicles however grew in Spain (+1 400), Ireland (+267), France (+131), Finland (+127) and Luxembourg (+71), as well as in the United Kingdom after 2001.

Estimated data show that the EU-27's stock of goods transport wagons was reduced by close to half between 1990 and 2005 (Table 3.7). Of the estimated reduction by 714 900 units, above 80 % are explained by decreases in Germany (208 500), Poland (172 400), Romania (100 900), as well as in Italy (54 000) and France (52 400). Although the phasing-out of obsolete stock, which was particularly pronounced in the central- and eastern Member States, is most probably responsible for a large part of the reduction, the data may also suggest a shift from haulage by rail to haulage by road (see Chapter 5).

Of the 18 EU-27 Member States with data available, only Luxembourg and Lithuania saw their stock of goods transport wagons grow from 1990 to 2005. An increase in Estonia by 13 100 units from 2000 to 2005 may reflect its role played in the EU-27's growing trade with Russia.

Table 3.7: Number of goods transport wagons, 1990 to 2005 (thousand)

	1990	2000	2003	2005	AAGR 1990 to 2005
EU-27	1 455.4*	910.6	797.3	740.5**	-4.4 %
EU-15	825.4	:	:	422.7**	-4.4 %
BE	30.3	18.8	20.1	17.4	-3.6 %
BG	40.9	24.9	13.5	12.1	-7.8 %
CZ	:	60.7	48.2	47.2	:
DK	4.6	2.2	:	:	:
DE	366.7	189.6	176.8	158.2	-5.4 %
EE	:	5.9	17.4	19.0	:
IE	1.8	1.9	1.6	0.9	-4.4 %
EL	11.0	3.5	3.5	3.5	-7.3 %
ES	37.7	26.5	25.4	23.8	-3.0 %
FR	148.1	94.8	103.8	95.7	-2.9 %
IT	99.7	70.1	56.2	45.7	-5.1 %
LV	11.1	9.1	8.0	8.9	-1.5 %
LT	12.9	13.2	12.1	13.2	0.2 %
LU	2.7	2.6	3.3	3.2	1.1 %
HU	:	23.5	22.2	19.1	:
NL	6.7	4.7	1.8	:	:
AT	34.3	24.0	22.7	22.7	-2.7 %
PL	275.6	130.1	111.0	103.2	-6.3 %
PT	4.6	4.2	4.0	3.5	-1.8 %
RO	166.1	118.0	75.5	65.2	-6.0 %
SI	8.7	6.3	4.8	4.5	-4.3 %
SK	:	27.0	24.0	25.5	:
FI	15.2	12.6	11.6	11.2	-2.0 %
SE	27.5	17.6	8.5	13.6	-4.6 %
UK	34.4	:	:	:	:
HR	13.7	10.0	7.9	7.3	-4.1 %
TR	21.9	17.9	16.8	17.5	-1.5 %
CH	27.1	19.9	19.5	18.3	-2.6 %

data relate to main railways (UIC members)

DE: includes DE-E: 1990=163 158, CY and MT: not applicable

* and ** estimate

Source: Eurostat, DG Energy and Transport, Member States

Inland waterways: goods vessels fewer yet larger

Table 3.8: Inland waterway transport equipment: Numbers of Self-propelled goods vessels and Dumb and pushed barges, 1990 to 2004

	Self-propelled goods vessels							Dumb and pushed barges						
	1990	1995	2000	2001	2002	2003	2004	1990	1995	2000	2001	2002	2003	2004
BE	1 611	1 388	1 363	1 330	1 300	1 299	1 279	167	173	158	169	177	213	244
CZ	:	80	67	69	76	71	75	:	292	176	158	224	216	227
DE	2 207	3 122	2 448	2 382	2 352	2 347	2 348	516	1 290	1 062	1 032	1 002	992	988
EE	3	4	:	1	1	1	1	2	-	:	3	3	3	3
FR	2 300	1 485	1 190	1 194	1 218	1 000	970	768	749	681	700	682	530	533
IT	:	2 973	3 102	3 104	3 102	:	:	:	431	434	431	432	:	:
LV	12	0	:	:	:	:	:	41	0	:	:	:	:	:
LT	10	12	11	10	25	31	30	18	16	11	8	29	29	27
LU	21	:	0	:	:	:	:	:	:	0	:	:	:	:
HU	29	28	237	235	230	230	135	192	150	394	385	391	391	113
NL	5 772	:	4 480	4 171	:	:	:	3 783	:	2 862	3 170	:	:	:
AT	39	22	32	34	29	:	:	171	126	139	137	128	:	:
PL	319	172	105	98	92	95	93	1 018	565	387	500	490	495	494
SK	8	9	12	11	26	27	27	255	233	202	191	206	195	204
FI	109	132	138	135	135	136	135	23	19	30	31	31	32	32
UK	:	186	186	186	151	151	151	:	361	361	361	339	339	339
CH	129	89	:	:	:	:	:	40	7	:	:	:	:	:

Source: Eurostat, Member States

Based on available data for the EU-25, there were an estimated 20 000 inland waterway transport vessels: 13 000 Self-propelled goods vessels and 7 000 Dumb and pushed barges, in 2003. As can be inferred from Table 3.8, the number of vessels has tended to declinine on the EU's waterways despite an increase in the length of waterways noted in Chapter 2. Following the Council Regulation on structural improvements in inland waterway transport[(2)] in 1995, scrapping schemes in individual Member States have, no doubt, contributed to the decrease in numbers, as has also a remarkable increase in transport efficiency with, for example, larger and faster vessels. With reductions by more than half between 1990 and 2004, France and Poland displayed the largest decreases in their total fleets. The number of inland waterway vessels however grew over the period in Germany, Lithuania, Finland and Hungary.

[(2)] Council Regulation (EC) 2819/95 amending Regulation (EEC) 1101/89 on structural improvements in inland waterway transport, 5.12.1995.

EU-27 sea-going merchant fleet

The EU-27's sea-going merchant fleet – essentially consisting of ships that carry dry and liquid cargo – comprised close to 10 000 vessels in 2006 (Table 3.9). This corresponded to a cumulative total of 333 million deadweight tonnes (dwt – the total weight a ship can carry, including cargo, oil, water, crew and provisions).

The fleet total measured is that of the number of 'controlled' vessels, of which the owners and operators are registered in an EU country and control their day-to-day operations. However, the vessel itself need not be registered in the owner or the operator's country, nor in another Member State. In 2006, two thirds of vessels were operated under another flag, often under so-called 'flags of convenience'.

For readers' information, the regulations governing a ship's management depend on the legal, safety, technological, fiscal and social provisions of the country of registration. Some countries have 'international' or 'open' registers, whereby requirements differ from those of the national register. An operator's choice of register being, in large part, governed by economic considerations explains the variations in the share of foreign-flagged vessels. In 2006, these ranged from 14.3 % in Malta to 100 % in Slovenia.

Making up 29 % of the EU-27 total, Greece had the largest fleet in 2006 with 2 943 vessels. Germany (27 %) had the second largest fleet followed by those of Denmark, Italy, the United Kingdom and the Netherlands (all four: 6 %).

Table 3.9: EU-27 Merchant Fleet: ships of 1 000 t gross registered tonnage and over, 2006* (number and million deadweight tonnes)

	Total fleet controlled		National flag		Foreign flag		Share of foreign flag in total fleet	
	Number	mio dwt	Number	mio dwt	Number	mio dwt	% Number	% mio dwt
EU-27	9 996	332.6	3 346	107.4	6 651	225.4	66.5	67.8
EU-15	9 289	321.2	3 102	104.1	6 187	217.2	66.6	67.6
BE	149	11.1	47	6.1	102	5.0	68.5	45.1
BG	109	1.8	73	1.4	37	0.5	33.9	28.8
DK	645	19.0	256	8.9	389	10.1	60.3	53.0
DE	2 731	70.3	392	13.0	2 339	57.2	85.6	81.5
EE	94	0.3	27	0.1	67	0.2	71.3	77.5
IE	40	0.2	21	0.1	19	0.1	47.5	33.9
EL	2 943	159.4	706	47.7	2 237	111.7	76.0	70.1
ES	211	3.9	119	0.8	92	3.1	43.6	79.0
FR	199	4.7	102	2.1	97	2.6	48.7	55.3
IT	644	14.0	491	10.0	153	4.1	23.8	29.0
CY	109	3.3	42	0.9	67	2.3	61.5	71.3
LV	118	1.7	16	0.3	102	1.4	86.4	81.1
LT	57	0.4	42	0.3	15	0.1	26.3	20.4
HU	1	0.0	0	0.0	1	0.0	100.0	100.0
MT	14	0.0	12	0.0	2	0.0	14.3	11.4
NL	604	7.5	452	4.0	152	3.5	25.2	46.2
AT	21	0.9	6	0.0	15	0.9	71.4	95.9
PL	121	2.5	14	0.0	107	2.5	88.4	100.0
PT	40	0.8	23	0.1	17	0.7	42.5	86.1
RO	57	0.7	18	0.2	39	0.5	68.4	70.5
SI	27	0.7	0	0.0	27	0.7	100.0	100.0
FI	121	1.6	79	0.7	42	0.9	34.7	56.0
SE	325	6.4	152	1.7	173	4.7	53.2	73.9
UK	616	21.3	256	8.7	360	12.6	58.4	59.1
HR	105	2.7	73	1.7	32	1.0	30.5	36.8
TR	785	10.5	432	6.8	353	3.6	45.0	34.5
IS	41	0.3	1	0.0	40	0.3	97.6	100.0
NO	1 287	43.3	481	12.9	806	30.4	62.6	70.1
CH	354	11.3	26	0.8	328	10.5	92.7	93.0

* data as at January 1st, 2006; CZ: not available
DK: also based on international registers such as the Danish International Ship Register, and including vessels registered in territorial dependencies

Source: DG Energy and Transport, Member States

Civil aircraft: 'Passenger aircraft' two thirds of the fleet

Look up in the sky and there are more jet trails criss-crossing one-another than there were at the beginning of the nineties. In fact, growing from 2 891 to 6 421 aircraft between 1990 and 2007, the EU-25's civil commercial fleet more than doubled in size, rising at an average rate of 4.7 % per year (data not shown).

The total number of civil aircraft in the EU-27 is relatively small, yet the average annual rate of growth recorded from 1990 to 2007 was greater than that in any of the other main transport modes.

Over one third of the increase in the number of civil aircraft was accounted for by additional 'Business/ corporate/ executive' aircraft, and over one third by new 'Passenger aircraft with 151 to 250 seats', as the fleets in those two categories grew at strong rates of 10 % and 9 % respectively.

Table 3.10 details the EU-27 civil aircraft fleet 'by operating country' in 2007. Nearly all aircraft operated in a country are also registered in that country, yet some may carry a foreign registration, as for instance internationally leased aircraft.

Table 3.10: Number of civil aircraft in service, end-2007

	Passenger Aircraft				Freight / Cargo		Quick-change convertible	Special purpose / Ambulance	Business / Corporate / Executive	Total
	50 seats or less	51 to 150 seats	151 to 250 seats	251 seats & more	<100 000 lbs mtow	>100 000 lbs mtow	(passenger / cargo)			
EU-27	761	1 515	1 554	495	186	187	87	82	1 554	6 421
EU-15	630	1 327	1 463	492	138	183	77	75	1 473	5 858
BE	20	43	18	5	12	42	4	1	37	182
BG	11	16	12	:	:	:	:	:	11	50
CZ	17	27	16	:	3	:	:	2	12	77
DK	34	48	23	6	:	11	6	:	57	185
DE	107	272	213	102	9	22	2	21	319	1 067
EE	9	9	:	:	2	:	2	1	7	30
IE	3	34	183	9	16	3	:	:	18	266
EL	15	38	15	6	6	:	:	:	22	102
ES	48	130	219	49	35	10	15	10	99	615
FR	104	129	150	68	1	18	17	18	96	601
IT	30	146	161	23	10	7	4	1	114	496
CY	:	2	11	2	:	:	:	:	5	20
LV	6	20	1	1	9	3	:	:	8	48
LT	14	9	:	:	8	:	:	:	2	33
LU	9	7	:	:	8	15	:	3	49	91
HU	8	18	19	:	16	1	2	1	4	69
MT	9	7	4	:	:	:	:	:	2	22
NL	19	78	31	48	:	10	4	3	36	229
AT	42	46	31	7	1	:	:	4	176	307
PL	24	36	14	:	10	:	6	3	6	99
PT	12	29	31	14	:	:	3	1	151	241
RO	20	24	7	:	:	:	:	:	10	61
SI	7	4	5	:	:	:	:	:	10	26
SK	6	16	2	:	:	:	:	:	4	28
FI	11	52	23	12	:	:	1	5	14	118
SE	58	26	22	5	25	:	2	2	37	177
UK	118	249	343	138	15	45	19	6	248	1 181
HR	4	6	6	:	:	:	2	:	:	18
TR	:	40	122	7	:	17	:	1	42	229
IS	19	:	21	:	:	13	:	:	5	58
NO	48	105	13	3	:	:	:	2	13	184
CH	20	54	43	4	11	:	:	4	153	289

Source: DG Energy and Transport, Ascend database

At the end of 2007, two thirds of the EU-27 fleet of civil aircraft were accounted for by passenger aircraft, whose numbers have for example been boosted by the rise in low-cost air services. Passenger aircraft with 51 to 150, and with 151 to 250 seats belonged to the largest categories, both contributing a share of 24 % to the total number of civil aircraft in the EU-27.

Close to a quarter of the total fleet in service (24 %) consisted of business/ corporate/ executive aircraft, which include privately- or company-owned aeroplanes, but also air-taxis, the majority of which have a seating capacity of less than 20. Of the remaining shares, cargo-only vehicles represented 6 % of the civil fleet, close-to-equal shares being contributed by both aircraft designed to carry cargo under 100 000 lbs (Imperial pounds) maximum take-off weight (mtow) (3 %) and those above this threshold (3 %). The propeller-driven Fokker F50, for example, 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[3].

Making up around 1 % of the total EU-27 fleet in 2007, quick-change convertible (passenger/ cargo) aircraft are designed to allow a quick change of configuration. They are often used for night-time postal flights and day-time passenger flights. special purpose/ ambulance aircraft also accounted for over 1 % of total. They are used for rescue, training, meteorology or mapping purposes as well as patrol.

[3] For a detailed analysis of the EU-27 fleet of civil aircraft, see: "Analyses of the European air transport market – Annual Report 2007" http://ec.europa.eu/transport/air_portal/observatory/index_en.htm

Largest aircraft fleets in the United Kingdom and Germany

Taking a closer look at the EU figures, the United Kingdom had the highest number of civil aircraft with 1 181, ahead of Germany (1 067), Spain (615) and France (601). The United Kingdom's fleet of passenger aircraft seating more than 150 passengers (481) made up nearly one quarter of the EU-27 total fleet in that category. This most probably points towards those Member State's importance for long-haul flights (see Chapter 4).

The United Kingdom also had the largest number of cargo aircraft including quick-change convertibles (79). Followed by Sweden (25), Spain had the highest number of cargo aircraft under the 100 000 lbs mtow threshold (35), most probably reflecting the extent of air cargo services between the Spanish mainland and islands.

EU citizens' view of security controls at airports and air passenger rights

Two important aspects of EU citizens' use of air services – security controls at airports and air passenger rights – were covered by a recent Eurobarometer survey. Among the citizens of the EU-27 countries who responded that they fly (57 % of total), 61 % expressed the view that security controls at airports are appropriate, 16 % that they are excessive and 24 % that they are insufficient. More people in the NMS-12 countries than in the EU-15 countries thought that they are insufficient (32 % and 22 %, respectively). Among men who fly, 21 % felt airport security controls to be insufficient while, among women who fly, 26 % felt so. More citizens held this view in the NMS-12 than in the EU-15.

The survey also reveals that a share of 46 % of EU-27 citizens are aware of the rights of air passengers while 17 %, although they do fly, are not. The ratio of those who indicated that they were aware of these rights was higher in the EU-15 countries than in the NMS-12 (48 % against 39 %). The overall ratio of those indicating that they were not aware of the rights of passengers was the highest in Hungary (68 %), Finland (58 %), Germany (57 %) and Latvia (57 %). In contrast citizens who are conscious of air passenger rights were in highest proportion in Cyprus (67 %), Portugal (66 %) and Slovenia (61 %).

http://ec.europa.eu/public_opinion/flash/fl_206b_en.pdf

Public transport satisfies

In order to measure citizens' perception of quality of life within their city, Eurostat's Urban Audit provides a number of perception indicators resulting from opinion polls.

Building on the success of the January 2004 survey in 31 cities of the EU-15, a perception survey parallel to the Urban Audit data collection was conducted in December 2006 with a larger sample per city in 70 cities of EU-27 as well as five cities in Turkey and Croatia. In randomized telephone interviews, 300 citizens in each city were asked about their perception of various aspects of the quality of life within their city.

In 59 EU-27 cities, a great majority of the 70 surveyed, more than half of the citizens were satisfied – that is, either 'very satisfied' or 'rather satisfied' – with the public transport in their city (Figure 3.11). However, this average masks large differences.

While more than 85 % of the citizens were satisfied in Helsinki, Vienna, Munich, Hamburg and Rennes, this was the case for less than one in three among the residents of Lefkosia, Sofia, Palermo and Bratislava. Moreover, city size is not taken into account: in a metropolis such as Rome – where public transport has a tremendous number of users – only 6 % were very satisfied and 32 % were rather satisfied.

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

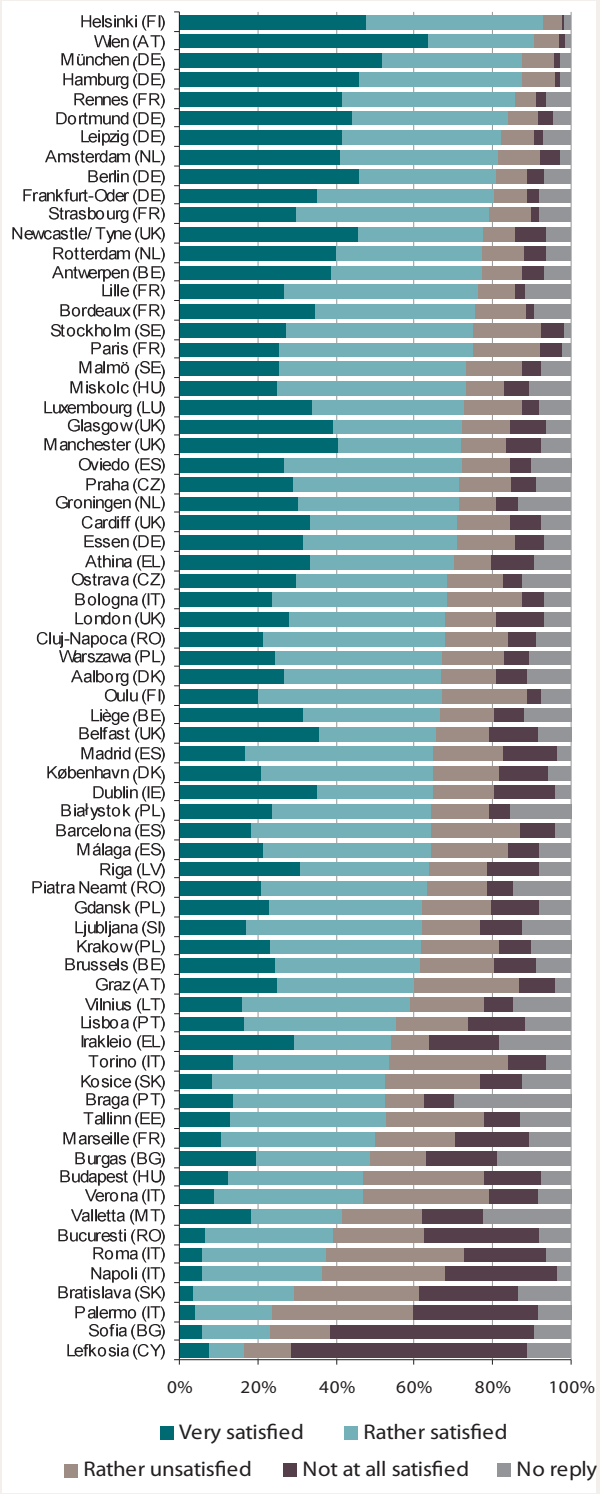
For further information, please see:

http://www.urbanaudit.org

and

http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1177&format=HTML&aged=0&language=EN&guiLanguage=en

Figure 3.11: Europeans' satisfaction with public transport, 2006



Source: Eurostat, Urban Audit – Urban perception

Powered two-wheelers

Snaking their way through traffic queues, the number of powered two-wheelers – which include motorbikes and, for the most part, mopeds – amounted to at least 30.9 million in the EU-27 in 2006, which is equivalent to 13.5 % of the number of cars in the same year. In some Member States, mopeds and scooters that are not registered are not included, which makes comparisons less than accurate.

Table 3.12: Number of powered two-wheelers, 1995 to 2006 (thousand)

	1995	2000	2005	2006	AAGR 1995 to 2006
EU-27	20 088*	:	29 990	30 926	2.7 %
EU-15	17 112*	20 751	27 752	28 680	3.3 %
BE	:	278	346	360	:
BG	519	522	147	76	na
CZ	915	748	794	823	-0.7 %
DK	58	138	172	184	7.5 %
DE	3 981	4 916	5 684	5 870	2.5 %
EE	3	7	10	13	8.7 %
IE	23	31	34	35	2.5 %
EL	:	781	1 124	1 206	:
ES	1 301	1 446	4 118	4 385	7.9 %
FR	2 289	2 410	2 480	2 500	0.6 %
IT	6 228	7 827	9 997	10 239	3.2 %
CY	50	43	40	40	-1.4 %
LV	16	21	32	37	na
LT	20	20	24	25	1.5 %
LU	28	33	38	39	1.9 %
HU	:	91	123	130	:
MT	17	12	12	12	-2.2 %
NL	308	438	553	568	3.9 %
AT	546	633	628	645	1.0 %
PL	929	803	754	784	-1.1 %
PT	216	346	588	559	6.1 %
RO	328	239	197	194	-3.2 %
SI	9	11	49	53	na
SK	82	46	56	58	na
FI	160	193	302	338	4.8 %
SE	264	310	453	498	4.0 %
UK	714	971	1 235	1 254	3.6 %
HR	10	22	128	143	na
TR	820	1 011	1 441	1 823	5.1 %
IS	2	2	4	6	7.2 %
NO	159	202	257	269	3.3 %
CH	371	494	592	609	3.1 %

Stock at year end (except BE: 1st Aug. and CH: 30th Sep.)

National vehicle stock data do not always include all powered two-wheelers and are therefore not fully comparable.

. Including mopeds: SI and HR, from 2002, LV from 2004.

. Excluding mopeds: SK: from 2000.

* estimate

Source: DG Energy and Transport, National statistics

In the EU-27, the total number of powered two-wheelers grew at an estimated average annual rate of 2.7 % from 1995 to 2006. The estimated growth rate over the same period was higher in the case of the EU-15: 3.3 %. Based on comparable data available for 20 Member States, the highest average annual growth rates in the number of powered two-wheelers could be measured in Estonia (8.7 %), Spain (7.9 %), Denmark (7.5 %) and Portugal (6.1 %). It is interesting to note that the five Member States in which numbers fell were all new Member States: the Czech Republic, Poland, Cyprus, Malta and Romania.

Italians are clearly the fondest of this means of transport and, in 2006, with over 10 million powered two-wheelers, Italy contributed a third (33.1 %) of the EU-27's total fleet, followed by Germany (19.0 %), Spain (14.2 %) and France (8.1 %).

Clean Air for All

That was the slogan of European Mobility Week 2008. Based on the success and lessons learnt from the international In Town Without My Car! (Car Free Day) campaign, the European Mobility Week has become an important annual event since its launch in 2002 with the support of the European Commission, together with a large number of other stakeholders. Every year, the number of participating cities and towns has grown. In 2007, home to an estimated 215.7 million citizens, 2 016 cities and towns throughout the EU-27 took part in the European Mobility Week and Car Free Day.

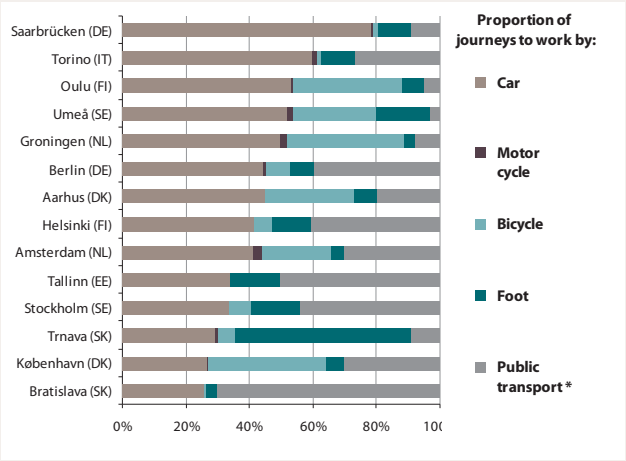
The European Mobility Week has a yearly central theme and past years have pushed forward accessibility for people with reduced mobility, safe streets for children, clever commuting and climate change. In 2007, the European Mobility Week with the motto 'Streets for People' for example encouraged each participating city to reallocate road space to non-motorised traffic without reducing individual mobility.

Raising general awareness of the importance of urban mobility and transport issues, European Mobility Week contributes to improving the health and quality of life of European citizens. It encourages car-driving citizens to adopt transport alternatives to the car, especially those of walking, cycling, using public transport and car-sharing.

http://www.mobilityweek.eu/

Getting around in European cities

Figure 3.13: Distribution of journeys to work, selected EU cities (2004)



Note: 2005: SE; 2003: DK and NL. Tallinn excluding motor- & bicycle

* Rail, Metro, Bus and Train

Source: Urban Audit

The Urban Audit survey provides data on the distribution by mode of transport used for journeys to work. These are shown for a number of selected cities (Figure 3.13).

Reflecting the importance cars have in the selected cities, the proportion of journeys made by car ranged between 78 % in Saarbrücken and 26 % in Bratislava. Most capital cities displayed a share of journeys to work by means of public transport that was above 40 %, rising to as much as 50 % in Tallinn and 70 % in Bratislava.

The non-polluting, non-motorised means of transport that are cycling and walking do have their place in EU-27 cities. Cycling appears to be more widespread in northern-European cities, as close to one quarter of journeys to work were made in this way in Amsterdam, Umeå and Aarhus, that proportion rising to as much as 37 % in Groningen and 34 % in Oulu. In Trnava, 56 % of journeys to work were made on foot.

Bicycle sales: generally up

The bicycle's important role as an alternative to private car use was introduced in Chapter 2. Within the context of a gradual 'rethinking of urban mobility' in the EU-27, specific measures have been put in place to improve cycling infrastructure through, for example, the development of cycling paths but also the promotion of safer cycling. Yet, unlike cars and other vehicles, bicycles are not registered, nor do they require extensive servicing, and they have a longer life. This explains why the measurement of their numbers is more difficult.

For the purposes of interpretation and policy-making, bicycle sales figures offer an indication of their popularity and of the demand for this means of transport. Based on BOVAG-RAI figures, bicycle sales in the EU-15 rose by approximately 1.4 % yearly from 2000 to 2006, to reach an estimated 18.3 million in 2006. Among the EU-15 Member States for which data are available, sales of bicycles grew most in Finland (7.3 % yearly), in the United Kingdom (6.5 %), Spain (4.9 %) and France (4.8 %). Sales in contrast fell in Austria (-3.1 %), Germany (-2.7 %) and the Netherlands (-2.3 %). This may come as some surprise given that, in the Netherlands, non-motorised individual transport enjoys extreme popularity.

Table 3.14: Bicycles sales, 2000 to 2006 (thousand)

	2000	2001	2002	2003	2004	2005	2006	AAGR 2000 to 2006
EU-15	16 844	14 796	15 260	16 431	17 112 *	18 837 *	18 317 *	1.4 % *
BE**	440	370	477	450	448	:	:	:
DK	380	365	425	425	:	:	:	:
DE	5 260	4 510	4 650	4 900	4 700	4 760	4 450	-2.7 %
IE	95	80	85	90	:	:	:	:
EL	190	161	232	245	:	:	:	:
ES	790	470	586	739	783	1 333	1 051	4.9 %
FR	2 660	2 280	2 422	3 258	3 516	3 760	3 527	4.8 %
IT	1 720	1 680	1 384	1 432	1 677	1 847	1 943	2.1 %
LU**								:
NL	1 519	1 365	1 348	1 219	1 227	1 239	1 323	-2.3 %
AT	470	400	372	393	501	375	390	-3.1 %
PT	350	295	300	300	300	:	:	:
FI	210	265	214	275	295	310	320	7.3 %
SE	430	365	365	405	:	:	:	:
UK	2 330	2 190	2 400	2 300	2 500	3 300	3 400	6.5 %

* Estimate

** Luxembourg sales included in Belgian figures

Source: BOVAG-RAI (NL)

4

Traffic and transport quantities and performances

Goods and Passenger transport

Transport is an activity which is rarely performed for its own sake. In most cases, it is carried out as part of a productive activity within which it performs its vital role of spatially linking markets. For example, raw materials are carried to factories for processing, finished goods are brought to shops, passengers are transported to places of work and leisure. The safe and efficient transport of passengers and goods are essential to the economy, and to citizens' quality of life.

Whilst specialising in the carriage of either passengers or goods, different modes are often in competition for the transport of freight or passengers. Freight and passenger operations may however share common infrastructure, with the result of their 'running in parallel'. For example, passenger cars and lorries usually drive on the same roads, passenger and freight wagons use the same rail tracks, air passenger, and air freight and mail make use of the same airports. Specialisation in infrastructure may also take place and, for example, while rail networks are being developed for high-speed passenger transport, the EU is also working towards the creation of a rail network which gives priority to freight, including a number of international freight-oriented 'corridors'.

After looking at transport infrastructure in Chapter 2 and transport vehicle fleets in Chapter 3, this chapter analyses the performance of Goods transport (Section 4.1) and Passenger transport (Section 4.2). Transport performance is measured as the weight of goods or the number of passengers multiplied by the distance covered. The first indicator is expressed in tonne-kilometres (tkm) and the second in passenger-kilometres (pkm). The distance covered by transport vehicles is measured in vehicle-kilometres (vkm). The transport modes' performances are analysed individually in this chapter, and the shares of national and international transport are detailed.

In individual countries, the use made of the different modes to transport passengers and goods depends on transport requirements, themselves influenced by topology, the urban-rural make-up, economic production, but also the availability of infrastructure and disposable income. In some new Member States, recent investments in airport infrastructure have, for example opened new possibilities for air travel, connecting those countries' economic centres more closely to others inside and outside the EU. Air passenger transport performance can be seen to have risen strongly in consequence.

Road clearly stands out as being the main mode for the performance of both passenger and goods transport. Air has witnessed growing popularity for the transport of passengers throughout the EU-27 since the mid-1990s, as a result of market deregulation and the emergence of low-cost carriers. In Rail, passenger and goods transport performance has grown, although rolling stock was in some cases reduced, probably reflecting efficiency gains. Especially when transport on extra-EU routes is included, the Sea plays a key role in goods transport.

It is important to note that statistical data collection methods vary between transport modes and in national and international transport. Care must therefore be taken in interpreting the data and in comparing between modes. Major improvements which have taken place in some Member States' data collection may also make intertemporal comparison as well as the calculation of average annual growth rates in performance unreliable.

The data presented in this chapter come from two main sources: DG Energy & Transport and Eurostat, and they may have sometimes been calculated differently. The collection of transport performance data is in many cases regulated by EU legal acts, that apply to the individual modes. Other data have been collected through the Common Questionnaire. Generally, vehicle age and type, cargo type, goods packaging and conveyance (eg. refrigeration), as well as passenger occupancy rates are not detailed.

4.1 Goods transport

4.1.1 Introduction

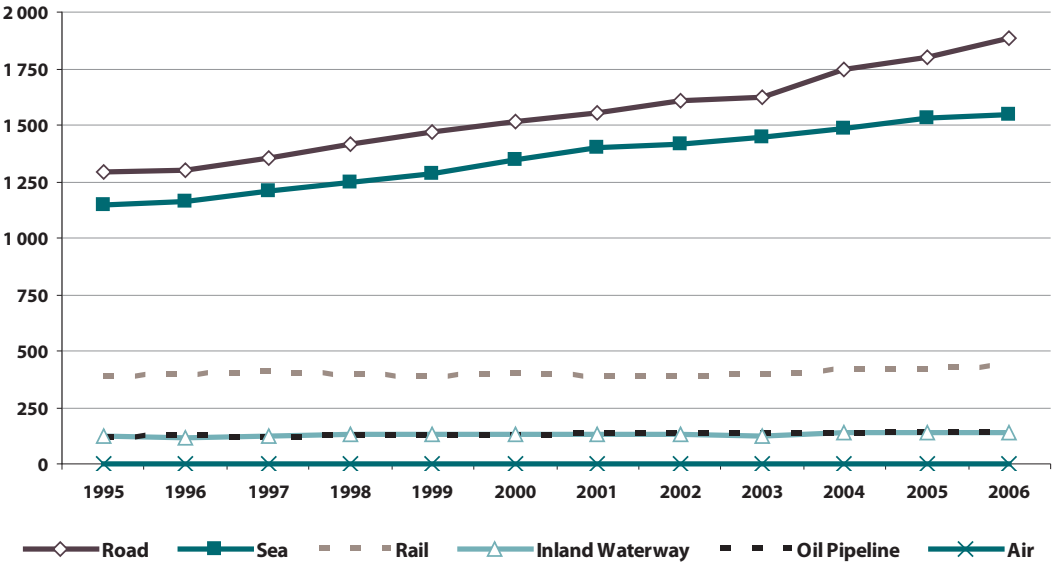
Turning to goods transport performance, trends in the transport modes covered were in many respects concordant with those observed previously in the sizes of transport infrastructure and means of transport fleets.

The main contributors to growth were often also the largest Member States. The 12 new Member States of the 2004 and 2007 enlargements (NMS-12) however displayed strong developments in a number of goods transport sectors. In Road goods transport, some of the NMS-12 have, for example, rapidly developed their cross-trade activities to become major players.

Physically linking up markets, multi-modal goods transport plays a vital role in a European open market from which many barriers to the provision of transport services have been removed. Given geographical conditions, the most fitting mode is chosen to transport goods of many types and sizes. Constantly seeking to improve their efficiency, goods transport enterprises seek to optimise their transport loads and routes.

The product mixture of goods transported in the EU-27 changed between the mid-1990s and the mid-2000s. Most noticeably, while more Machinery and transport equipment was carried less Solid fuels were transported. Providing an insight into the Member States' national and international trade, as well as into the role transport plays in this, goods transport is detailed in this publication by product Chapter (1 digit) and by Group of goods (2 digits) of the NST/R classification (Standard Goods Nomenclature for Transport Statistics/revised, Eurostat). As of 2008, the NST 2007 has become the unique classification for transported goods in all modes.

Figure 4.1: Goods transport performance, by mode, EU-27, 1995 to 2006 (billion tkm)



Source: DG Energy and Transport

In the EU-27, total goods transport performance by Road, Rail, Inland waterways, Oil pipeline, domestic and intra-EU Sea transport and Air freight and mail transport, grew from 3 060 billion tkm in 1995 to 4 140 billion tkm in 2006 (Figure 4.1 & Table 4.2). The latter equates to moving a tonne of goods over 23 km per day per inhabitant in the EU-27.

From 1995 to 2006, all six modes contributed positively to the EU-27's average 2.8 % yearly growth in goods transport performance. The modes grew at average yearly rates ranging from 1.1 % in Rail to 3.8 % in Air. Over half (55 %) of the increase in total performance during the period was attributable to Road (compared to its 46 % share in total in 2006) and to Sea transport (37 % of total increase, equal to Sea's share in 2006). Also apparent in other chapters, these trends explain the change in the modal distribution of goods transport occuring over the period.

Table 4.2: Comparative goods transport performance: EU-27, USA, Japan, China and Russia, 2006 (billion tkm and %)

	EU-27		USA		Japan		China		Russia	
Road	1 888	46%	1 890	30%	347	60%	975	11%	201	4%
Rail	435	10%	2 705	43%	23	4%	2 195	25%	1 951	41%
Oil pipeline	135	3%	854	14%	:	0%	166	2%	2 499	53%
Inland waterways	138	3%	486	8%	:	0%	1 291	15%	58	1%
Sea (domestic / intra-EU-27)	1 545	37%	332	5%	208	36%	4 258	48%	48	1%
Total, 5 modes	4 140	100%	6 266	100%	578	100%	8 886	100%	4 757	100%

Note: The data concerning different geographical entities are not fully comparable.

Source: DG Energy and Transport, Eurostat, US Bureau of Transportation Statisitics, Japan Statistics Bureau, National Bureau of Statistics of China, Goskom STAT (Russia), International Transport Forum

Table 4.2 depicts the estimated tonne-kilometres of goods transport performed together, in 2006, by the five modes shown, in the EU-27 and in main economic partners - the USA, Japan, China and Russia.

Russia performed 4.8 trillion tkm of goods transport, 15 % more than the EU-27. Major shares of performance were accounted for by Oil pipeline (53 %) and Rail (41 %).

Total goods transport performance in the USA amounted to 6.3 trillion tkm, somewhat above 50 % more than in the EU-27. Major shares were made up by Rail (43 %) and by Road (30 %).

In China, total transport performance in 2006 was above double that of the EU-27. Goods transport performance was especially accounted for by Sea and by Rail.

Road goods transport performance grew by 3.5 % yearly on average from 1995 to 2006 (Table 4.3). However, the large increase from 2003 to 2004 is in part due to changes in the collection of Road freight transport statistics in some Member States. The performance of goods transport by Road did grow more yearly from 2004 to 2006 (3.9 %) than on average over the entire period.

Domestic and intra-EU transport of goods by Sea grew at 2.7 % yearly. Air, the smallest contributor to total, grew most (3.8 %). This rise took place alongside strong growth in Air passenger transport (see Section 4.2). Smaller yearly increases in performance were recorded over the period by Oil pipelines (1.5 %), Inland waterways (1.2 %) and Rail (1.1 %).

Table 4.3: Goods transport performance, by mode, EU-27, 1995 to 2006 (billion tkm)

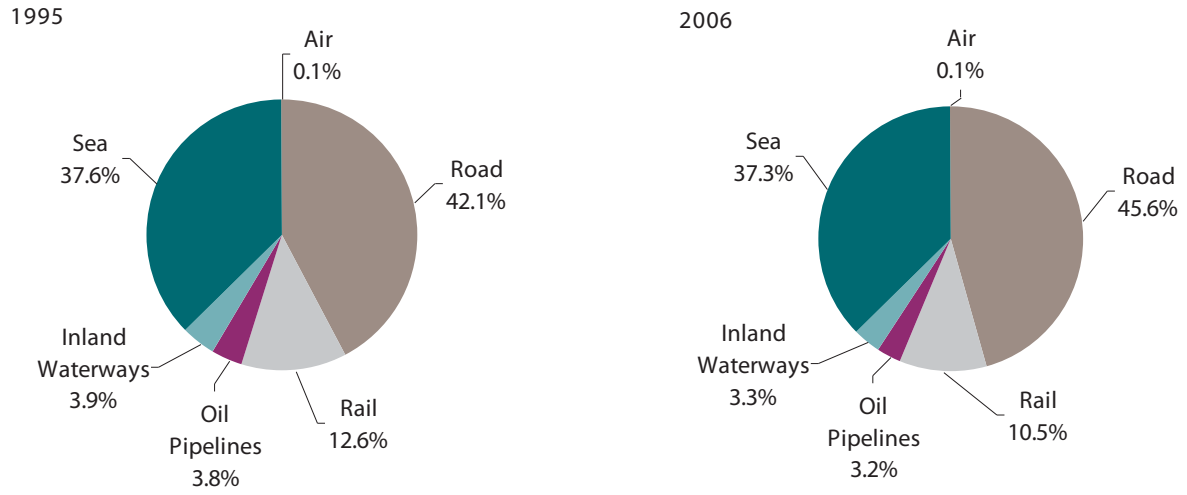
	Road	Rail	Oil Pipelines	Inland Waterways	Sea	Air	Total
Modal share	46%	10%	3%	3%	37%	0%	100%
2006	1 888	435	135	138	1 545	3.0	4 143
2005	1 800	413	136	138	1 530	2.9	4 020
2004	1 747	413	131	136	1 488	2.8	3 918
2003	1 625	391	130	123	1 445	2.6	3 717
2000	1 519	401	126	133	1 348	2.7	3 529
1995	1 289	386	115	121	1 150	2.0	3 062
AAGR 1995 to 2006	3.5%	1.1%	1.5%	1.2%	2.7%	3.8%	2.8%

Road: national and international haulage by vehicles registered in the EU-27

Air & Sea: only domestic and intra-EU27 transport; provisional estimates

Source: DG Energy and Transport

Figure 4.4: Modal distribution of goods transport performance, EU-27, 1995 and 2006 (% tkm)



Note: The data concerning different geographical entities are not fully comparable.

Source: DG Energy and Transport, Eurostat, US Bureau of Transportation Statisitics, Japan Statistics Bureau, National Bureau of Statistics of China, Goskom STAT (Russia), International Transport Forum

Growth in Road goods transport performance translated into a 3.5 percentage point (pp) increase in the mode's share in total from 1995 to 2006 (Figure 4.4). Rail's smaller rate of growth over the period reflects in the mode's 10.5 % share of EU-27 tonne-kilometre performance in 2006, compared to 12.6 % in 1995 (-2.1 pp).

Strong Road goods transport performance also contributed to reducing the shares of Inland waterways (-0.6 pp) and of Oil pipelines (-0.5 pp) in total goods transport. The modal shares of National and intra-EU seaborne transport of goods and that of Air transport remained close to unchanged over the period.

Tonnes of goods travel kilometres

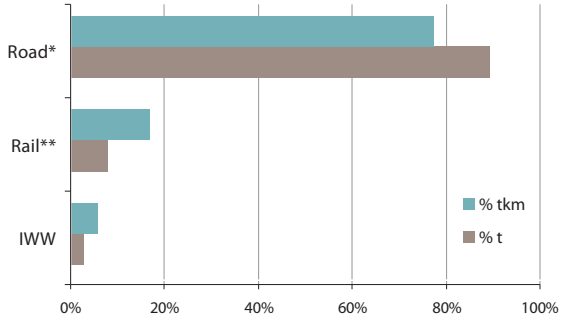
Considering the three main inland transport modes, Road, Rail and Inland waterways, a more detailed picture emerges when the modes' transport, in tonnes loaded, is compared to their transport performance, in tonne-kilometres (Figure 4.5).

Different modal shares in the two measures arise from the different distances over which goods are transported by the individual modes. This can be determined by topology, the modes' physical specificities as well as those of the goods carried. The reader must however note that, in the different modes, different methods are applied to calculating tonnes carried and tonne-kilometre performance.

Of the three, Road was the mode that transported most goods in 2006, being both the mode that carried most in terms of tonnes loaded (89 %) and the one that performed most tonne-kilometres (77 %). The different proportions in the two measures are explained by greater loads of goods that are carried by Road over relatively shorter distances, thus reducing the mode's share in total transport in terms of tonne-kilometres.

In contrast, Rail's share in performance (17 %) was more than double its share of total tonnes carried (8 %), which reflects that goods are transported by Rail over greater distances than they are on average by all three modes. Similarly, Inland waterways' share in total was larger in terms of tonne-kilometres (6 %) than it was in terms of tonnes (3 %).

Figure 4.5: Modal share in inland goods transport, EU-27, 2006 (% t and % tkm)



*excluding MT ** EU-25; all tonnes data by loading and unloading country from detailed reporting only; weight in tonnes may be overestimated; also see box, p. 59

Source: Eurostat (Transport)

NST/R: classifying transported goods

All types of goods are transported in the EU-27, be they large or small, light or heavy, gaseous, liquid or solid. Some bulky goods do not require packaging and travel in specially foreseen container vehicles or vessels. Other goods, such as computers and high-precision machinery are fragile and they may require specially designed containers. Agricultural products such as fruit, vegetables and meat, but also some medicines, for example, may require refrigeration all along their distribution chains. Dangerous goods such as a number of chemicals and most fuels are transported securely by special means.

In this chapter, goods transported are classified according to the Standard Goods Nomenclature for Transport Statistics/Revised: "NST/R". This breaks down into the Chapters 0 to 9. The Chapters themselves break down into the Groups of goods 1 to 24 (Table 4.6).

It generally appears to be the case that, being less valuable per unit of weight on average, bulkier goods travel shorter distances. Travelling at a large range of speeds, the different transport modes charge different fares per unit of weight they transport.

For detailed information on the NST/R goods classification, please refer to Eurostat's Classification Server 'Ramon':

http://ec.europa.eu/eurostat/ramon/

Table 4.6: NST/R goods classification: Chapters and Groups of goods

Chapter	Group of goods	
0	Agricultural products and live animals	
	1	Cereals
	2	Potatoes, other fresh or frozen fruits and vegetables
	3	Live animals, sugar beet
	4	Wood and cork
	5	Textiles, textile articles and man-made fibres, other raw animal and vegetable materials
1	Foodstuffs and animal fodder	
	6	Foodstuff and animal fodder
	7	Oil seeds and oleaginous fruits and fats
2	Solid mineral fuels	
	8	Solid minerals fuels
3	Petroleum products	
	9	Crude petroleum
	10	Petroleum products
4	Ores and metal waste	
	11	Iron ore, iron and steel waste and blast furnace dust
	12	Non-ferrous ores and waste
5	Metal products	
	13	Metal products
6	Crude and manufactured minerals, building materials	
	14	Cement, lime, manufactured building materials
	15	Crude and manufactured minerals
7	Fertilisers	
	16	Natural and chemical fertilisers
8	Chemicals	
	17	Coal chemicals, tar
	18	Chemicals other than coal chemicals and tar
	19	Paper pulp and waste paper
9	Machinery, transport equipment,manufactured and miscellaneous articles	
	20	Transport equipment, machinery, apparatus, engines, whether or not assembled, and parts thereof
	21	Manufactures of metal
	22	Glass, glassware, ceramic products
	23	Leather, textile, clothing, other manufactured articles
	24	Miscellaneous articles

Counting Rail transport performance

Two sources of bias exist, which may influence the Rail transport statistics presented in this chapter.

Detailed and simplified reporting

In preparing Rail transport performance statistics the inclusion by Member States of undertakings performing less than 500 million tkm goods transport or less than 200 million pkm passenger transport yearly may differ. Optionally, those undertakings are exempted from detailed reporting, their performance being recorded instead under simplified reporting[1].

This results in the underestimation of certain indicators. In goods transport, this is the case with goods transported by NST/R category (see above), dangerous goods and load-unload data, which all cover detailed-reporting undertakings only. In passenger transport, while the total transport performance of all railway undertakings is covered, National and International transport figures, for example, include the performance of railway undertakings under detailed reporting only.

Irrespective of their size, all undertakings active in Rail goods transport in 2007 were covered by detailed reporting in CZ, DE, EE, IE, LV, LT, LU, PT, SI, FI, SE and UK. The Rail passenger transport statistics of AT, DK, ES, IT, NL, NO and RO included simplified reporting data for 2006.

Double-counting (tonnes only)

Expressed in tonnes, the EU totals of weight transported by Rail are overestimated by default. As the territoriality principle cannot be applied to the collection of tonnes data, some values (international and transit) are reported by several Member States, for the transport of the same goods. They are thus included twice or even three times in the EU total. The estimated order of magnitude of the resulting double-counting is of around 30 %. This is not the case for figures in tonne-kilometres as each country reports the tonne-kilometres performed on its own territory.

[1] Regulation (EC) N° 91/2003, European Parliament and Council, on Rail Transport Statistics, 16.12.2002.

Goods transport by product

Table 4.7: Transport of goods, by NST/R Chapter, EU-27, 2006 (million t)

	Road*	Rail**	IWW
Total	17 056.8	1 528.9	503.2
Agricultural products and live animals (0)	1 336.3	94.6	20.6
Foodstuffs & animal fodder (1)	1 817.6	29.4	25.4
Solid mineral fuels (2)	171.7	279.6	46.2
Petroleum products (3)	628.8	152.2	86.3
Ores & metal waste (4)	249.4	165.6	53.0
Metal products (5)	497.6	185.7	21.1
Crude & manuf. minerals, building materials (6)	8 060.0	174.5	149.9
Fertilisers (7)	176.1	35.3	10.7
Chemicals (8)	739.8	79.4	37.3
Machinery, transp. equipment, manuf. & misc. articles (9)	3 379.5	332.7	52.8

* excluding MT

** EU-25; all data by loading and unloading country from detailed reporting only; weight in tonnes may be overestimated; also see box, p. 59

Source: Eurostat (Transport)

Table 4.8: Transport of goods, by NST/R Chapter, EU-27, 2006 (billion tkm)

	Road*	Rail***	IWW
Total	1 845.4	400.9	137.7
Agricultural products and live animals (0)	209.8	25.7	11.3
Foodstuffs & animal fodder (1)	299.1	10.9	9.1
Solid mineral fuels (2)	13.6	54.3	15.9
Petroleum products (3)	55.7	40.8	20.6
Ores & metal waste (4)	24.6	36.1	16.4
Metal products (5)	110.0	46.4	8.5
Crude & manuf. minerals, building materials (6)	320.2	36.6	27.3
Fertilisers (7)	15.8	10.7	4.7
Chemicals (8)	129.4	24.7	10.5
Machinery, transp. equipment, manuf. & misc. articles (9)	667.1	114.7	13.3

* excluding MT

*** EU-25; all data by loading and unloading country from detailed reporting only; also see box, p. 59

Source: Eurostat (Transport)

The figures presented above cover all goods transported yet it is particularly interesting to analyse the EU-27's three main inland modes' transport performance by NST/R product Chapter (see box, p. 59).

Both in terms of tonnes loaded and of tonne-kilometres performed in 2006, Road transported most freight in each of the NST/R Chapters except for Solid mineral fuels (NST/R 2), of which more were transported by Rail (Tables 4.7 and 4.8).

The total weight in tonnes transported by Road in the EU-27 in 2006 (17.1 billion tonnes) consisted to nearly one half (47 %) of *Crude and manufactured minerals, building materials* (NST/R 6) (Figure 4.9).

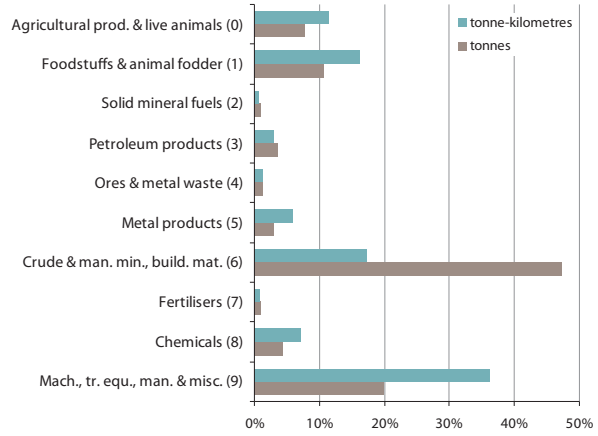
Transport of these bulky products for example benefits from the versatility of Road vehicles, which often makes them the only means to use at reasonable cost in difficult terrain such as farmland, mines or building sites.

Machinery, transport equipment, manufactured and miscellaneous articles (NST/R 9) and *Foodstuffs and animal fodder* (NST/R 1) were the second and third main product Chapters, accounting for 20 % and 11 % respectively of the total weight transported by Road.

In terms of weight loaded, the main products transported by Rail were *Machinery, transport equipment, manufactured and miscellaneous articles* (22 %) (Figure 4.10). The five product Chapters NST/R 2 to 6 (fuels, metals and other mineral products) together made up a further 63 % of the weight carried by Rail.

The total weight of goods transported by Inland waterways consisted to nearly one half of either *Crude and manufacturing materials* (30 %) or of *Petroleum products* (NST/R 3) (17 %) (Figure 4.11).

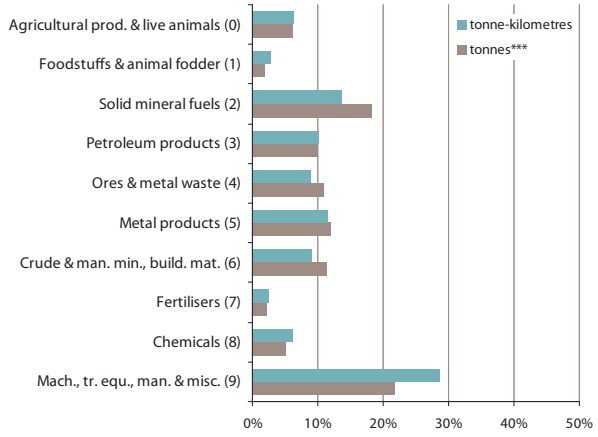
Figure 4.9: Road goods transport: distribution by NST/R Chapter, EU-27*, 2006 (% t and % tkm)



* excluding MT

Source: Eurostat (Transport)

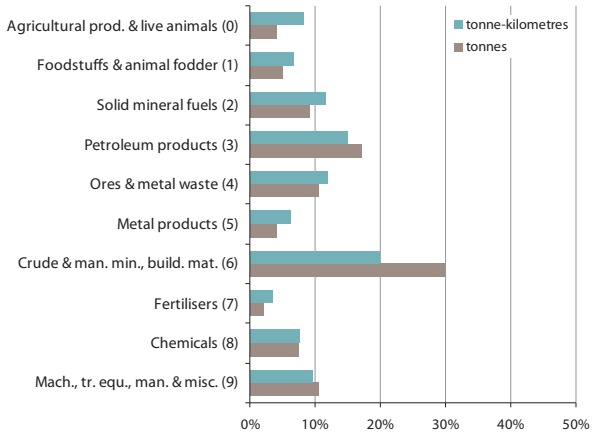
Figure 4.10: Rail goods transport: distribution by NST/R Chapter, EU-27**, 2006 (% t and % tkm)



** excluding BG, CY, MT and RO; detailed reporting only; also see box, p. 59
*** weight in tonnes may be overestimated; also see box, p. 59

Source: Eurostat (Transport)

Figure 4.11: IWW goods transport: distribution by NST/R Chapter, EU-27, 2006 (% t and % tkm)



Source: Eurostat (Transport)

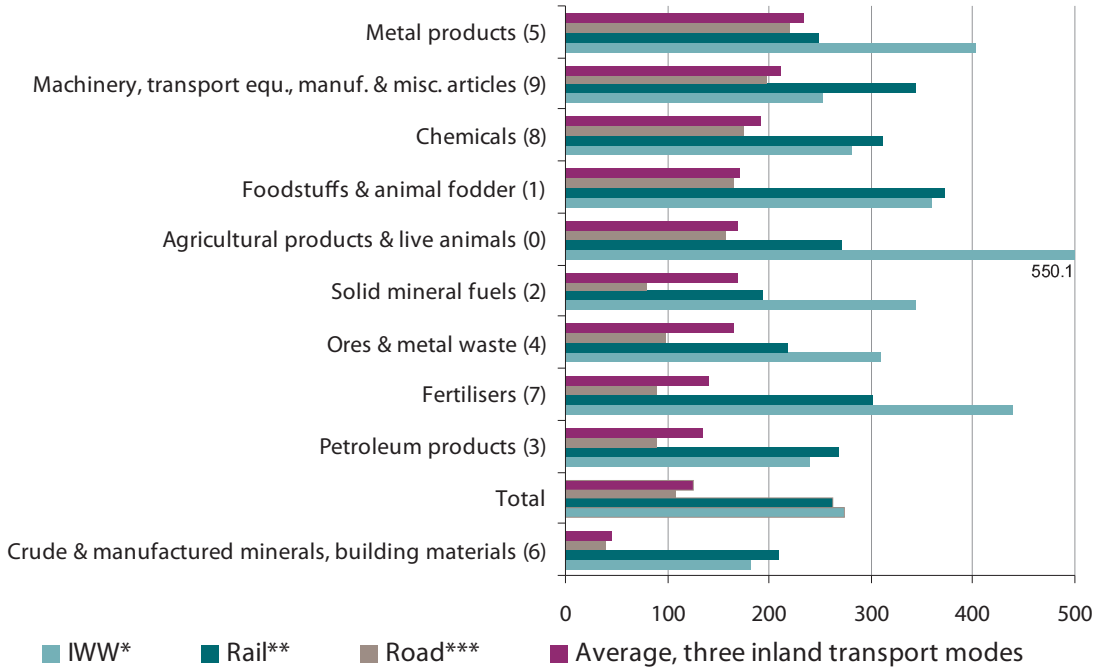
Road transport's autonomy, manoeuvrability and versatility endow it with a large range of product-specific uses. The higher value-added products of NST/R Chapter *Machinery, transport equipment, manufactured and miscellaneous articles* accounted for well over a third (36 %) of the total tonne-kilometres performed by Road in 2006, compared to their 20 % share of total weight loaded (Figure 4.9). Goods with higher value-to-weight ratios tend to travel further as they are relatively cheaper to carry per weight. This helps to explain those products' greater share in Road's total tonne-kilometre performance than total tonnes carried.

Thus, while *Crude and manufactured minerals and building materials* made up somewhat under half of the tonnes transported by Road, they only accounted for 17 % of the mode's total tonne-kilometre performance. Road's utility in transporting bulky goods including, for example, ready-mixed cement, freshly extracted minerals but also raw milk and bottled drinks, is greatest over short distances. *Crude and manufactured minerals and building materials*, together with *Foodstuffs and animal fodder* (16 %) did however make up the second- and third-main NST/R product Chapters in terms of total tonne-kilometres performed by EU-27 Road transport in 2006.

Rail's performance in tonne-kilometres transported was greater than Road's in the two NST/R Chapters *Solid mineral fuels and Ores and metal waste* (NST/R 4). Rail displayed less disparity between the distributions by product Chapter of total tonnes and tonne-kilometres transported than did Road transport. For *Solid mineral fuels and Machinery, transport equipment, manufactured and miscellaneous articles,* while the former Chapter of bulky goods made up a higher share of weight loaded in tonnes (18 %) than it did of tonne-kilometres (14 %), the latter accounted for 29 % of tonne-kilometres performed compared to 22 % of the total tonnes transported by Rail (Figure 4.10).

In Inland waterway transport, reflecting the shorter than average distances over which those goods are carried, *Petroleum products*, *Crude and manufactured minerals and building materials*, as well as *Machinery, transport equipment, manufactured and miscellaneous articles* contributed more proportionally to the mode's total transport in tonnes than to its total performance in tonne-kilometres (Figure 4.11).

Figure 4.12: Average distance goods are carried, by NST/R Chapter, EU-27, 2006 (kilometres)



* The total number of tonnes transported is overestimated by default. As the territoriality principle cannot be applied to the figures in tonnes, some values (international and transit) are included twice or even three times. This is not the case for figures in tonne-kilometres as each country provides figures of tonne-kilometres performed on its own territory.

** excluding BG, CY, MT and RO; detailed reporting data only; weight in tonnes may be overestimated and distances thus underestimated; also see box, p. 59

*** excluding CY and MT

Source: Eurostat (Transport)

Figure 4.12 provides estimates of the average distances goods travelled in 2006, by NST/R product Chapter. These are calculated, by mode, as the ratio of total tonne-kilometres performed to total tonnes transported. Travelling 125 km on average, goods were transported furthest by Inland waterway (274 km), followed by Rail (262 km). Road carried goods over a shorter average distance of 108 km.

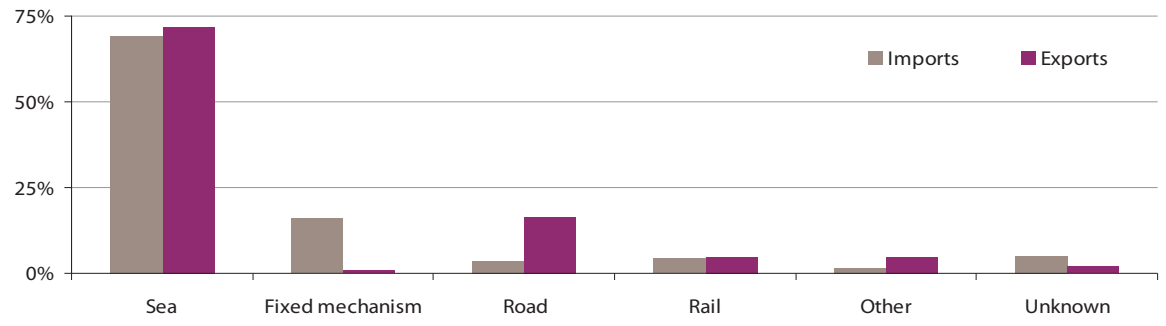
On average, in all three transport modes, the goods of NST/R Chapters *Metal products* (NST/R 5) (234 km) and *Machinery, transport equipment, manufactured and miscellaneous articles* (211 km) were transported furthest. In comparison, with what one may expect to be lower value-to-weight ratios, the products of the NST/R Chapter *Crude and manufactured minerals, building materials* were carried over an estimated average 46 km.

It is interesting to note that *Metal products* were the goods that travelled furthest on average by Road (221 km), while *Foodstuffs and animal fodder* (NST/R 1) covered the greatest distance by Rail (372 km). Products such as grain (e.g. corn and soyabeans), which belong to NST/R Chapter 0 *Agricultural products and live animals* were, on average, transported over a distance of 550 km by means of Inland waterways, more than the products of any other NST/R Chapter.

Transport by mode in extra-EU-27 trade

Looking at the EU-27's trade with partners beyond the EU's borders, the focus is on the weight of goods transported in extra-EU trade, especially on the modes employed in transporting those goods. Neither the value of the goods transported by the different modes in extra-EU trade nor goods' product make-up are analysed here. For this purpose, please see the Pocketbook "EU Energy and Transport in Figures"[2] as well as two publications of Statistics in Focus[3].

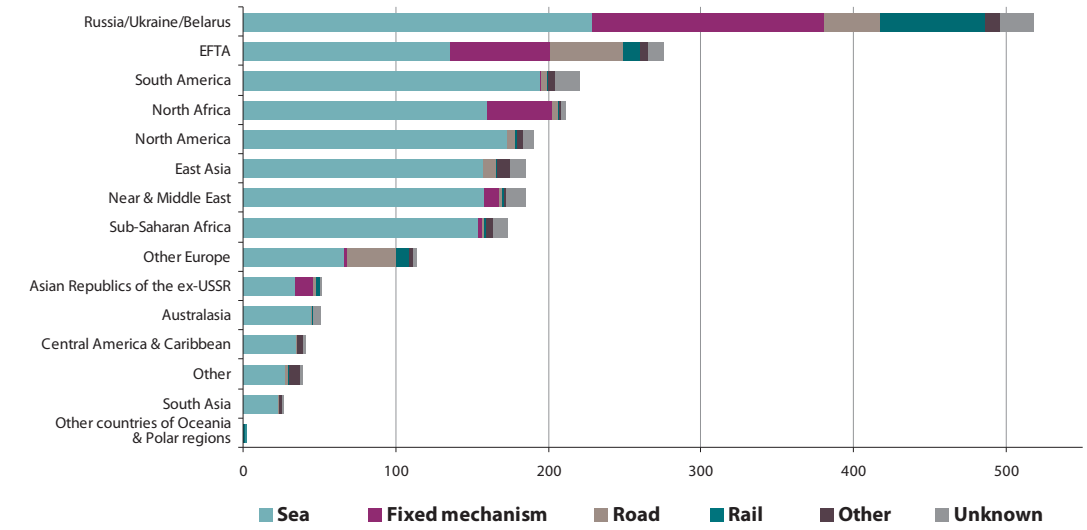
Figure 4.13: Modal split of goods transport in extra-EU-27 imports and exports, 2006 (% tonnes)



Source: Eurostat (Comext)

Sea was the main mode of transport active in extra-EU-27 trade in 2006, when it accounted for 72 % of the transportation of exports weighing an aggregate 0.5 billion tonnes and for 69 % of imports with a total weight of 1.8 billion tonnes (Figure 4.13). Mainly representing pipelines, Fixed mechanism transport played an important role in transporting 16 % of imports whereas Road transported 16 % of extra-EU exports. Rail carried 5 % of exports and 4 % of imports. The 2.3 billion tonnes of goods traded extra-EU-27 in 2006 (imports and exports) are detailed by transport mode and by geographical area (Figure 4.14). The EU-27's European trade partners Russia/Ukraine/Belarus (22.7%) and EFTA (12.1%) accounted for the largest shares of extra-EU trade in tonnes. Possible in these cases, land transport accounted for approximately half of the volumes traded with both main partners. Yet, when one leaves the European continent, Sea transport was dominant for the transport of goods to and from all other world geographical areas.

Figure 4.14: Modal split of goods transport in extra-EU-27 trade (imports and exports), by world geographical area, 2006 (million tonnes)



Source: Eurostat (Comext)

[2] "EU Energy and Transport in Figures", Statistical Pocketbook 2007/2008, DG Energy and Transport, 2008

[3] Statistics in Focus: "Extra EU-25 trade in goods by mode of transport" (KS-NO-06-002-EN) and "Trade between EU-25 and neighbouring countries by mode of transport" (KS-NO-06-001-EN), 2006

Transport's role in the EU's international trade in goods

The EU-27 recorded a EUR 13.6 billion surplus in international transactions in goods transport services with the rest of the world while it recorded a EUR 14.0 billion deficit in Travel in 2006[4]. Although these transactions are directly related to `Transport services´ (NACE 60 to 63, see Chapter 5), their analysis goes beyond this publication's coverage.

This chapter puts particular emphasis on the important international component in EU-27 transport performance. Both in goods and passenger transport, analysed by individual mode hereafter, a distinction is made between national and international transport. The reader must however bear in mind that the methods applied to calculating domestic and international transport performances differ within and between individual transport modes. Distances covered in international transport may also be difficult to measure.

The main modes´ transport networks sometimes extend far beyond national boundaries, playing an important role in the EU-27´s external trade, be it close-by, intra-EU, or long-distance extra-EU trade. Of all the flows of goods and passengers transported by EU-27 operators in a year, one may broadly say that Road and Rail vehicles are employed most for national and intra-EU trade, while Sea and Air vessels, but also Fixed mechanisms (fuel pipelines), play a major role in extra-EU trade (see box, p.63).

Each mode's performance is limited by its technical specificities and requirements. With Road, the transport of bulky goods tends to take place more locally, that is more readily within national boundaries as well as intra-EU, than extra-EU. International transport, in contrast, tends rather to concern goods with higher added value per weight, especially when a more expensive mode (per tonne-kilometre performed) is used, such as Air mail and freight, for example.

Intra-EU goods transport

While the box above weighs up the modes' contributions to the transport of goods exchanged in extra-EU-27 trade, Table 4.15 shows the intra-EU-27[5] flows of goods transported in 2006, both nationally and internationally, between the Member States, by the three main inland modes – Road, Rail and Inland waterways.

When interpreting the data in this table, one should note that, for Road transport for instance, 799 thousand tonnes loaded in Belgium and unloaded in the Czech Republic in 2006 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),
- cross-trade (see further) of goods loaded in Belgium and unloaded in the Czech Republic by any EU-registered haulier other than Belgian or Czech.

An estimated 16 925 million tonnes (M t) of goods were transported by Road within the EU-27 ('intra-EU-27') in 2006, while 1 220 M t of goods were transported by Rail and 495 M t by Inland waterway (Table 4.15).

The largest quantities of goods were transported nationally by Road within the major economies Germany (2 928 M t), Spain (2 327 M t), France (2 114 M t), the United Kingdom (1 874 M t) and Italy (1 460 M t).

Those five Member States were also the EU-27's top five actors in terms of Road transport of goods both loaded and unloaded in trade with other Member States. In Germany, most goods were both loaded (3 108 M t) and unloaded (3 095 M t) in intra-EU-27 transport.

[4] Statistics in Focus, "EU International Trade in Services in 2006", KS-SF-08-021-EN-N, 2008

[5] 'Intra-EU' is applied to transport both within and between Member States, and should not be confused with the term as it is applied to the exchanges, between the partners only, in trade.

Reflecting the reciprocity of trade employing that mode between those Member States, the main country-to-country flows of goods transported by Road in 2006 were: Germany to the Netherlands (43 M t), the Netherlands to Germany (40 M t), Belgium to France (35 M t), France to Belgium (26 M t), and Germany to France (26 M t).

The largest quantities of goods were transported nationally by Rail in Poland (228 M t) followed by Germany (218 M t), the United Kingdom (108 M t), France (71 M t) and Romania (53 M t).

Most goods transported intra-EU-27 were both loaded onto Rail and unloaded in Germany (258 M t and 273 M t respectively) followed by Poland (251 M t and 238 M t), the United Kingdom (both: 109 M t), France (both: 85 M t) and the Czech Republic (64 M t and 68 M t).

In Rail transport, the top-five country pairs rather point towards one-way transport flows: the Netherlands to Germany (15 M t), Germany to Austria (10 M t), Slovakia to the Czech Republic (10 M t), Poland to Germany (8 M t), and Italy to Germany (8 M t).

National and intra-EU Inland waterway transport featured five main actors: the Netherlands, Germany, Belgium, France and Romania. Most goods transported intra-EU-27, were both loaded onto Inland waterway vessels and unloaded in the Netherlands (211 M t and 161 M t respectively) followed by Germany (112 M t and 156 M t), Belgium (85 M t and 95 M t), France (47 M t and 42 M t) and Romania (25 M t and 24 M t).

Also suggesting reciprocity, in 2006, the five main country pairs in EU-27 Inland waterway goods transport featured three active Member States: the Netherlands, Germany and Belgium. Those five country-pairs were: the Netherlands to Germany (77 M t), the Netherlands to Belgium (38 M t), Germany to the Netherlands (34 M t), Belgium to the Netherlands (29 M t) and Belgium to Germany (13 M t).

Table 4.15: Intra-EU goods transport by country pair and by inland mode, 2006 (1000 tonnes)

UNLOAD ↓	LOAD → EU-27	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV
EU-27	16924 932	368 888	147 219	425 382	190 653	3107 735	31 494	300 950	505 966	2377 134	2220 935	1515 488	43 623	51 646
	1219 861	42 597	17 213	64 042	1 898	258 313	19 871	1 245	970	27 313	85 337	54 454	-	3 124
	495 360	84 998	2 521	799		111 564					47 293			
BE	355 072	274 141	:c	517	289	19 649	:c	:c	39	1 287	25 705	1 636	0	69
	38 751	24 867	104	85		2 324		-		177	5 860	2 367	-	
	95 289	37 543		10		14 991					4 456			
BG	146 352	:c	144 595	:c	:c	150	:c	0	935	:c	:c	132	0	0
	17 671	0	16 263	23		15		-	171	0	1	10	-	
	2 683	0	2 000			92								
CZ	421 238	799	:c	398 055	117	8 782	:c	:c	:c	376	944	1 021	0	35
	67 551	80	7	45 861	5	3 583		-	0	2	62	61	-	
	784	5		419		335								
DK	193 218	528	:c	212	177 652	7 357	:c	54	:c	267	833	343	:c	31
	3 269	23		30	1 409	879		-		4	74	401	-	4
	61	2				58								
DE	3094 555	19 744	314	10 740	6 719	2928 172	183	87	1 127	6 881	23 225	14 513	1	555
	272 845	4 761	87	4 252	263	217 890		-	26	702	2 236	8 198	-	12
	155 617	12 910	199	350		57 156					5 183			
EE	31 706	:c	:c	:c	:c	134	29 635	0	0	:c	28	43	0	1 010
	20 392			1		0	19 323	-					-	221
IE	310 046	50	0	:c	45	129	0	294 255	:c	63	119	109	0	:c
	1 245	-	-	-	-	-	-	1 245	-	-	-	-	-	-
	5					5								
EL	506 330	36	1 020	:c	:c	1 069	:c	:c	501 433	119	321	1 320	5	0
	1 718		247	8	4	86		-	564		0	81	-	
ES	2377 112	2 300	:c	388	243	6 347	:c	62	87	2326 693	19 552	4 802	0	92
	27 316	236	0	3	0	583	0	-	0	25 447	468	3	-	0
	153					33								
FR	2233 747	35 319	323	1 028	702	25 549	:c	167	170	16 464	2113 756	13 322	:c	136
	85 462	5 525	0	72	30	4 774		-		334	70 592	1 504	-	
	41 930	4 876		0		2 178					30 555			
IT	1518 973	2 180	208	1 227	408	14 565	63	48	1 154	4 652	12 664	1460 039	:c	164
	61 751	2 607	7	350	121	8 094		-		32	4 828	38 088	-	
	5					4								
CY	43 634	0	0	0	0	0	0	0	12	0	:c	2	43 611	0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LV	51 444	33	:c	58	:c	432	676	0	0	43	43	62	0	48 174
	4 398					0	484	-					-	2 404
	1													
LT	49 563	130	:c	155	66	1 025	337	:c	:c	110	232	239	0	805
	13 944	0		4		12	63	-			2	0	-	423
	4					4								
LU	35 895	4 204	0	38	43	4 250	0	:c	0	121	2 648	124	0	0
	5 928	1 800		4		1 705		-		3	205	56	-	
	1 023	240				389					73			
HU	252 287	236	89	1 003	51	2 520	:c	15	31	253	453	1 137	0	27
	20 428	26	48	1 002	0	1 264		-	180	15	12	246	-	5
	1 005	16	22			109								
MT	:	0	0	0	0	0	0	0	0	0	0	0	0	0
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	560 776	22 601	:c	688	794	42 629	67	148	185	2 397	6 814	1 651	:c	177
	11 070	1 256		69	2	2 176		-		8	199	715	-	30
	161 367	29 372		20		34 064					7 026			
AT	352 943	722	46	3 096	108	20 203	:c	:c	:c	436	1 010	5 115	:c	51
	59 547	684	:c	4 305	3	10 037		-	12	15	196	1 841	-	
	4 751	5	45			717								
PL	852 639	1 231	160	2 643	688	12 712	105	:c	96	772	1 636	1 674	0	234
	237 860	176	7	3 294		2 685	1	-	3	7	102	237	-	20
	4 699	11				224								
PT	307 438	440	0	50	:c	1 008	0	:c	:c	12 193	1 310	752	0	0
	9 247					3		-		455	0		-	
	18					3								
RO	327 746	328	464	533	:c	2 376	0	:c	403	128	897	2 393	:c	:c
	57 726	13	402	320	0	164	0	-	11	0	20	175	-	2
	24 439	0	235			15					0			
SI	78 053	121	0	257	:c	985	0	0	0	145	420	1 851	0	0
	8 221	17	25	388	0	426		-	3	0	22	131	-	
	2	0												
SK	172 453	217	:c	3 975	:c	1 983	:c	:c	:c	201	236	484	0	:c
	14 875	14	16	3 909		328		-	0	32	18	13	-	1
	341	5	19			21								
FI	392 377	:c	0	:c	120	127	330	0	:c	45	21	:c	0	31
	26 206			0	5	54		-			4	42	-	1
	1					0								
SE	351 633	219	:c	210	2 380	1 748	98	:c	68	218	316	217	:c	55
	43 104	258		62	56	1 100		-		3	210	100	-	
	92	10				80								
UK	1907 702	3 309	:c	509	228	3 834	:c	6 114	226	3 270	7 752	2 507	6	:c
	109 336	254				131		-		77	226	185	-	1
	1 089	4				1 085								

Road: - freight reported by country of registration of vehicle; IT: 2005; CY: excl. Cross-trade; UK: data subject to revision

Rail: - freight reported by country of unloading except: BG, AT & UK (loading) and country-pairs: DK to PL, LV to (DK, DE & NL), FI to (CZ, DK, FR, IT & PL); BE (national): 2006 (provisional data, based on detailed reporting only - see box, p. 59)

IWW: - freight reported by country of loading

Source: Eurostat (Transport), Member States

Intra-EU goods transport by country pair and by inland mode, 2006 (1000 tonnes) *(continued)*

UNLOAD ↓ / LOAD →	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK
EU-27	48 468	32 828	252 570	:	568 195	347 067	852 304	305 763	328 258	77 889	173 503	393 142	351 640	1906 192
	16 435	4 477	21 317	-	24 273	48 695	250 635	9 272	55 836	8 664	24 248	26 231	44 267	109 134
		231	2 302		210 519	2 453	6 285		24 710		1 685			
BE	138	1 896	161	0	24 952	559	932	222	415	79	188	26	224	1 948
		1 171	42	-	791	477	122		6	1	19		250	88
		8	27		38 138	95	18				3			
BG	0	0	96	0	:c	:c	:c	:c	444	:c	:c	:c	0	0
		2	175	-		47	24		882	20	37		0	1
			32			43			464		52			
CZ	135	46	860	0	983	1 429	2 740	:c	331	266	3 776	49	224	270
	15	12	227	-	371	326	6 995		30	37	9 853	1	23	0
					20		0		5					
DK	116	73	39	0	1 239	165	865	:c	:c	46	92	172	3 040	94
		40	7	-	14	42	18				14	4	306	
					1									
DE	681	2 972	2 385	0	39 759	13 573	11 761	837	2 733	971	1 865	121	1 691	2 945
	51	422	1 068	-	14 746	6 255	8 238	0	27	71	1 102	0	2 405	33
		105	567		76 500	499	1 788		31		329			
EE	182	:c	:c	0	52	:c	163	0	0	:c	:c	352	107	:c
	803		12	-		0	21		2		8	1		
IE	:c	:c	22	0	248	:c	46	0	0	:c	:c	0	:c	14 960
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EL	:c	0	44	0	328	70	72	:c	336	0	:c	:c	59	98
	0	0	394	-	4	191	8		43	34	54	0		
ES	82	88	268	0	2 264	322	517	10 884	114	115	144	37	134	1 577
	0	0	9	-	0	18	0	483	0	0	4	0	0	62
			121											
FR	164	2 996	435	0	10 729	1 068	1 627	1 563	1 517	338	391	41	289	5 653
		342	15	-	885	311	465		3	45	84		121	360
		1	1		4 317	1	1							
IT	260	124	2 056	0	2 225	7 343	1 270	668	2 781	2 568	876	:c	172	1 258
		191	890	-	336	4 509	409		163	469	308	10	208	131
		1												
CY	0	0	0	0	1	0	:c	:c	0	0	0	0	0	8
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LV	988	0	37	0	67	:c	631	0	0	0	:c	124	49	27
	1 471		5	-		6	15		3	5	5			
					1									
LT	44 669	:c	63	0	153	41	1 292	0	:c	0	:c	67	99	80
	13 346	0	16	-		0	73		0	0	4	1		
LU	0	23 736	7	0	535	49	39	:c	0	:c	:c	:c	:c	101
		2 108		-	0	30	10				0		7	
					321									
HU	23	12	239 496	0	343	1 616	1 098	38	912	378	2 227	40	63	226
	10	4	12 077	-	145	2 074	493		1 108	513	1 205		1	
			80		201	396			174		7			
MT	0	0	0	:	0	0	0	0	0	0	0	0	0	:c
	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NL	128	579	235	0	475 455	751	1 444	285	441	76	175	62	912	2 082
		60	67	-	5 880	533	35		1		26		11	2
		115	422		90 182	70	18		4		72			
AT	:c	61	1 757	0	1 025	316 110	724	:c	409	929	722	:c	227	192
	30	34	2 642	-	604	30 505	3 425		142	3 529	1 337	1	205	:c
			490		810	1 137			452		1 095			
PL	711	93	915	0	1 813	649	823 034	71	228	217	1 196	141	1 087	533
	684	27	287	-	216	344	227 673		140	47	1 878	1	31	
					4		4 460							
PT	:c	:c	37	0	329	99	66	290 970	:c	:c	:c	:c	:c	184
				-				8 789						
			16											
RO	:c	0	1 190	0	582	468	334	:c	317 334	38	176	0	11	91
	9	10	1 992	-	7	429	509	0	53 222	26	415	0	0	0
			544			59			23 552		33			
SI	:c	:c	705	0	159	1 453	168	:c	:c	71 659	101	0	:c	29
		1	898	-	2	2 272	70		4	3 620	334		8	
									2					
SK	:c	:c	1 336	0	164	804	1 428	:c	55	47	161 395	:c	40	88
	16	3	481	-	204	199	1 851		59	241	7 489		1	
			2		22	153			25		94			
FI	:c	0	25	0	129	0	93	0	:c	0	:c	389 709	1 747	:c
		2	0	-	18	0	0		0	0		25 959	115	6
					1									
SE	88	:c	109	0	1 013	188	941	:c	:c	:c	45	2 201	341 439	80
		48	13	-	50	127	181		0	6	72	243	40 575	
					2									
UK	103	152	292	:c	3 648	310	1 019	225	208	162	134	:c	26	1873 668
				-		:c			1	0		10		108 451

Road: - freight reported by country of registration of vehicle; IT: 2005; CY: excl. Cross-trade; UK: data subject to revision

Rail: - freight reported by country of unloading except: BG, AT & UK (loading) and country-pairs: DK to PL, LV to (DK, DE & NL), FI to (CZ, DK, FR, IT & PL); BE (national): 2006 (provisional data, based on detailed reporting only - see box, p. 59)

IWW: - freight reported by country of loading

Source: Eurostat (Transport), Member States

4.1.2 Road goods transport

Table 4.16: Road goods transport, national and international, 2007 (million t)

	National	International	Total
EU-27*	16 265	994	17 259
BE	279	73	352
BG	128	7	135
CZ	408	46	454
DK	184	14	198
DE	2 848	181	3 028
EE	35	5	40
IE	298	12	310
EL	480	5	485
ES	2 345	64	2 409
FR	2 191	67	2 258
IT**	1 460	40	1 500
CY	40	0	40
LV	54	8	62
LT	49	13	62
LU	27	31	58
HU	218	25	243
MT	:	:	:
NL	499	137	636
AT	314	40	354
PL	895	89	984
PT	290	34	324
RO	339	18	357
SI	72	17	89
SK	152	27	179
FI	414	7	421
SE	353	7	360
UK***	1 893	26	1 919
LI	:	1	:
NO	264	7	271

* estimate (IT: 2006; excluding MT) ** IT: 2006, rounded estimate
*** UK: data subject to revision, International: 2004

Source: Eurostat (Transport)

Table 4.17: Road goods transport, national and international, 2007 (billion tkm)

	National	International	Total
EU-27*	1 299.8	625.5	1 926.3
BE	19.7	22.4	42.1
BG	5.9	8.7	14.6
CZ	15.8	32.3	48.1
DK	11.8	9.2	21.0
DE	261.4	82.0	343.4
EE	1.9	4.5	6.4
IE	14.4	4.6	19.0
EL	21.7	6.1	27.8
ES	190.6	68.3	258.9
FR	191.4	27.8	219.2
IT**	160.0	30.0	191.0
CY	1.2	0.0	1.2
LV	3.0	10.2	13.2
LT	2.7	17.6	20.3
LU	0.5	9.0	9.6
HU	13.2	22.6	35.8
MT	:	:	:
NL	30.7	47.2	77.9
AT	14.7	22.7	37.4
PL	65.8	85.1	150.9
PT	18.3	27.9	46.2
RO	23.9	35.6	59.5
SI	2.6	11.2	13.7
SK	5.6	21.5	27.2
FI	26.0	3.9	29.8
SE	36.4	4.1	40.5
UK***	160.4	11.1	171.5
LI****	:	0.3	:
NO	15.7	4.0	19.6

* estimate (IT 2006, excluding MT) ** IT: 2006, rounded estimate *** UK: data subject to revision **** LI: national data not available

Source: Eurostat (Transport)

The Road goods transport of the Member States, Liechtenstein and Norway is presented in tonnes (Table 4.16), in tonne-kilometres (Table 4.17), and traffic in vehicle-kilometres (Table 4.18). Magnitude and proportions of national and international Road transport performance are influenced by a country's size, topology, neighbourhood and location in Europe, as well as on its commercial specialisation and degree of openness to trade. Measuring Road goods transport can be complex as, for example, lorries' international round-journeys may involve travelling through several countries, with a number of points of loading and unloading. International Road goods transport's three components – Regular international transport, Cross-trade and Cabotage – are detailed below.

The EU-27's main players in terms of total tonnes carried by Road transport were the largest economies Germany, Spain, France, the United Kingdom and Italy, particularly due to large amounts of goods carried nationally. Interestingly, the Netherlands transported the second largest total quantity of goods internationally, as it is a Member State specialised in foreign trade.

While, in the EU-27, international transport accounted for an estimated 5.8 % of the weight transported by Road in 2007, greater shares of goods transport were international in the central and eastern European NMS-12, in Austria, Portugal, Denmark and Germany, but especially in the Benelux countries.

In contrast, International Road goods transport, made up around one third (32.6 %) of EU-27 tonne-kilometre performance. International performance was greater than national performance in all of the central and eastern European NMS-12, in the Benelux countries, in Austria and in Portugal.

Dividing tonne-kilometre performance by tonnes carried shows that goods were carried furthest nationally in Italy (109 km), Sweden (103 km) and Germany (92 km) on average. Goods transported internationally travelled more than 1 000 km on average when transported by hauliers from Romania, Lithuania, Greece, Latvia and Spain, all of which are Member States with a peripheral geographical location in the EU-27.

Table 4.18: Road goods traffic, national and international*, 2007 (million vkm)

	National	International	Total
EU-27**	101 918	39 113	141 035
BE	1 908	1 265	3 173
BG	568	587	1 155
CZ	1 911	2 209	4 120
DK	1 265	608	1 874
DE	20 088	5 141	25 229
EE	142	273	415
IE	1 388	273	1 661
EL	1 542	312	1 854
ES	12 148	3 884	16 031
FR	14 952	1 559	16 511
IT***	9 720	2 020	11 740
CY	94	1	96
LV	499	607	1 107
LT	270	1 057	1 328
LU	48	542	589
HU	1 129	1 377	2 507
MT	:	:	:
NL	3 293	3 205	6 498
AT	1 122	1 264	2 386
PL	5 941	5 530	11 471
PT	1 448	1 649	3 097
RO	1 590	1 938	3 529
SI	254	708	963
SK	854	1 518	2 372
FI	1 592	203	1 794
SE	1 949	262	2 211
UK****	16 203	1 121	17 324
LI	:	:	:
NO	1 203	197	1 401

* data refer to laden vehicles only ie. empty-driving vehicles not included
** estimate (IT: 2006; excluding MT) *** IT: 2006, rounded estimate
**** UK: data subject to revision

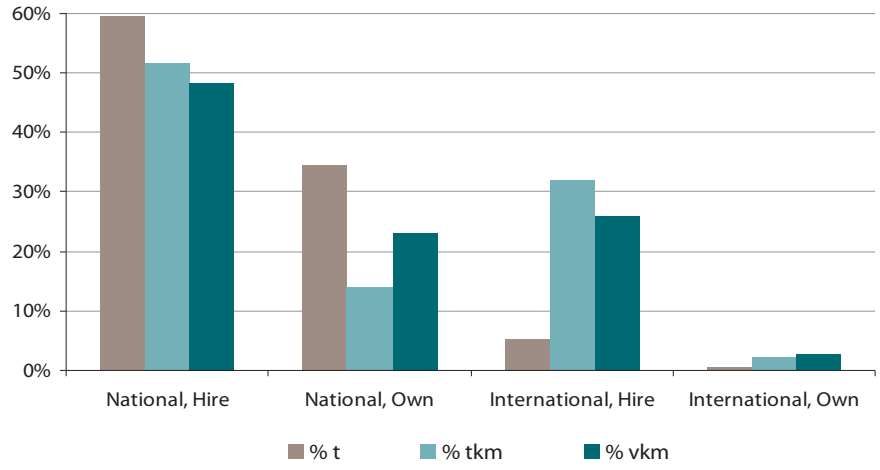
Source: Eurostat (Transport)

Vehicle-kilometre is the unit of measurement representing the movement of a vehicle over one kilometre. It is important when considering the cost factors of transport (see Chapter 7) as it further enables calculations such as that of average vehicle load. As can be seen from Figure 4.20, for example, tonne-kilometres and vehicle-kilometres performed are closely related.

The EU-27's largest economies, Germany, the United Kingdom, France, Spain, and Italy, were its main players in terms of the total distance covered by vehicles undertaking Road goods transport, due especially to large distances covered nationally. The greatest distance was performed internationally by vehicles from Poland. While international transport accounted for 27.7 % of the total vehicle-kilometres performed by Road goods transport in the EU-27, this ratio stood above or slightly under 50 % in all of the central and eastern European NMS-12 as well as in Luxembourg, Portugal and Austria.

Figure 4.19 depicts national and international Road goods transport (t, tkm and vkm) by ownership of carriage. Transport for hire or reward is defined as the carriage for remuneration of persons or goods on behalf of third parties, while Transport on own account is transport that is not for hire or reward. Hire and reward made up a greater share of tonne-kilometre performance in international Road goods transport. Possible explanations for this are that companies engaged in hire or reward traffic have a greater incentive to engage in international movements and they are better organised in ensuring that their vehicles are not travelling empty once they are operating internationally. This especially applies in cross-trade.

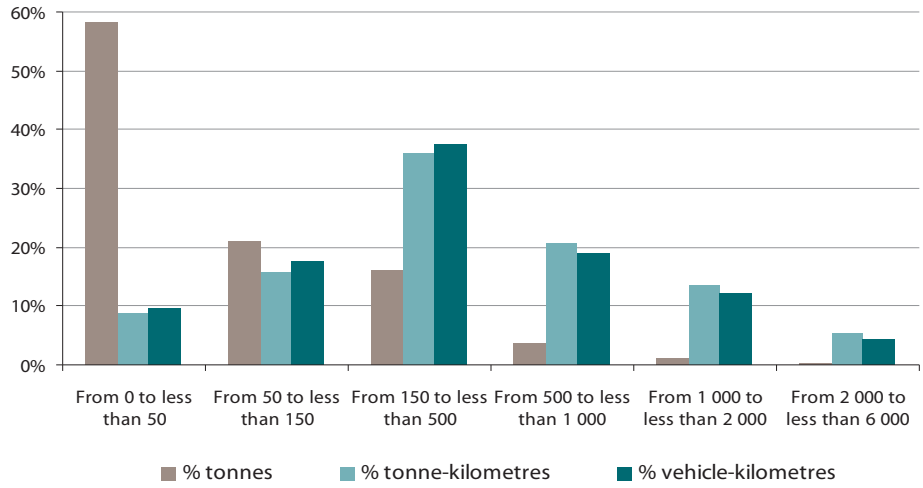
Figure 4.19: Road goods transport: distribution by ownership of carriage, national and international, EU-27*, 2007 (% t, % tkm and % vkm)



* excluding IT & MT

Source: Eurostat (Transport)

Figure 4.20: Road goods transport, distribution by kilometre distance class, EU-27*, 2006 (% t, % tkm, % vkm)



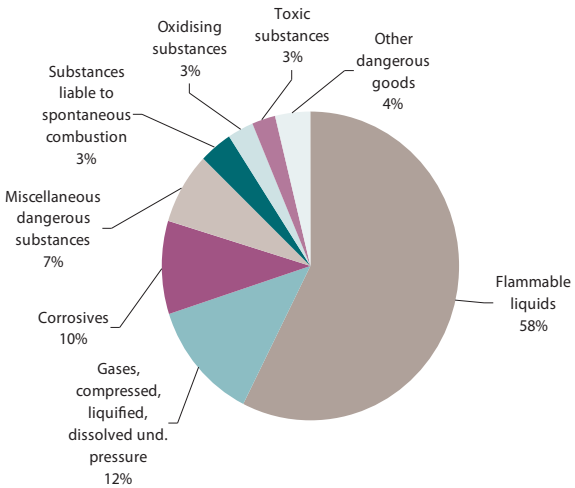
* IT:2005; excluding MT

Source: Eurostat (Transport)

Figure 4.20 depicts the distribution by kilometre distance-class of EU-27 Road goods transport, in terms of tonnes and tonne-kilometres, and traffic in terms of vehicle-kilometres. The shares of total tonnes of goods transported are greater, the smaller the distance-class, as fewer tonnes are carried by Road, the longer journeys are.

The distributions by distance-class of the tonne-kilometre and vehicle-kilometre performance of Road goods transport and traffic respectively resemble one-another, and they appear to be normal distributions. Most tonne-kilometres (36 %) and vehicle-kilometres (38 %) were performed in the '150 to 500 km' distance-class.

Figure 4.21: Dangerous goods transported by road, EU-27*, 2007 (% tkm)



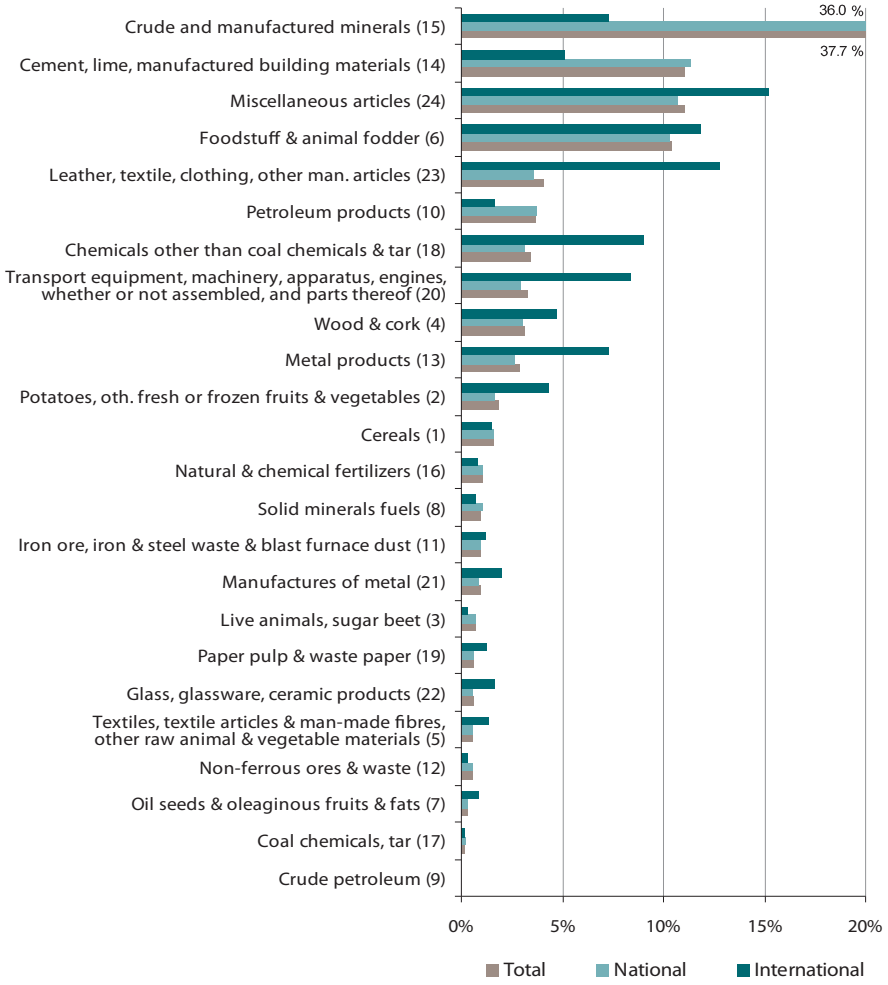
Estimation based on 98.4% of Road transport of dangerous goods in the Member States with data available

* excluding IT & MT

Source: Eurostat (Transport)

Transported goods are classified as being dangerous according to the main categories of Directive 94/55/EC. Dangerous goods accounted for an estimated 4.1 % of total tonne-kilometre performance of Road goods transport in 2007 in the EU-27 (excluding Italy and Malta). Fuel made up the two largest categories of dangerous goods transported by road: Flammable liquids (58 %) and Gases (12 %) (Figure 4.21).

Figure 4.22: Road goods transport, national and international*, distribution by NST/R Group of goods, EU-27**, 2006 (% t)



* excluding Cabotage ** IT: 2005; CY: excluding Cross-trade; excluding MT

Source: Eurostat (Transport)

Figure 4.22 details Road goods transport loaded in tonnes by NST/R Group of goods. Accounting for 94.3 % of total, National transport displayed similar product proportions to total.

Over two thirds of the weight of goods transported by Road in the EU-27 in 2006 were accounted for by four NST/R Groups of goods: *Crude and manufactured minerals* (36 %), *Cement, lime, manufactured building materials* (11 %), *Miscellaneous articles* (11 %) and *Foodstuff and animal fodder* (10 %). The first two Groups of goods had smaller shares in the total weight of goods loaded internationally, international trade in those bulky goods being less viable by Road.

Ten Groups of goods especially including manufactured goods, but also agricultural and food products, displayed shares in the total weight of goods transported internationally of at least twice the size of their shares in the total weight of goods transported nationally. This points at the greater distances over which those goods were transported.

Road goods transport - National

Table 4.23: National road goods transport, 2000 to 2007 (million t)

	2000	2005	2006	2007	AAGR '00 to '07
EU-27*	:	:	15 920.2	16 261.7	:
BE	315.8	265.1	274.1	279.2	-1.7%
BG	:	:	142.8	128.1	:
CZ	361.3	423.6	398.1	407.8	1.7%
DK	206.9	189.9	177.7	183.6	-1.7%
DE	2 898.8	2 613.1	2 758.9	2 847.8	-0.3%
EE	:	25.9	29.6	35.0	:
IE	175.4	285.1	294.3	298.0	7.9%
EL	:	429.6	501.4	480.0	:
ES	907.7	2 147.9	2 326.3	2 344.6	14.5%
FR	1 843.6	1 997.2	2 113.7	2 191.0	2.5%
IT**	1 176.4	1 460.0	1 456.5	:	:
CY	:	53.7	43.6	39.9	:
LV	:	47.4	48.1	53.8	:
LT	:	45.8	44.7	49.4	:
LU	19.4	22.9	23.7	26.7	4.6%
HU	:	216.3	233.4	218.2	:
MT	:	:	:	:	:
NL	464.7	471.6	475.5	499.2	1.0%
AT	241.2	248.5	316.1	314.2	3.8%
PL	:	810.8	823.0	895.4	:
PT	276.1	305.9	290.9	290.0	0.7%
RO	:	:	316.9	338.6	:
SI	:	70.4	71.7	71.6	:
SK	:	174.9	161.4	152.1	:
FI	415.6	392.4	389.7	414.3	0.0%
SE	322.7	348.9	334.3	353.4	1.3%
UK***	1 628.1	1 805.1	1 873.7	1 893.4	2.2%
NO	225.2	240.7	245.2	264.0	2.3%

* IT 2006; excluding MT ** IT: 2006 estimated *** UK: data subject to revision

Source: Eurostat (Transport), Member States

Table 4.24: National road goods transport, 2000 to 2007 (million tkm)

	2000	2005	2006	2007	AAGR '00 to '07
EU-27*	:	:	1 250 244	1 295 561	
BE	19 754	19 283	19 615	19 650	-0.1%
BG	:	:	5 806	5 890	:
CZ	14 214	15 518	16 082	15 831	1.6%
DK	11 000	11 058	11 495	11 800	1.0%
DE	226 529	237 617	251 379	261 440	2.1%
EE	:	1 847	1 979	1 942	:
IE	8 337	13 983	13 832	14 428	8.2%
EL	:	19 610	26 137	21 729	:
ES	106 936	166 386	174 588	190 611	8.6%
FR	163 163	177 331	182 753	191 388	2.3%
IT**	158 250	171 587	155 808	:	:
CY	:	1 374	1 145	1 184	:
LV	:	2 734	2 718	3 006	:
LT	:	2 137	2 232	2 704	:
LU	415	494	544	548	4.1%
HU	:	11 394	12 425	13 186	:
MT	:	:	:	:	:
NL	31 538	31 827	31 009	30 686	-0.4%
AT	12 389	12 514	14 437	14 744	2.5%
PL	:	60 940	59 420	65 769	:
PT	14 220	17 445	17 540	18 319	3.7%
RO	:		22 723	23 932	:
SI	:	2 361	2 279	2 573	:
SK	:	5 621	5 203	5 617	:
FI	27 717	27 815	25 465	25 956	-0.9%
SE	31 451	34 701	35 474	36 395	2.1%
UK***	150 337	154 396	158 156	160 425	0.9%
NO	12 483	15 348	15 316	15 675	3.3%

* IT 2006; excluding MT ** IT: 2006 provisional datum *** UK: data subject to revision

Note: Calculations of average annual growth rates for ES and PT are biased due to important methodological changes implemented over the period.

Source: Eurostat (Transport)

National road transport is defined as road transport between two places (a place of loading and a place of unloading) located in the same country, by a vehicle registered in that country.

In 2007, the five main contributors to EU-27 total were the major economies Germany, France, Spain, the United Kingdom and Italy (2006). In terms of tonnes, they together made up two thirds (66 %) of the weight of goods loaded nationally in the EU-27 (Table 4.23). In terms of tonne-kilometres, the five Member States however accounted for three quarters (74 %) of EU-27 national Road goods transport performance in 2007 (Table 4.24). The discrepancy can be assigned to the fact that goods travel greater distances within these large countries than on average in the EU-27.

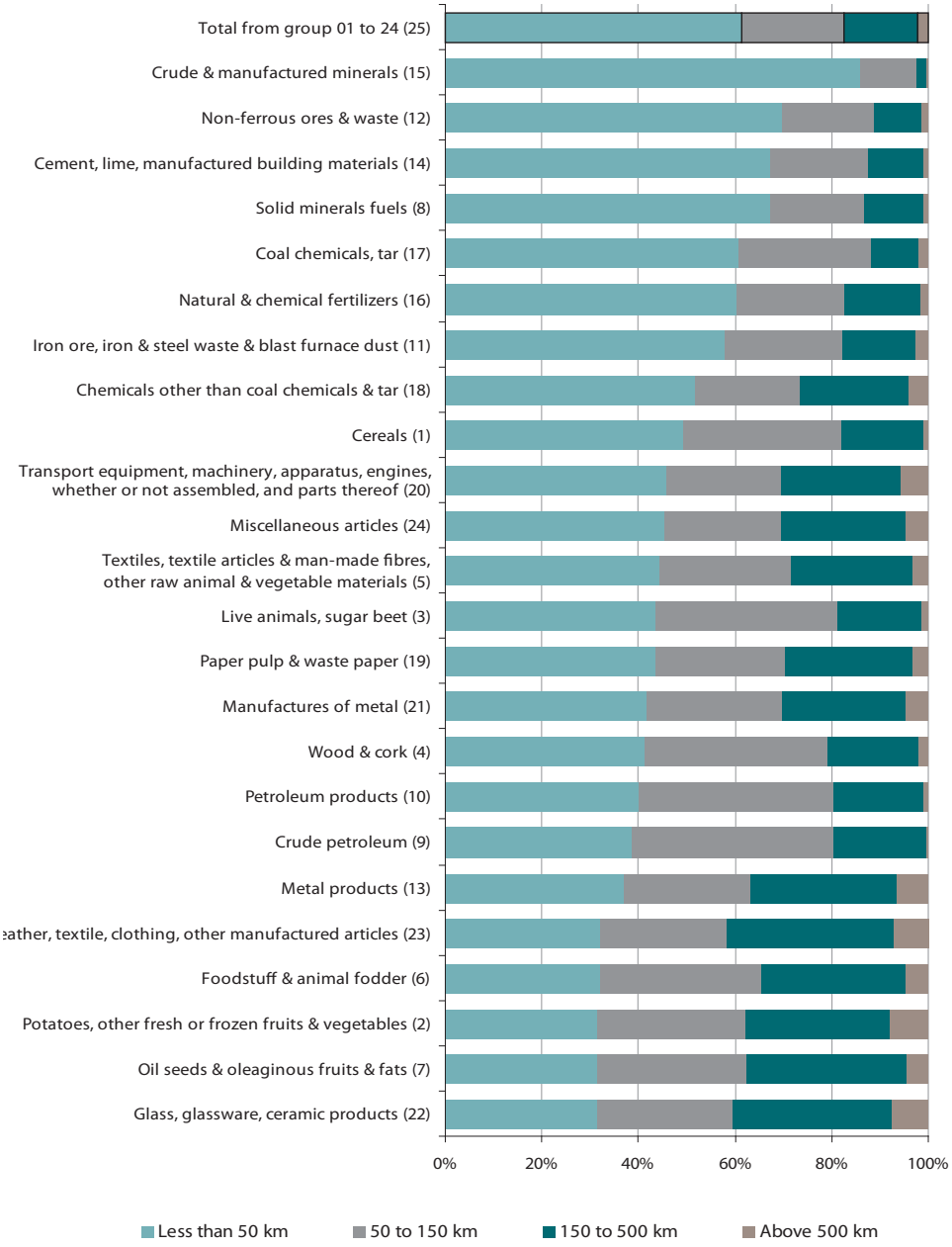
From 2000 to 2007, in the 13 EU-15 Member States for which data are available[6], the weight in tonnes of goods transported by Road grew at an average yearly rate of 3.0 %. The Member States contributing most to growth were Spain, France and the United Kingdom, while volumes loaded were reduced in Germany, Belgium and Denmark.

Transport performance in tonne-kilometres, in comparison, grew at 2.8 % over the period in these 13 Member States. The increase in Road goods transport performance was especially accounted for by Spain (48 %) but also by Germany (20 %), France (16 %) and the United Kingdom (6 %).

Over the shorter 2005-to-2007 period, national Road goods transport in tonnes grew at an average yearly rate of 1.4 % in nine of the ten new Member States of the 2004 enlargement. Growth was notably driven by increases in Poland, but also in the three Baltic states. In contrast, tonne-kilometre Road goods transport performance in the nine new Member States grew at 3.7 % yearly on average. The main contributors to that increase were Poland (61 %) and Hungary (23 %).

[6] EU-15 excluding EL and IT

Figure 4.25: National road goods transport: km distance-class distribution, by NST/R Group of goods, EU-27*, 2006 (% t)



* IT 2005; excluding MT

Source: Eurostat (Transport)

Figure 4.25 details the distribution by kilometre distance-class of the weight in tonnes of NST/R Groups of goods transported nationally by Road in the EU-27 in 2006. In eight Groups of goods including ores, minerals, fuels, building materials and fertilizers, more than half of the weight in tonnes of goods were transported less than 50 km. Less bulky manufactured goods as well as food and animal feed were carried over sometimes much greater distances.

Road goods transport - International

Table 4.26: International road transport of goods by hauliers registered in the country, 2007 (million tkm)

	Regular international transport*	Cross-trade	Cabotage	Total
EU-27**	512 510	98 571	16 059	627 141
BE	18 090	2 815	1 529	22 434
BG	6 834	1 822	78	8 734
CZ	23 849	8 214	248	32 311
DK	8 468	399	293	9 160
DE	70 717	8 743	2 546	82 006
EE	3 558	754	163	4 475
IE	3 731	443	418	4 592
EL	5 895	103	65	6 063
ES	65 547	1 892	825	68 264
FR	26 478	776	569	27 823
IT***	29 955	696	1 022	31 673
CY	17	:	:	17
LV	6 644	3 514	39	10 197
LT	9 465	8 040	69	17 574
LU	2 638	4 128	2 248	9 014
HU	15 897	6 597	126	22 620
MT	:	:	:	:
NL	37 830	7 407	1 999	47 236
AT	17 172	4 800	686	22 658
PL	62 424	21 588	1 098	85 110
PT	23 368	3 589	927	27 884
RO	35 479	:	61	35 540
SI	7 608	3 303	250	11 161
SK	13 085	8 241	216	21 542
FI	3 624	84	147	3 855
SE	3 563	429	152	4 144
UK****	10 574	194	285	11 053
LI	80	235	23	338
NO	3 877	36	42	3 956

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

** EU aggregate excludes CY and RO for Cross-trade and CY for Cabotage; MT data not available; IT: 2006 provisional data

*** 2006 provisional data

**** UK: data subject to revision

Source: Eurostat (Transport), Member States

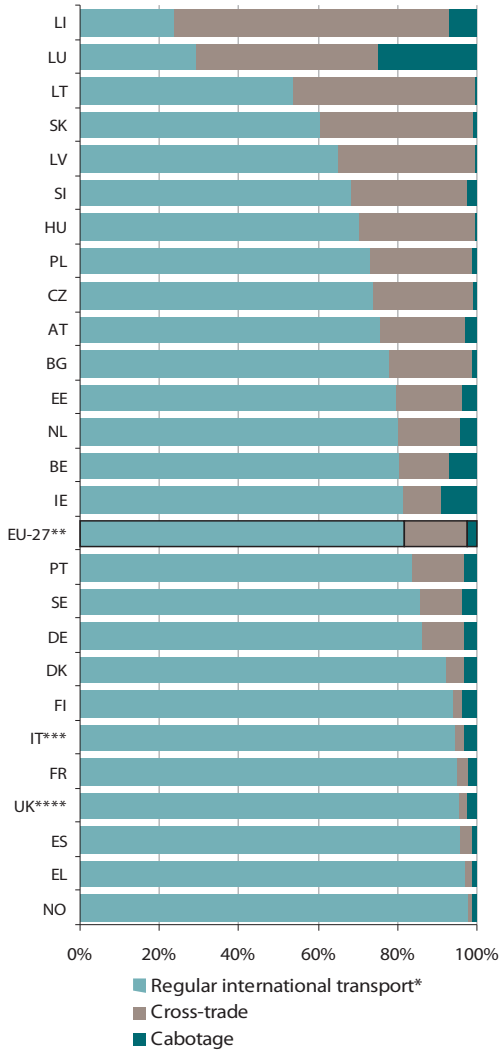
The international transport of goods by Road is defined as Road transport between two places (a place of loading and a place of unloading) in two different countries of which one is the reporting country. This includes cross-trade and cabotage by road. It may involve transit through one or more additional country or countries. The international Road goods transport performance figures presented in Table 4.17 are detailed in Table 4.26 by the components Regular international transport, Cross-trade and Cabotage. Regular international goods transport by Road (loaded and unloaded) was by far the main activity as it represented an estimated 82 % of the EU-27's total international Road goods transport performance in tonne-kilometres in 2007. This share however tended to be lower in the smaller central and eastern European new Member States as well as in the Benelux (Figure 4.27).

Five Member States accounted for over half of total international Road goods transport performance in the EU-27. With its growing role as a central European trader, and boosted by strong cross-trade, Poland has become the largest player, accounting for 13.5 % of EU-27 international Road goods transport performance in 2007. Poland was followed by Germany (13.1 %), Spain (10.9 %), the Netherlands (7.5 %) and Romania (5.7 %, excluding cross-trade). Developments in Regular international Road goods transport are further detailed in Table 4.28.

Cross-trade is defined as international Road transport between two different countries performed by a road motor vehicle registered in a third country. This type of transport is performed by hauliers delivering goods in one country then taking another consignment, thus avoiding to 'run empty'. Since 1993, cross-trade has been possible for journeys between any two Member States for holders of a 'Community licence'. Cross-trade accounted for 16 % of total EU-27 international Road goods transport performance in 2007 and it is further detailed in Table 4.29.

Cabotage is defined as Road goods transport between two places (a place of loading and a place of unloading) in the same country, by a vehicle not registered in that country. It may involve transit through one or more additional country or countries. Cabotage began to be liberalised in 1998 and, by 2009 at the latest, it will be opened up to the Member States of the 2004 enlargement. In 2007, Cabotage made up an estimated 3 % of EU-27 international Road goods transport performance. It is further detailed in Table 4.30.

Figure 4.27: International road goods transport: distribution by freight journey, 2006 (% tkm)



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

** IT: 2006; excluding CY, MT & RO

*** IT: 2006, provisional data

**** UK: data subject to revision

Source: Eurostat (Transport)

The make-up of the EU-27 Member States, Liechtenstein and Norway's international Road goods transport performance is depicted in terms of its three components (Figure 4.27).

Regular international Road transport was clearly the largest activity in the overwhelming majority of countries. Together with Norway, the Member States displaying above EU-average shares of regular international transport performance appear to have been older as well as often larger Member States.

The Member States displaying below-average shares of regular international transport performance (ie. those engaging more in cross-trade and/or cabotage) included all the NMS-12 for which data are available, the Benelux countries as well as Austria, Ireland and Liechtenstein.

Hauliers from smaller countries, which tend to be more open to international trade, may have more incentive to perform cross-trade and cabotage due to the limited sizes of their national markets, and due to the fact that other markets are geographically closer.

Added to this, hauliers from the central and east European Member States face lower average personnel costs in Road goods transport (see Chapter 5), which provides them with a cost advantage when offering their goods transport services in other Member States. From May 2009 onwards, hauliers from all Member States that joined the EU in 2004 will have the same rights to perform cabotage operations as the hauliers from other Member States.

Table 4.28: International road goods transport: loaded and unloaded, 2000 to 2007 (million tkm)

	2000	2005	2006	2007	AAGR '00 to '07
EU-27*	:	:	499 238	512 510	:
BE	25 320	19 555	18 974	18 090	-4.7%
BG	:	:	6 368	6 834	:
CZ	20 528	21 810	25 475	23 849	2.2%
DK	12 166	11 643	9 151	8 468	-5.0%
DE	48 684	62 545	67 671	70 717	5.5%
EE	:	3 122	2 869	3 558	:
IE	2 650	3 017	2 624	3 731	5.0%
EL	:	4 050	7 680	5 895	:
ES	40 472	63 662	64 465	65 547	7.1%
FR	37 863	26 745	27 440	26 478	-5.0%
IT**	25 742	37 871	29 955	:	:
CY	:	19	20	17	:
LV	:	3 839	5 459	6 644	:
LT	:	7 700	8 917	9 465	:
LU	1 529	2 412	2 522	2 638	8.1%
HU	:	11 237	14 019	15 897	:
MT	:	:	:	:	:
NL	37 876	40 788	41 001	37 830	0.0%
AT	16 712	17 802	18 254	17 172	0.4%
PL	:	39 588	50 198	62 424	:
PT	11 792	20 701	22 945	23 368	10.3%
RO	:	:	34 406	35 479	:
SI	:	6 400	7 189	7 608	:
SK	:	11 043	10 230	13 085	:
FI	3 977	3 909	4 052	3 624	-1.3%
SE	3 732	3 193	3 776	3 563	-0.7%
UK***	14 951	12 608	13 578	10 574	-4.8%
LI	:	86	80	80	:
NO****	2 944	2 850	4 022	3 877	4.0%

* estimate (IT 2006, excluding MT) ** IT: 2006, provisional datum *** UK: data subject to revision **** NO: from 2006, new estimation method

Source: Eurostat (Transport)

Table 4.29: International road goods transport: Cross-trade by hauliers registered in the country, 2000 to 2007 (million tkm)

	2000	2005	2006	2007	AAGR '00 to '07
EU-27*	:	:	92 060	98 576	:
BE	4 606	3 413	2 877	2 815	-6.8%
BG	:	:	1 387	1 822	:
CZ	2 568	6 087	8 733	8 214	18.1%
DK	606	468	370	400	-5.8%
DE	4 086	7 685	8 693	8 743	11.5%
EE	:	717	598	754	:
IE	563	448	564	443	-3.4%
EL	:	96	96	102	:
ES	1 064	2 123	1 882	1 892	8.6%
FR	2 157	788	729	777	-13.6%
IT**	411	1 248	696	:	:
CY	:	:	:	:	:
LV	:	1 785	5 247	3 514	:
LT	:	6 021	6 920	8 041	:
LU	4 436	3 757	3 608	4 129	-1.0%
HU	:	2 420	3 954	6 597	:
MT	:	:	:	:	:
NL	8 455	8 815	9 012	7 407	-1.9%
AT	5 676	6 155	5 780	4 800	-2.4%
PL	:	10 645	17 425	21 589	:
PT	785	3 715	3 636	3 589	24.3%
RO	:	:	:	:	:
SI	:	2 123	2 380	3 303	:
SK	:	5 814	6 654	8 241	:
FI	231	80	110	84	-13.5%
SE	318	495	503	430	4.4%
UK***	223	297	206	194	-2.0%
LI	:	282	241	235	:
NO	60	28	33	36	-7.0%

* estimate (IT 2006; excluding: CY, MT & RO) ** IT: 2006, provisional datum
*** UK: data subject to revision

Source: Eurostat (Transport)

From 2000 to 2007, in 13 of the EU-15 Member States for which data are available[7], regular international Road goods transport grew at an average yearly rate of 1.8 % (Table 4.27). Among those countries, Regular international transport grew most in Portugal (10.3 %), Luxembourg (8.1 %), Spain (7.1 %) and Germany (5.5 %).

Over the shorter 2005-to-2007 period, reflecting their rapidly growing especially intra-EU trade, regular international Road goods transport rose by 16.7 % on average in the 9 NMS-12 of the 2004 enlargement (excluding Malta). This compares to 0.9 % yearly average growth over the same period in the 14 EU-15 Member States for which data are available.

From 2005 to 2007, performance in regular international Road goods transport grew at impressive yearly average rates of 32 % in Latvia and of 26 % in Poland. The latter Member State contributed to 60 % of the increase in the 9 NMS-12. Over this shorter period, Germany, accounting for 13.8 % of EU-27 regular international Road goods transport in 2007, replaced Spain (12.8 %) in first position. Poland (12.2 %) rapidly became a dominant force in the market and replaced the Netherlands (7.4 %) in third position.

From 2000 to 2007, in the 14 EU-15 Member States for which data are available, cross-trade grew by 1.0 % yearly on average (Table 4.29). This however does not provide a full picture as, with the European Union's recent enlargements, cross-trade has grown at very fast rates in the new Member States.

From 2005 to 2007, in the 14 EU-15 Member States for which data are available[8], cross-trade Road transport activity in fact decreased at a yearly average rate of 3.4 % while, in contrast, cross-trade performance in the 8 central and eastern European new Member States of the 2004 enlargement grew at an impressive yearly average rate of 30.1 %. In 2007, accounting for 21.9 % of EU-27 total, Poland performed most Road goods cross-trade, ahead of Germany (8.9 %) (Figure 4.31). Hauliers' from Poland, Hungary and Slovakia having quickly established themselves as leaders in this area is a sign of the European road freight market's open and competitive nature.

[7] EU-15 excluding EL and IT

[8] EU-15 excluding IT

Table 4.30: International road goods transport: Cabotage by hauliers registered in the country, 2000 to 2007 (million tkm)

	2000	2005	2006	2007	AAGR '00 to '07
EU-27*	:	:	15 459	16 059	:
BE	1 366	1 597	1 552	1 529	1.6%
BG	:	:	204	78	:
CZ	:	33	86	248	:
DK	248	129	239	293	2.4%
DE	1 408	2 257	2 273	2 546	8.8%
EE	:	138	102	163	:
IE	725	462	434	418	-7.6%
EL	:	5	89	65	:
ES	246	1 059	854	825	18.9%
FR	815	421	523	569	-5.0%
IT**	273	1 098	1 022	:	:
CY	:	:	:	:	:
LV	:	36	30	39	:
LT	:	50	66	69	:
LU	1 230	2 141	2 133	2 248	9.0%
HU	:	100	80	126	:
MT	:	:	:	:	:
NL	1 697	2 733	2 172	1 999	2.4%
AT	345	573	717	686	10.3%
PL	:	653	1 273	1 098	:
PT	40	747	714	927	56.7%
RO	:	:	14	61	:
SI	:	149	264	250	:
SK	:	87	125	216	:
FI	49	54	88	147	16.9%
SE	119	186	164	152	3.6%
UK***	110	207	242	285	14.5%
LI	:	:	18	23	:
NO	4	14	19	42	42.5%

* estimate (IT 2006; excuding CY & MT) ** IT: 2006, provisional datum
*** UK: data subject to revision

Source: Eurostat (Transport), Member States

Reflecting market deregulation as well as hauliers' constant efforts to optimise vehicle loading rates, in the 13 EU-15 Member States for which data are available from 2000 to 2007[9], Road cabotage grew at an average yearly rate of 6.0 % (Table 4.30). More recently however, these Member States together with Greece recorded lower growth averaging 0.2 % yearly from 2005 to 2007.

Over the same period, the eight central and eastern European new Member States of the 2004 enlargement displayed average yearly growth in Road cabotage performance of 33.1 %. Poland (46 %) accounted for the largest share of that increase, followed by the Czech Republic (22 %), Slovakia (13 %) and Slovenia (11 %).

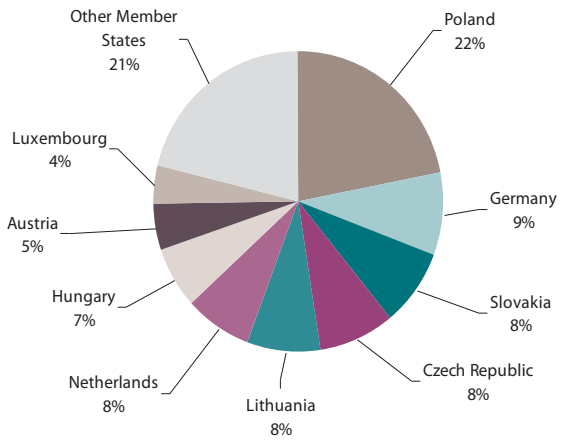
In 2007, hauliers from Germany were the most active caboteurs. This Member State made the largest contribution to EU-27 Road cabotage performance (15.9 %) followed by the three Benelux countries Luxembourg (14.0 %), the Netherlands (12.4 %) and Belgium (9.5 %).

While performance in Road goods cabotage grew steadily over the entire period in Germany, at a yearly rate of 8.8 %, strong yearly growth of 12 % from 2000 to 2005 in Luxembourg gave way to more moderate 2 % yearly growth from 2005 to 2007. After reaching a peak in 2002, Road goods cabotage performance in Belgium declined, as it did in the Netherlands after 2004.

[9] EU-15 excluding IT

Poland contributed most to the EU-27's cross-trade performance in 2007 (22 %) followed by Germany and Slovakia. Four of the five top cross traders in the EU-27 were central or eastern European Member States. Over half (51.2 %) of the EU-27's cabotage performance was accounted for by Germany and the three Benelux Member States.

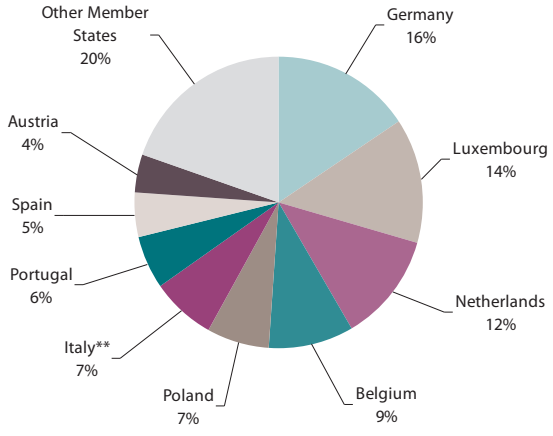
Figure 4.31: Main cross-traders: share in EU-27*, 2007 (% tkm)



* excluding CY, MT and RO; IT: 2006, estimate

Source: Eurostat (Transport)

Figure 4.32: Main caboteurs: share in EU-27*, 2007 (% tkm)



* excluding CY and MT; IT: 2006 estimate
** 2006 estimated

Source: Eurostat (Transport)

4.1.3 Rail goods transport

Table 4.33: Rail goods transport, 2007 (thousand tonnes)

	National	International		Transit	Total	AAGR '03 to '07
		Incoming	Outgoing			
EU-27*	981 388	409 009	296 351	129 709	1 816 457	:
BE	21 424	14 511	20 129	2 076	58 139	1.1%
BG	15 887	2 580	2 171	1 266	21 905	:
CZ	46 959	22 759	22 140	7 919	99 777	1.7%
DK	778	1 665	778	3 680	6 901	-2.7%
DE	226 307	59 101	56 425	19 283	361 116	5.0%
EE	36 239	30 299	2 000	0	68 538	1.1%
IE	825	0	0	0	825	:
EL	572	2 240	2 103	27	4 943	13.3%
ES	25 149	2 461	1 851	0	29 461	2.9%
FR**	70 592	15 170	16 443	7 018	109 222	:
IT	38 571	39 586	27 130	27	105 314	9.1%
LV	2 000	42 775	2 356	5 032	52 164	1.9%
LT	12 332	16 315	5 029	19 827	53 503	5.3%
LU	2 201	3 830	2 235	3 880	12 146	-4.8%
HU	14 825	15 287	12 043	9 369	51 523	4.7%
NL	5 553	8 940	24 734	1 473	40 700	8.2%
AT	33 220	34 629	20 505	27 172	115 526	8.9%
PL	181 125	34 466	25 501	4 216	245 307	11.0%
PT	9 654	449	453	0	10 556	4.9%
RO	53 826	11 128	3 367	451	68 772	:
SI	3 619	4 648	5 558	3 750	17 575	2.7%
SK	7 509	19 567	11 875	12 862	51 813	0.6%
FI	26 204	12 536	1 548	0	40 288	-1.9%
SE	42 847	4 117	20 463	381	67 809	4.0%
UK	103 170	9 950	9 514	0	122 634	8.2%
HR	2 586	4 377	4 563	4 238	15 764	:
TR	17 749	1 512	1 548	40	20 849	7.3%
LI	0	1	10	1 992	2 003	:
NO	6 914	16 802	1 400	0	25 117	4.4%

* estimate (FR: 2006) ** 2006; CY and MT: no railways

Note: Weight in tonnes may be overestimated as some values (international and transit) are included twice or even three times; also see box, p. 59.

Source: Eurostat (Transport)

A total 1 816.5 million tonnes of goods were transported by Rail in the EU-27 in 2007 (Table 4.33). National Rail goods transport accounted for more than half (54.0 %). While Incoming and Outgoing international Rail transport made up shares of 22.5 % and 16.3 % respectively, Transit accounted for 7.1 %. Member States displayed specific patterns depending, for example, on their size, geographical location and foreign trade.

The share of National in total goods transport exceeded EU-27 average in Ireland and the United Kingdom (Member States consisting of large islands) but also in Spain, Romania, Poland, Finland, France (2006), Sweden and Germany (Member States with larger territories) as well as in Portugal and Bulgaria.

Highlighting some European trade patterns, Incoming and Outgoing Rail transport differed in the Member States. In Latvia, Incoming accounted for 82 % of total tonnes carried by Rail, while Outgoing made up only 5 %, as large amounts of goods are imported by Rail while exports are largely effected by Sea. The Netherlands, a major importer by maritime routes, exports some goods via Rail, which reflects in a share of Incoming in total of 22 % compared to 61 % for Outgoing.

While nearly all Rail goods transport took this form in Liechtenstein (99 %), the share of Transit in total stood at or above one quarter in Denmark (53 %), Lithuania (37 %), Luxembourg (32 %) and Slovakia (25 %). These smaller countries hold strategic geographic positions on Rail transport routes.

Table 4.34: Rail goods transport, 2007 (million tkm)

	National	International		Transit	Total	AAGR '03 to '07
		Incoming	Outgoing			
EU-27*	226 928	102 323	75 851	45 663	450 769	:
BE	2 248	2 300	3 324	363	8 235	2.0%
BG	3 899	436	424	483	5 241	:
CZ	7 267	2 416	4 444	2 177	16 304	0.7%
DK	146	282	135	1 216	1 779	-2.7%
DE	53 784	22 934	24 983	12 914	114 615	9.9%
EE	862	7 242	325	0	8 430	-3.4%
IE	129	0	0	0	129	:
EL	193	415	221	6	835	16.3%
ES	9 323	963	778	0	11 064	-1.5%
FR**	24 575	5 851	6 314	4 449	41 190	:
IT	13 192	7 598	4 477	17	25 285	5.6%
LV	375	15 398	736	1 804	18 313	0.5%
LT	2 959	5 523	1 039	4 852	14 373	5.8%
LU	69	153	65	140	427	-5.0%
HU	1 727	2 978	2 230	3 113	10 048	7.2%
NL	1 195	1 456	4 358	206	7 216	11.3%
AT	5 024	5 889	4 268	6 189	21 371	6.1%
PL	36 314	8 755	6 870	2 315	54 253	3.4%
PT	2 312	134	141	0	2 586	5.7%
RO	12 075	2 347	1 137	198	15 757	:
SI	671	780	1 274	878	3 603	4.5%
SK	1 131	2 814	1 704	3 998	9 647	-1.2%
FI	7 581	2 533	319	0	10 434	0.9%
SE	15 681	1 932	5 291	345	23 250	3.6%
UK	24 196	1 194	994	0	26 384	8.9%
HR	653	1 089	975	857	3 574	:
TR	8 439	413	863	40	9 755	3.2%
LI	0	0	0	18	18	:
NO	2 454	775	227	0	3 456	7.1%

* estimate (FR: 2006) ** 2006 CY and MT: no railways

Source: Eurostat (Transport)

In the EU-27, Rail goods transport tonne-kilometres were performed nationally and internationally in similar proportions to those of the weights carried by Rail (Table 4.34).

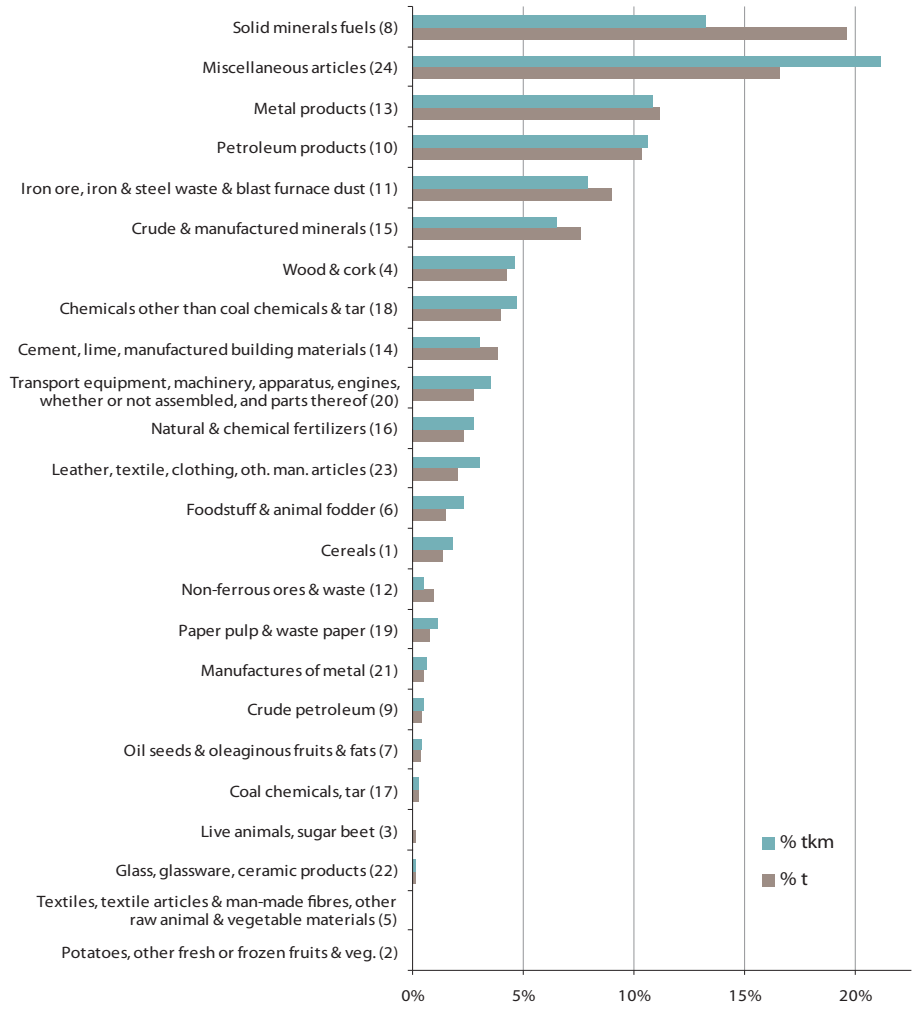
The Member States displaying most absolute National transport performance in 2007 were Germany, Poland and the United Kingdom. They were also those with the greatest total Rail goods transport performance in the EU-27.

Germany recorded most international Rail goods transport performance, both Incoming and Outgoing, while Latvia and Poland respectively recorded the second largest incoming and outgoing Rail goods transport performances. Due to its key location for trans-Alpine and east-west European land transport, Austria recorded the second largest performance in Transit Rail goods transport in the EU-27 in 2007.

From 2003 to 2007, in the Member States for which data are available, the total weight carried by Rail grew most yearly on average in Greece (13 %), Poland (11 %), Italy (9 %) and Austria (9 %). Over the period, the total weight of goods carried by Rail fell in Luxembourg (-5 %), Denmark (-3 %) and Finland (-2 %).

In comparison, Rail goods transport performance grew most yearly in Greece (16 %), the Netherlands (11 %) and Germany (10 %) while reductions took place in Luxembourg (-5 %), Estonia, Denmark (both: -3 %), Spain and Slovakia (both: -1 %).

Figure 4.35: Rail goods, share of NST/R Groups of goods in tonnes transported and tonne-kilometres performed, EU-27*, 2007 (%)



* estimate (FR & LU: 2006; excluding BG) CY and MT: no railways

Note: Detailed reporting data only. Weight in tonnes may be overestimated as some values (international and transit) are included several times This may bias the distribution of tonnes transported in favour of internationally transported goods. Also see box, p. 59.

Source: Eurostat (Transport)

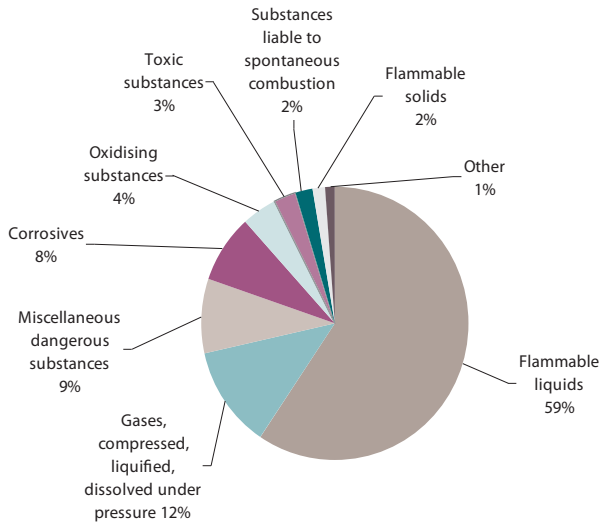
The distribution of Rail goods transport by NST/R Group of goods (two digits), both in terms of tonnes carried and tonne-kilometres performed, is depicted in Figure 4.35. It further details the proportions accounted for by NST/R Chapter, as observed in Figure 4.9.

In terms of tonnes carried, the Group of goods with the largest share in total was *Solid mineral fuels* (NST/R 8) (19.6 %). In the past, coal used to fuel Rail, and the latter's infrastructure is adapted to this good's transport. Solid mineral fuels' smaller share in Rail goods transport performance (13.2 %) reflects the smaller average distance over which this bulky good is transported. In terms of tonne-kilometres the Group of goods contributing most to Rail goods transport performance was *Miscellaneous articles*[10] (NST/R 24) (21.1 %).

In the EU-25 in 2006, although few of these goods were transported on Rail, the greatest average distance was travelled by *Potatoes, other fresh or frozen fruits and vegetables* (NST/R 2) (483 km), while *Live animals, sugar beet* (NST/R 3) travelled least (123 km). One must note that, as international and transit tonnes transported may be overestimated, this may bias the distribution of the weight of goods transported in favour of internationally transported goods. The average distance travelled by such goods may be underestimated.

[10] Miscellaneous articles (NST/R 24): Packing containers, used; Construction materials, fairground vehicles and equipment, used; Removal equipment; Gold, coins, medals and Other manufactured goods not classified according to kind

Figure 4.36: Dangerous goods transported by rail, EU-27*, 2006 (% tkm)



* excluding BG, CY, MT & RO

Note: detailed reporting data only

Source: Eurostat (Transport)

The classes of dangerous goods carried by rail are those defined by the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID). Dangerous goods including gases, liquid hydrocarbons and corrosives accounted for an estimated[(11)] 14.0 % of the total tonne-kilometres performed by Rail goods transport in 2006.

Flammable liquids (59.4 %), which mostly consist of hydrocarbons used for fuel, made up by far the largest share of performance in transport of dangerous goods by Rail. They were followed by *Gases, compressed, liquified, dissolved under pressure* (12.0 %) and *Miscellaneous dangerous substances* (9.0 %) (Figure 4.36).

The first two categories of goods made up nearly identical shares in the EU-27's performance of the transport of dangerous goods by Road, in 2007 (see Figure 4.21).

(11) BE: 2007

Rail goods transport - National

Table 4.37: National rail goods transport, 2003 to 2007 (thousand tonnes)

	2003	2005	2006	2007	AAGR '03 to '07
EU-27*	:	:	1 003 647	981 388	:
EU-25	:	895 215	934 162	911 675	:
BE**	21 437	24 810	24 867	21 424	0%
BG	:	:	16 263	15 887	:
CZ	40 849	39 506	45 861	46 959	4%
DK	1 492	1 865	1 409	778	-15%
DE	196 398	201 725	217 890	226 307	4%
EE	26 790	26 992	19 323	36 239	8%
IE	:c	1 820	1 245	825	:
EL	763	691	564	572	-7%
ES	21 310	25 488	25 447	25 149	4%
FR	78 372	69 319	70 592	:c	:
IT	27 820	34 617	38 088	38 571	9%
LV	2 329	2 633	2 404	2 000	-4%
LT	5 435	14 364	13 346	12 332	23%
LU	2 328	1 910	2 108	2 201	-1%
HU	13 536	13 440	12 077	14 825	2%
NL	5 708	6 213	5 880	5 553	-1%
AT	19 457	27 517	30 505	33 220	14%
PL	108 842	218 082	227 673	181 125	14%
PT	7 811	8 699	8 789	9 654	5%
RO	:	54 087	53 222	53 826	:
SI	3 354	3 381	3 620	3 619	2%
SK	8 359	7 881	7 489	7 509	-3%
FI	24 980	23 479	25 959	26 204	1%
SE	35 827	38 740	40 575	42 847	5%
UK	87 391	102 043	108 451	103 170	4%
HR	:	2 813	2 959	2 586	:
TR	14 040	16 039	16 742	17 749	6%
LI	:	0	0	0	:
NO	4 583	7 195	6 975	6 914	11%

* estimate (FR: 2006) ** BE: 2005 and 2006 data based on detailed reporting only, 2006 data are provisional; also see box, p. 59; CY and MT: no railways

Source: Eurostat (Transport), Member States

Table 4.38: National rail goods transport, 2003 to 2007 (million tkm)

	2003	2005	2006	2007	AAGR '03 to '07
EU-27*	:	:	222 806	226 928	:
EU-25	:	192 516	206 545	210 954	:
BE**	1 970	2 353	2 376	2 248	3%
BG	:	:	4 136	3 899	:
CZ	6 531	6 222	6 912	7 267	3%
DK	344	442	259	146	-19%
DE	36 219	44 412	50 524	53 784	10%
EE	710	747	674	862	5%
IE	:c	303	205	129	:
EL	194	149	129	193	0%
ES	9 675	9 574	9 690	9 323	-1%
FR	27 873	24 558	24 575	:c	:
IT	10 437	12 021	12 955	13 192	6%
LV	431	509	475	375	-3%
LT	1 331	3 424	3 157	2 959	22%
LU	80	68	75	69	-4%
HU	1 574	1 645	1 491	1 727	2%
NL	1 034	1 073	1 116	1 195	4%
AT	3 802	4 494	4 650	5 024	7%
PL	32 907	35 792	36 045	36 314	2%
PT	1 773	2 131	2 127	2 312	7%
RO	:	12 978	12 125	12 075	:
SI	594	620	650	671	3%
SK	1 557	1 281	1 184	1 131	-8%
FI	6 760	6 607	7 375	7 581	3%
SE	12 856	14 125	14 894	15 681	5%
UK	18 253	19 964	25 007	24 196	7%
HR	:	630	686	653	
TR	7 855	7 997	8 226	8 439	2%
LI		0	0	0	
NO	1 557	2 215	2 374	2 454	12%

* estimate (FR: 2006) ** BE: 2005 and 2006 data based on detailed reporting only, 2006 data are provisional; also see box, p. 59; CY and MT: no railways

Source: Eurostat (Transport)

National railway transport is railway 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 railway undertakings were registered (according to the territoriality principle).

National Rail goods transport accounted for over half of the total weight of goods transported by Rail (54.0 %) in the EU-27 in 2007, and half of total Rail goods transport performance in tonne-kilometres (50.3 %) (Tables 4.33 and 4.34). In contrast with Road transport, in which vehicles are more autonomous, a set of factors apply when trains enter into foreign territory such as different gauges, different technical, communication and other standards.

Three Member States, Germany (23 %), Poland (18 %) and the United Kingdom (11 %), accounted for more than half of the total weight of goods transported nationally by Rail in the EU-27 in 2007 (Table 4.37). While Germany (24 %) and Poland (16 %) made up the largest shares of EU-27 tonne-kilometre Rail goods transport performance, France (2006) ranked third, close before the United Kingdom (both: 11 %) (Table 4.38).

In the 21 Member States[12] for which data are available, the total weight of goods transported nationally by Rail grew at an average annual rate of 6.1 % from 2003 to 2007, an important share of the increase over the period being accounted for by the major players Poland (41 %) and Germany (17 %). The 13 EU-15 Member States for which data are available displayed an average yearly growth rate of 4.3 % while, in the 8 NMS-12, National rail goods transport in tonnes grew at an average rate of 9.8 %.

In the same 21 Member States***, National Rail goods transport performance in tonne-kilometres grew at an average annual rate of 5.7 %. In contrast with tonnes carried, the 13 EU-15 Member States displayed 6.9 % yearly growth in tonne-kilometre performance while the 8 NMS-12 recorded 3.0 % growth.

[12] BE, CZ, DK, DE, EE, EL, ES, IT, LV, LT, LU, HU, NL, AT, PL, PT, SI, SK, FI, SE & UK

Rail goods transport - International

Table 4.39: International rail goods transport: Incoming and outgoing, 2003 to 2007 (thousand tonnes)

	2003	2005	2006	2007	AAGR '03 to '07
EU-27*	:	:	698 356	705 353	:
EU-25	:	629 429	679 505	686 107	:
BE**	33 052	33 356	34 698	34 640	1%
BG	:	:	4 389	4 751	:
CZ	45 134	39 430	43 981	44 899	0%
DK	3 165	2 697	2 757	2 443	-6%
DE	88 698	99 344	110 775	115 526	7%
EE	38 798	41 195	41 960	32 299	-4%
IE	:c	0	0	0	:
EL	1 830	2 362	3 275	4 344	24%
ES	4 868	4 351	3 719	4 312	-3%
FR	33 409	31 781	31 612	:c	:
IT	46 467	55 116	64 054	66 710	9%
LV	42 343	46 523	41 486	45 132	2%
LT	14 229	15 729	16 681	21 344	11%
LU	7 012	5 628	6 141	6 065	-4%
HU	24 288	26 848	29 961	27 329	3%
NL	23 989	28 254	30 834	33 674	9%
AT	48 242	48 046	56 042	55 133	3%
PL	48 722	48 316	59 140	59 966	5%
PT	907	888	986	902	0%
RO	:	14 107	14 462	14 495	:
SI	9 553	9 854	10 122	10 206	2%
SK	31 584	29 850	31 355	31 442	0%
FI	15 327	17 243	17 601	14 084	-2%
SE	21 665	24 150	24 081	24 581	3%
UK	2 026	18 467	18 244	19 464	76%
HR	:	8 034	8 313	8 940	:
TR	1 698	2 858	2 974	3 060	16%
LI	:	2	2	11	:
NO	16 598	17 665	17 827	18 202	2%

* 2007: estimate (FR: 2006) ** BE: 2005 & 2006 detailed reporting only, 2006 data provisional, also see box, p. 59; CY and MT: no railways

Source: Eurostat (Transport), Member States

Table 4.40: International rail goods transport: Incoming and outgoing, 2003 to 2007 (million tkm)

	2003	2005	2006	2007	AAGR '03 to '07
EU-27*	:	:	173 806	178 179	:
EU-25	:	160 516	169 702	173 836	:
BE**	5 118	5 315	5 757	5 624	2%
BG	:	:	778	859	:
CZ	7 424	6 921	7 012	6 860	-2%
DK	608	468	518	417	-9%
DE	33 780	40 088	45 033	47 917	9%
EE	8 960	9 893	9 745	7 568	-4%
IE	:c	0	0	0	:
EL	262	464	514	636	25%
ES	2 016	2 060	1 679	1 741	-4%
FR	13 277	11 937	12 166	:c	:
IT	9 858	10 726	11 179	12 076	5%
LV	16 291	17 144	14 570	16 134	0%
LT	3 169	4 315	4 748	6 562	20%
LU	235	208	226	218	-2%
HU	4 312	4 679	5 375	5 208	5%
NL	3 671	4 786	5 116	5 815	12%
AT	9 343	9 610	11 201	10 158	2%
PL	12 239	12 464	14 918	15 625	6%
PT	299	291	302	275	-2%
RO	:	3 073	3 326	3 484	:
SI	1 752	1 844	1 921	2 054	4%
SK	5 002	4 481	4 533	4 518	-3%
FI	2 825	3 099	3 685	2 853	0%
SE	7 063	7 364	7 145	7 224	1%
UK	481	2 358	2 359	2 187	46%
HR	:	1 562	1 805	2 064	:
TR	743	1 030	1 291	1 276	14%
LI	:	0	0	0	:
NO	1 069	934	978	1 002	-2%

* 2007: estimate (FR: 2006) ** BE: 2005 & 2006 detailed reporting only, 2006 data provisional, also see box, p. 59; CY and MT: no railways

Source: Eurostat (Transport), Member States

International railway transport is railway 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 and countries.

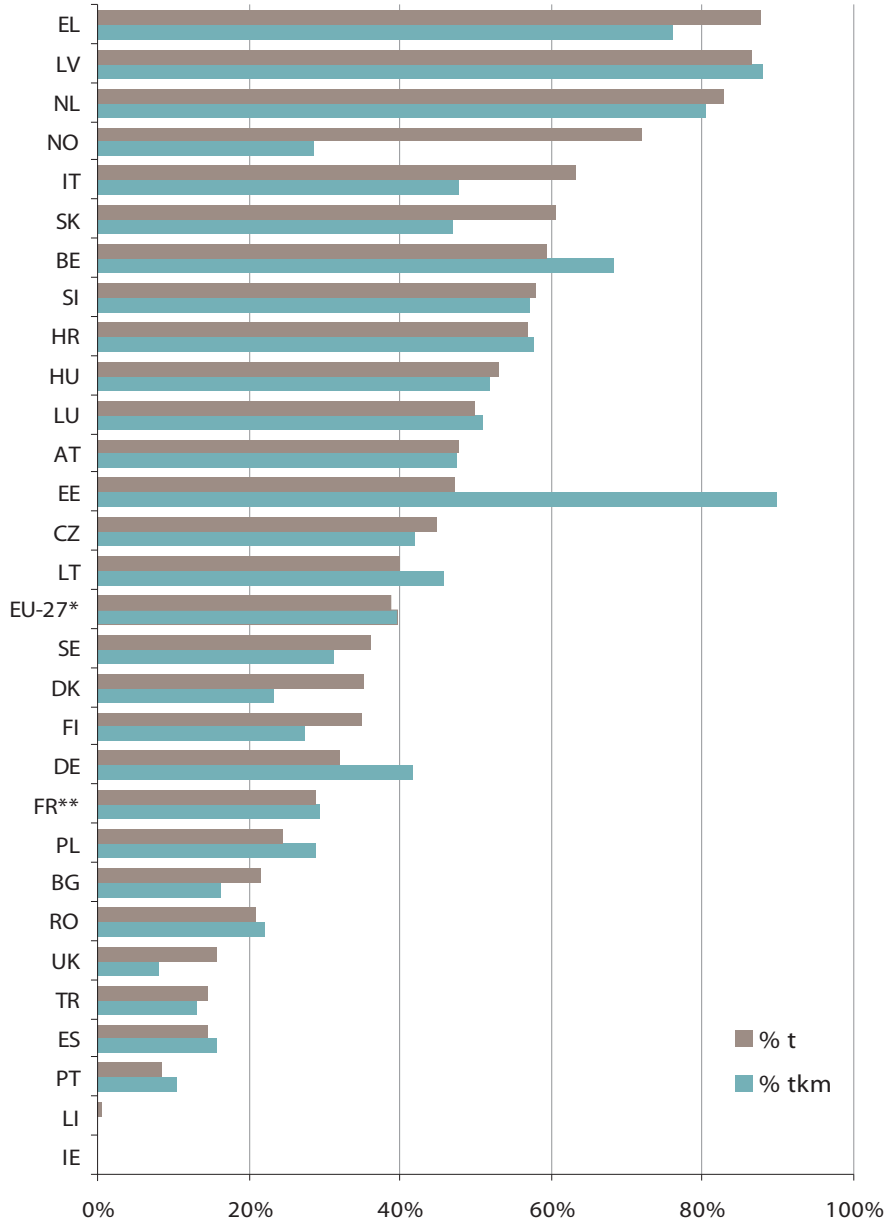
In the EU-27, an estimated 705.4 million tonnes of goods were carried in international Rail transport in 2007 (Table 4.39). The international transport of goods by Rail resulted in the performance of 178.2 billion tonne-kilometres (Table 4.40).

Interestingly, while the total weight transported internationally by Rail in the EU-27 in 2007 was equivalent to somewhat under three quarters (71.0 %) of the weight transported internationally by Road (Table 4.16), Rail's international tonne-kilometre performance was equivalent to somewhat above a quarter (28.5 %) of Road's (Table 4.17).

Five Member States accounted for a little under half of the weight of goods transported internationally by Rail in the EU-27 in 2007: Germany (16 %), Italy and Poland (both: 9 %), Austria (8 %) and Latvia (6 %). The five Member States, together with France (2006), accounted for approaching two thirds of EU-27 tonne-kilometre international Rail goods performance: Germany (27 %), Latvia and Poland (both: 9 %), France (2006) and Italy (both: 7 %) and Austria (6 %).

As a share of total tonne-kilometre performance, international Rail freight (incoming and outgoing) was comparatively less important in Ireland (0 %), the United Kingdom (8 %), Portugal (11 %), Spain and Bulgaria (both: 16 %) (Table 4.34). While, in Ireland and the United Kingdom, lower shares are explained by those Member States' separation from the European mainland, in the case of Spain, for example, the lower share could be a result of transshipment (from one railway wagon to another) between France and Spain, arising from a difference in rail gauges.

Figure 4.41: Rail goods transport: share of international transport (incoming & outgoing) in total (based on tonnes loaded), 2007 (% t and % tkm)



* estimate (FR: 2006) ** 2006

Note: share of international Rail goods transport in tonnes may be overestimated, also see box, p. 59; CY and MT: no railways

Source: Eurostat (Transport)

In the EU-27, the share of international Rail goods transport (excluding transit) in total tonnes loaded was 38.8 % whereas it was 39.5 % in the total tonne-kilometres performed (Figure 4.41).

The share of international rail freight transport in total tonnes loaded was as high as 87.9 % in Greece, 86.5 % in Latvia and 82.7 % in the Netherlands. In those Member States, the share of international transport in total tonne-kilometre performance was also high, amounting to 76.2 %, 88.1 % and 80.6 % respectively.

Readers should note however that freight volumes loaded outside the EU-27 and unloaded on an EU territory are not included in this picture. It is important to keep this in mind since flows of international Rail freight can be quite significant from certain non-EU-27 countries such as Switzerland, Russia, the Ukraine and Belarus.

Table 4.42: Transit rail goods transport, 2003 to 2007 (thousand tonnes)

	2003	2005	2006	2007	AAGR '03 to '07
EU-27*	:	:	128 855	129 709	:
EU-25	106 152	118 940	126 999	127 992	:
BE**	1 243	2 810	2 624	2 076	14%
BG	:	:	1 229	1 266	:
CZ	7 313	6 676	7 649	7 919	2%
DK	3 055	3 144	3 311	3 680	5%
DE	11 829	16 225	17 454	19 283	13%
EE	0	0	0	0	:
IE	0	0	0	0	:
EL	:	4	45	27	:
ES	66	7	712	0	-100%
FR	8 895	6 432	7 018	:c	:
IT	6	23	27	27	46%
LV	3 683	5 704	4 840	5 032	8%
LT	23 783	19 194	20 197	19 827	-4%
LU	5 457	3 200	3 884	3 880	-8%
HU	5 116	10 563	12 667	9 369	16%
NL	0	542	553	1 473	:
AT	14 392	26 265	24 233	27 172	17%
PL	4 252	3 154	4 581	4 216	0%
PT	0	0	0	0	:
RO	:	981	627	451	:
SI	2 906	3 110	3 311	3 750	7%
SK	10 578	11 579	13 605	12 862	5%
FI***	3 196	0	0	0	:
SE	382	308	288	381	0%
UK	0	0	0	0	:
HR	:	3 485	4 123	4 238	:
TR	17	48	29	40	24%
LI	:	1 841	2 029	1 992	:
NO	0	0	0	0	:

* estimate (FR: 2006) ** BE: 2005 & 2006 detailed reporting only, 2006: provisional data, also see box, p. 59 *** FI: new definition from 2004
CY and MT: no railways

Source: Eurostat (Transport), Member States

Table 4.43: Transit rail goods transport, 2003 to 2007 (million tkm)

	2003	2005	2006	2007	AAGR '03 to '07
EU-27*	:	:	43 801	45 663	:
EU-25	38 401	39 358	42 979	44 982	:
BE**	205	462	439	363	15%
BG	:	:	482	483	:
CZ	1 907	1 722	1 855	2 177	3%
DK	1 033	1 066	1 115	1 216	4%
DE	8 465	10 920	11 451	12 914	11%
EE	0	0	0	0	:
IE	0	0	0	0	:
EL	:	:	18	6	:
ES	52	0	266	0	-100%
FR	5 686	4 206	4 449	:c	:
IT	3	14	17	17	54%
LV	1 233	2 125	1 786	1 804	10%
LT	6 957	4 718	4 991	4 852	-9%
LU	210	116	140	140	-10%
HU	1 728	2 765	3 301	3 113	16%
NL	0	5	58	206	:
AT	3 722	4 853	5 129	6 189	14%
PL	2 261	1 716	2 659	2 315	1%
PT	0	0	0	0	:
RO	:	532	340	198	:
SI	672	781	802	878	7%
SK	3 554	3 701	4 271	3 998	3%
FI***	462	0	0	0	-100%
SE	251	186	232	345	8%
UK	0	0	0	0	:
HR	:	642	814	857	:
TR	14	50	28	40	30%
LI	:	17	18	18	:
NO	0	0	0	0	:

* estimate (FR: 2006) ** BE: 2005 & 2006 detailed reporting only, 2006 data provisional, also see box, p. 59 *** FI: new definition from 2004
CY and MT: no railways

Source: Eurostat (Transport), Member States

Railway transit is defined as transport through a country between two places (a place of loading/embarkation and a place of unloading/disembarkation) outside that country. Transport operations involving loading/embarkation or unloading/disembarkation of a railway vehicle at that country's border from/onto another mode of transport are not considered as transit.

The magnitude of Rail transit is influenced by a country's size together with its location within or close to the EU. In 2007, approaching two thirds of EU-27 Rail transit performance in tonne-kilometres were accounted for by two large, centrally situated Member States, Germany (28 %) and France (10 %, 2006) together with two smaller Member States with key locations on important cross-border Rail routes, Austria (14 %) and Lithuania (11 %) (Table 4.43).

Due to their pivotal locations, the share of transit in the total weight of goods transported by Rail stood above one quarter in Liechtenstein (99 %), Denmark (53 %), Lithuania (37 %), Luxembourg (32 %) and Croatia (27 %) in 2007 (Table 4.42).

Transit accounted for close to or above one third of Rail goods transport performance in Liechtenstein (100 %), Denmark (68 %), Slovakia (41 %), Lithuania (34 %) and Luxembourg (33 %). In many countries, transit's share in total tonne-kilometre performance was somewhat greater than in terms of weight. This was however not the case in Lithuania, Croatia and the Netherlands, due to those countries' important roles as maritime gateways.

In the countries for which an average annual growth rate in transit rail goods transport performance could be calculated from 2003 to 2007, this was greatest in Italy (54 %), Turkey (30 %), Hungary (16 %), Belgium (15 %), Austria (14 %), Germany (11 %) and Latvia (10 %). Transit performance fell over the period in Luxembourg (-10 %) and Lithuania (-9 %).

4.1.4 Inland waterway goods transport

The Rhine (1 320 km) is by far the most important river for Inland waterway goods transport in the EU-27. Flowing through Switzerland, Germany and the Netherlands, it forms a major part of the French-German border and it also links Belgium and Luxembourg through tributaires. The Danube (2 850 km) forms the second main axis, linking the EU's Bulgaria, Romania, Hungary, Slovakia, Austria and Germany, but also Croatia, Serbia, Moldova and the Ukraine. Other major rivers, the Elbe and Oder/Odra connect the Czech Republic, Poland and Germany. Rivers' water conditions and operating capacity may be affected by seasonal variations.

Table 4.44: Inland waterway goods transport*, 1990 to 2006 (thousand tonnes)

	1990	1995	2000	2003	2005	2006	AAGR '90 to '06
EU-27	:	:	:	:	498 806	503 194	:
BE	99 438	105 924	120 132	137 145	160 397	165 855	3.2%
BG**	:	:	:	7 269	5 270	5 947	:
CZ	:	:	1 744	1 184	1 613	1 141	:
DE	231 574	237 884	242 223	219 999	236 765	243 495	0.3%
FR	66 086	55 055	70 669	63 670	68 347	71 448	0.5%
LU	11 551	10 484	11 514	9 704	10 377	11 395	-0.1%
HU	:	:	:	6 137	8 413	7 327	:
NL	286 147	286 070	313 708	293 390	317 639	317 853	0.7%
AT	:	8 790	10 980	10 737	9 336	9 183	:
PL	:	:	:	:	7 166	6 609	:
RO	:	:	:	:	32 845	29 274	:
SK	:	:	3 510	2 624	2 350	2 252	:
HR	:	:	:	:	1 446	1 509	:

* National + International (loaded & unloaded) + Transit ** BG: 2003 including vessels used for ferrying purposes

Source: Eurostat (Transport)

A group of 12 Member States that make use of Inland waterways as a means of transport together with the candidate country Croatia report quarterly Inland waterway statistics. This is done on the basis of the "territoriality principle", whereby each reporting country reports the loading, unloading and movement of goods taking place on its national territory.

In the EU-27, the weight of goods transported by inland waterways stood at somewhat above 500 million tonnes in 2006 (Table 4.44). Inland waterway transport performed 137.7 billion tonne-kilometres, which was equivalent to around 30 % of the transport performance of Rail that year (Table 4.45).

Table 4.45: Inland waterway goods transport*, 1990 to 2006 (million tkm)

	1990	1995	2000	2003	2005	2006	AAGR '90 to '06
EU-27	:	:	:	:	137 668	137 712	:
BE	5 389	5 731	7 215	8 230	8 566	8 908	3.2%
BG**	:	:	:	613	757	785	:
CZ	:	:	80	49	64	44	:
DE	54 803	63 982	66 465	58 154	64 096	63 975	1.0%
FR	7 581	6 630	9 110	8 024	8 905	9 005	1.1%
LU	362	338	378	316	342	381	0.3%
HU	:	:	:	1 517	2 110	1 913	:
NL	35 661	35 457	41 271	39 031	42 225	42 310	1.1%
AT	:	2 046	2 444	2 276	1 753	1 837	:
PL	:	:	:	:	327	289	:
RO	:	:	:	:	8 436	8 157	:
SK	:	:	:	94	88	106	:
HR	:	:	:	:	119	116	:

* National + International (loaded & unloaded) + Transit ** BG: 2003 including vessels used for ferrying purposes

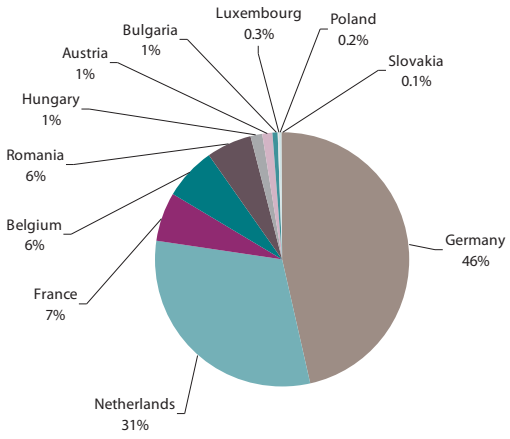
Source: Eurostat (Transport)

Two Member States, Germany (46 %) and the Netherlands (31 %) accounted for over three quarters of EU-27 Inland waterway tonne-kilometre performance in 2006 (Figure 4.46). Together with France (7 %), Belgium and Romania (both: 6 %), they accounted for 96 % of performance.

In the first three Member States, Inland waterway goods transport performance grew at close to 1 % annually on average from 1990 to 2006. In Belgium, performance grew at 3.2 % due to both strong transport growth on international routes and to a doubling of national performance over the period[13].

[13] Marco Polo and Naiades (see Chapter 2) have contributed to the development of multimodal hubs in Brussels and Liège.

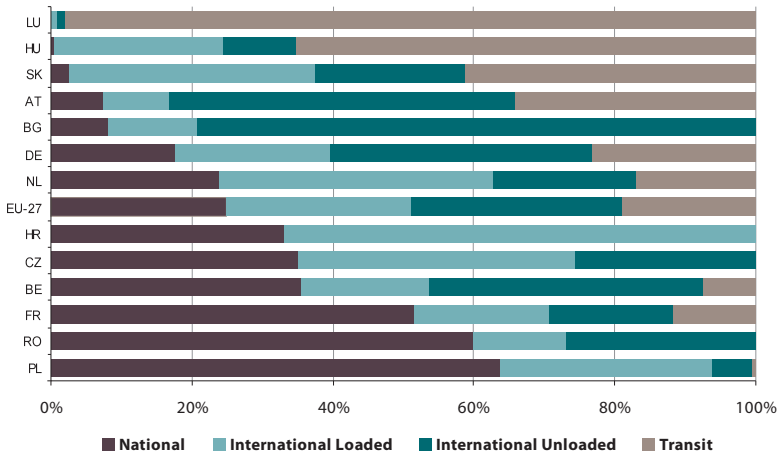
Figure 4.46: Inland waterway goods transport, Member State shares in EU-27, 2006 (% tkm)



Source: Eurostat (Transport)

National transport accounted for over half of Inland waterway goods transport performance in the large Member States Poland (64 %), Romania (60 %) and France (52 %) in 2006 (Figure 4.47). Goods Loaded for international transport accounted for over a third of performance in the Czech Republic and the Netherlands (both: 39 %), and Slovakia (35 %), reflecting Inland waterways' importance for exports in those Member States. Goods Unloaded from international journeys accounted for close to or above half of performance in Bulgaria (79 %) and Austria (49 %). Transit accounted for the main share of performance in Luxembourg (98 %), Hungary (65 %) and Slovakia (41 %).

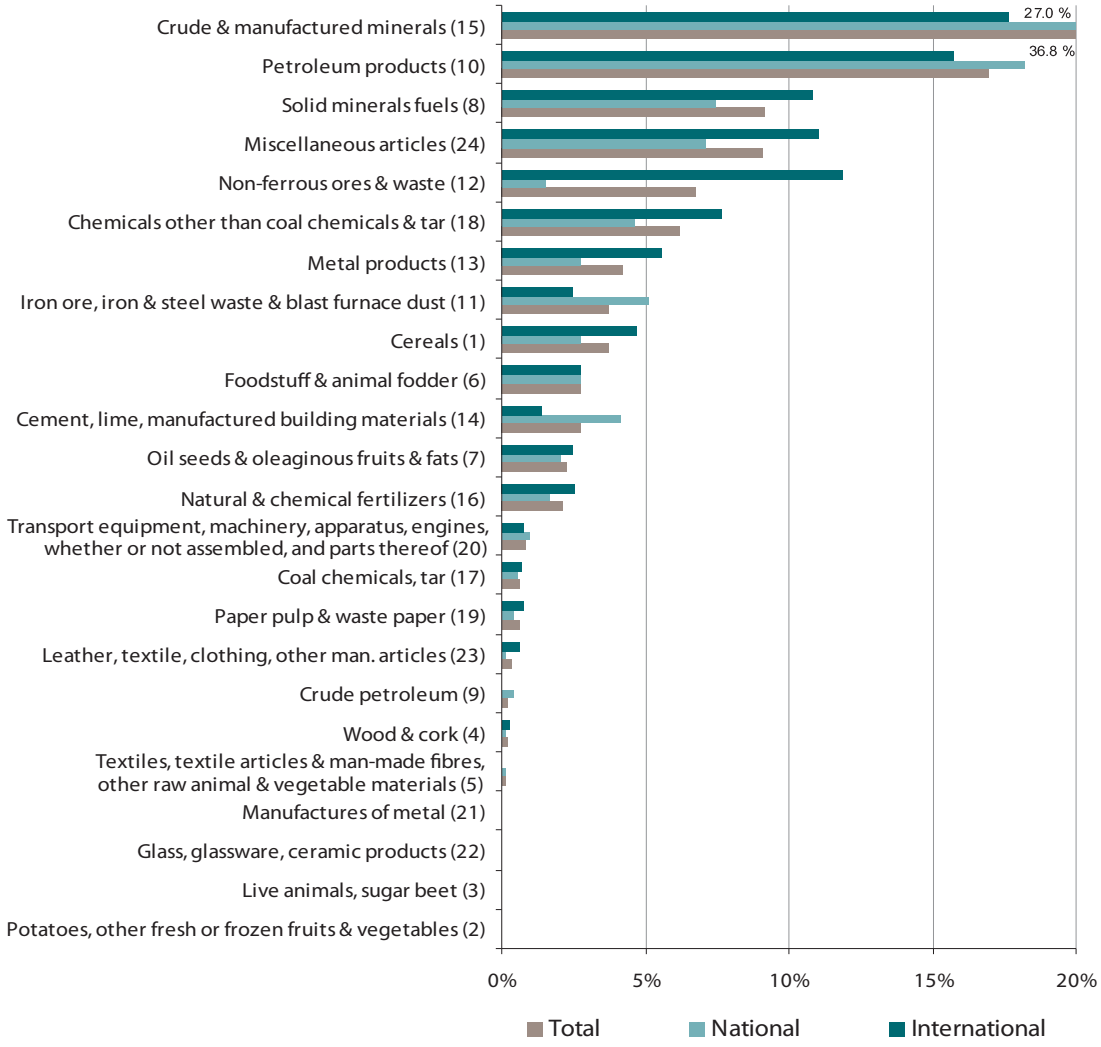
Figure 4.47: Inland waterway goods transport, EU-27 and Member States*, distribution by freight journey, 2006 (% tkm)



* BG & RO: Transit data not available

Source: Eurostat (Transport)

Figure 4.48: Inland waterway goods transport; national, international (loaded) and total, distribution by NST/R Group of goods, EU-27, 2006 (% t)



Source: Eurostat (Transport)

The distribution of the weight of goods transported on Inland waterways in the EU-27 in 2006, presented in Figure 4.11, is further detailed by NST/R Group of goods (two digits), both in national and international transport (Figure 4.48).

Three Groups of goods, all of mineral origin, accounted for over half of the weight of goods transported by Inland waterways: *Crude & manufactured minerals* (NST/R 15) (27.0 %) and the fuels *Petroleum products* (NST/R 10) (16.9 %) and *Solid minerals fuels* (NST/R 8, especially: coal) (9.2 %). While *Miscellaneous articles* (NST/R 24) accounted for 9.1 % of total, the next four Groups of goods, including ores, metals and chemicals, accounted for 20.9 %.

Barges travel less rapidly than do Road or Rail vehicles and, while they can only viably be refrigerated in special cases (e.g. the 'self-refrigeration' of ammonia), they are particularly suited for the transport of bulky goods. Nationally, Inland waterways were used more to transport bulky materials such as *Crude & manufactured minerals, Petroleum products, Iron ore, waste & furnace dust* (NST/R 11) and *Cement, lime, and building materials* (NST/R 14).

For detailed sectoral analyses of the goods transported by Inland waterway, please see: "Market observation for inland navigation in Europe" [14]

[14] http://ec.europa.eu/transport/iw/observatory/doc/2007_01_marketobs_en.pdf

Inland waterway goods transport - National

Table 4.49: National inland waterway goods transport, 1990 to 2006 (million tkm)

	1990	1995	2000	2003	2005	2006	AAGR '90 to '06
EU-27	:	:	:	:	35 466	34 396	:
BE	1 698	1 413	2 391	2 832	3 060	3 169	4.0%
BG	:	:	:	68	67	64	:
CZ	:	:	28	22	30	15	:
DE	14 110	17 155	13 351	10 833	11 695	11 230	-1.4%
FR	4 267	2 262	4 141	4 021	4 640	4 645	0.5%
LU	1	0	0	0	0	:	:
HU	:	:	:	4	5	8	:
NL	6 896	6 887	9 629	10 557	10 426	10 060	2.4%
AT	:	83	117	61	37	137	:
PL	:	:	:	:	185	184	:
RO	:	:	:	:	5 316	4 881	:
SK	:	:	:	7	6	3	:
HR	:	:	:	:	39	39	:

Source: Eurostat (Transport)

In 2006, close to the entirety of EU-27 national Inland waterway goods transport performance was accounted for by five Member States: Germany (33 %), the Netherlands (29 %), Romania (14 %), France (14 %) and Belgium (9 %) (Table 4.49). The latter two and, to a lesser extent, the Netherlands displayed a reduction in national performance during the first half of the 1990s. Tonne-kilometre performance grew thereafter in those three Member States, first rapidly in the second half of the 1990s, then at more moderate rates in the 2000s. In contrast, in Germany, performance peaked in 1995, then fell until 2003 and stabilised thereafter.

Inland waterway goods transport - International

Table 4.50: International* inland waterway goods transport, 1990 to 2006 (million tkm)

	1990	1995	2000	2003	2005	2006	AAGR '90 to '06
EU-27	:	:	:	:	102 202	103 316	:
BE	3 691	4 318	4 824	5 398	5 506	5 740	2.8%
BG**	:	:	:	545	690	721	:
CZ	:	:	53	27	34	29	:
DE	40 693	46 827	53 114	47 322	52 401	52 745	1.6%
FR	3 314	4 367	4 969	4 003	4 266	4 360	1.7%
LU	361	338	378	316	342	381	0.3%
HU	:	:	:	1 512	2 105	1 905	:
NL	28 766	28 570	31 641	28 474	31 799	32 250	0.7%
AT	:	1 963	2 327	2 216	1 715	1 700	:
PL	:	:	:	:	141	105	:
RO	:	:	:	:	3 121	3 277	:
SK	:	:	:	87	82	104	:
HR	:	:	:	:	79	78	:

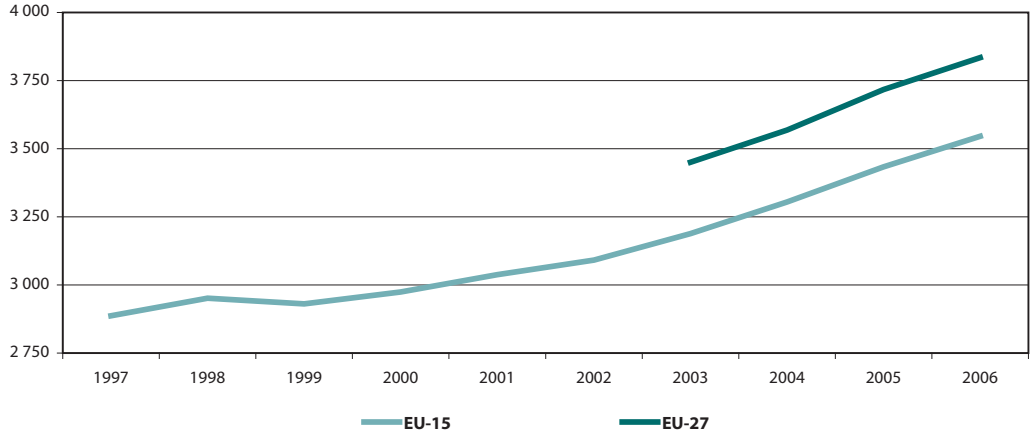
* International loaded, international unloaded and transit ** BG: 2003 including vessels used for ferrying purposes

Source: Eurostat (Transport)

Germany (51 %) and the Netherlands (31 %) accounted for the largest shares of EU-27 international Inland waterway goods transport performance in 2006, followed by Belgium (6 %) and France (4 %) (Table 4.50). While these Member States displayed growth during the 1990s, all four except Belgium saw their performances reduced from 2000 to 2003, mainly due to that year's drought. International Inland waterway goods transport performance then grew again from 2003 to 2006, at average annual rates of 4 % in both Germany and the Netherlands, of 3 % in France and of 2 % in Belgium.

4.1.5 Maritime goods transport

Figure 4.51: Gross weight of seaborne goods handled*, EU-15 and EU-27, 1997 to 2006 (million tonnes)



* all ports

Source: Eurostat (Transport)

A total 3 834 million tonnes (gross weight) of goods were handled in EU-27 ports in 2006 (Table 4.52). This is equivalent to roughly over one fifth of the weight of goods carried by Road in the EU-27 in 2006 and more than twice the weight carried by Rail. The land-bound Member States, the Czech Republic, Luxembourg, Hungary, Austria and Slovakia do not report activity in this sector. Sea freight journeys do not follow set paths, explaining why, compared to the inland transport modes, it is difficult to measure maritime transport's tonne-kilometre performance.

The 'handling' of goods at ports provides a measurement of this mode's ports' performance. A lot of care must however be taken when interpreting total figures, which are a sum of goods handled inwards and outwards, as a measure of transport. These totals may include double-counting, due to goods' being loaded in one port and unloaded in another port, as both may be included in the figures.

This thriving transport mode plays an important role in the transport of extra-EU traded goods (see box p. 63), but also intra-EU. Short Sea Shipping is the transport of goods between ports in the EU-27 and Norway, on one hand, and ports situated in geographical Europe, on the Mediterranean Sea and the Black Sea, on the other. In 2006, the volume of EU-27 Short Sea Shipping amounted to more than 1.9 billion tonnes, accounting for 62 % of total EU-27 maritime goods transport[15].

From 2003 to 2006, the total weight of goods handled in the EU-27 grew at an average annual rate of 3.6 % (Figure 4.51). Looking at the longer 1997-to-2006 period, the gross weight of seaborne goods handled in the EU-15 grew at an average annual rate of 2.3 %. This growth rate may be overestimated as data referring to the 1997-2001 period are incomplete for all aspects at EU-15 level.

Table 4.52: Gross weight of seaborne goods handled*, 2006 (million tonnes)

	Inward	Outward	Total
EU-27	2 436.5	1 397.8	3 834.3
BE	125.5	93.5	218.9
BG	16.3	11.3	27.5
DK	59.7	48.0	107.7
DE	182.2	120.5	302.8
EE	6.8	43.2	50.0
IE	38.6	14.8	53.3
EL	94.3	65.1	159.4
ES	298.6	115.7	414.4
FR	250.6	99.8	350.3
IT	358.1	162.1	520.2
CY	6.5	1.4	7.9
LV	6.8	50.1	56.9
LT	8.5	18.8	27.2
MT	3.3	0.2	3.6
NL	358.9	118.3	477.2
PL	19.9	33.2	53.1
PT	46.9	20.0	66.9
RO	24.6	22.1	46.7
SI	10.6	4.9	15.5
FI	60.2	50.3	110.5
SE	94.6	85.9	180.5
UK	365.1	218.6	583.7
HR	15.5	10.8	26.3
IS	4.1	1.9	5.9
NO	62.2	134.6	196.8

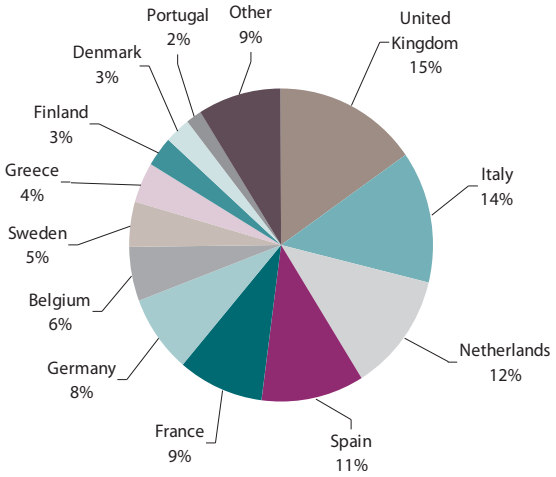
* all ports

Source: Eurostat (Transport)

[15] "Short Sea Shipping of goods 2000-2006", Statistics in Focus 2/2008

Unloaded goods made up a fairly constant share of two-thirds of the volume of goods handled in EU-15 ports from 1997 to 2006 (data not shown). In the EU-27 that share was slightly lower, amounting to 64 % in 2006 (Table 4.52). More goods were handled inwards than outwards in most Member States, and the share of unloaded goods in total reached as much as 94 % in Malta, 82 % in Cyprus and 75 % in the Netherlands. Playing an important role on the East-West export route of Russian oil and other raw materials, the Baltic states displayed an inverse balance as, in Latvia (12 %), Estonia (14 %) and Lithuania (31 %), unloaded goods made up the smaller share of total goods handled. Similarly, with strong exports of solid mineral fuels, unloaded goods handled accounted for 37 % of total in Poland.

Figure 4.53: Member State shares in EU-27 gross weight of seaborne goods handled*, 2006 (% tonnes)



* all ports

Source: Eurostat (Transport)

The ports of four Member States together accounted for over half of the total 3.8 billion gross tonnes of goods handled in the EU-27 in 2006: the United Kingdom (15 %), Italy (14 %), the Netherlands (12 %) and Spain (11 %) (Figure 4.53).

In maritime transport, consistent data are available by type of cargo (the way goods are handled) and not by type of goods (the NST/R classification seen up until now in this chapter, for other modes of transport). In the EU-27, bulk cargo accounted for close to two thirds of the 3.5 billion tonnes handled (inwards and outwards) in main ports (ports handling more than 1 million tonnes of goods). Liquid bulk accounted for 40 % while Dry bulk made up 26 % of the total gross weight of goods handled in main ports in 2006 (Table 4.54 and Figure 4.55).

Table 4.54: Top five Member States handling seaborne cargo*, by cargo type, 2006: EU-27 gross weight handled (million tonnes) and Top-5 Member State shares in cargo type total (%)

	Liquid bulk		Dry bulk		Large freight containers		Ro-Ro mobile units**		Other cargo	
EU-27		1,390.4		903.4		600.0		381.7		236.9
1	UK	16%	NL	16%	DE	18%	UK	25%	IT	12%
2	NL	15%	UK	14%	ES	16%	SE	12%	UK	11%
3	IT	15%	ES	12%	NL	13%	DE	10%	NL	11%
4	FR	13%	IT	11%	IT	12%	IT	9%	ES	10%
5	ES	10%	FR	9%	BE	12%	BE	8%	BE	9%

* goods handled in ports handling more than 1 million tonnes of goods annually

** self-propelled and not

Source: Eurostat (Transport)

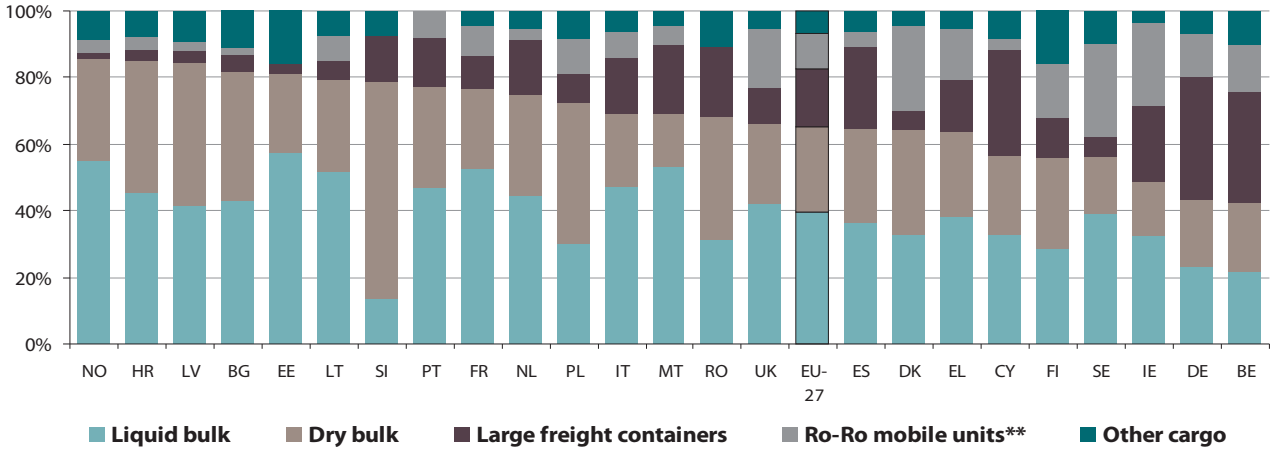
The United Kingdom handled the largest shares of Liquid bulk goods (16 %) in the EU-27, due especially to the transport of oil products, followed by the Netherlands and Italy (both: 15 %).

The Netherlands was the largest handler of Dry bulk goods, accounting for 16 % of the EU-27 total. For instance, this includes the transport of chemicals, grain, ores and coal, and it reflects the access the Netherlands has to an inland waterway network that stretches into the heart of Europe.

Looking at the handling of Large freight containers, Germany (18 %) made up the largest share in the EU-27, followed by Spain (16 %) and the Netherlands (13 %).

The United Kingdom accounted for 25 % of the gross weight of Roll-on Roll-off (Ro-Ro) mobile units handled in the EU-27. This high share can be explained by the importance of cargo services principally across the Channel and the Irish Sea.

Figure 4.55: Gross weight of seaborne goods handled (inwards and outwards) in main ports*, by type of cargo, 2006 (% total cargo handled)



* ports handling more than 1 million tonnes of goods annually ** self-propelled and not

Source: Eurostat (Transport)

Figure 4.55 details the distribution of goods handled (inwards and outwards) by type of cargo, in the Member States, Croatia and Norway. In the latter two countries, as well as in Latvia and Bulgaria, the handling of bulk goods was most important.

In Estonia (57 %), Norway (55 %), Malta and France (both: 53 %) and Lithuania (52 %). Liquid bulk accounted for more than half of the goods handled in main ports in 2006.

Dry bulk accounted for over a third of the goods handled in Slovenia (65 %), Latvia (43 %), Poland (42 %), Croatia (40 %), Bulgaria (39 %) and Romania (36 %).

Large freight containers were the type of cargo with the third largest volumes handled in the EU-27's main ports, accounting for 17 % of total. Germany (37 %), Belgium (33 %) and Cyprus (32 %) stood out with shares of around double the EU average.

Ro-Ro mobile units accounted for 11 % of the gross weight of goods handled in main ports in the EU-27 in 2006. The share of Ro-Ro mobile units was above double the EU average in Member States with major vehicle ferry services: Sweden (28 %), Denmark (26 %) and Ireland (25 %).

Making up 7 % of the goods handled in the EU-27's main ports, Other cargo is the category including, amongst others, forestry products as well as iron and steel products. This category made up a tenth or more of the goods handled in Finland and Estonia (both: 16 %), Bulgaria (11 %), Romania and Belgium (both: 10 %).

Table 4.56: Top 20 cargo ports in 2006 - on the basis of gross weight of goods handled (million tonnes)

2006		1997		2000		2003		2006
Rank	Port	Rank	Total	Rank	Total	Rank	Total	Total
1	Rotterdam (NL)	1	303.4	1	302.5	1	307.4	353.6
2	Antwerp (BE)	2	104.6	2	116.0	2	126.1	151.7
3	Hamburg (DE)	4	69.6	4	77.0	3	93.6	115.5
4	Marseille (FR)	3	92.9	3	91.3	4	92.4	96.5
5	Le Havre (FR)	5	58.2	5	63.9	6	67.4	70.0
6	Bergen (NO)	:	:	:	:	5	76.4	67.9
7	Grimsby & Immingham (UK)	8	48.0	6	52.5	7	55.9	64.0
8	Algeciras (ES)	17	34.2	:	:	11	48.3	60.0
9	Amsterdam (NL)	12	36.9	13	42.0	16	40.8	56.8
10	Bremen & Bremerhaven (DE)	23	30.6	15	39.2	14	42.5	55.6
11	Tees & Hartlepool (UK)	7	51.2	7	51.5	8	53.8	53.3
12	London (UK)	6	55.7	8	47.9	9	51.0	51.9
13	Taranto (IT)	15	36.0	20	33.1	21	35.3	50.9
14	Dunkerque (FR)	14	36.4	9	44.3	13	45.8	50.4
15	Trieste (IT)	11	42.1	10	44.0	15	41.6	44.6
16	Genova (IT)	10	42.2	11	43.8	12	46.9	44.4
17	Wilhelmshaven (DE)	13	36.4	12	43.4	17	39.4	43.1
18	Constanta (RO)	:	:	:	:	24	32.2	42.9
19	Tallinn (EE)	:	:	:	:	19	37.0	41.2
20	Valencia (ES)	45	16.3	36	22.0	27	30.4	40.7

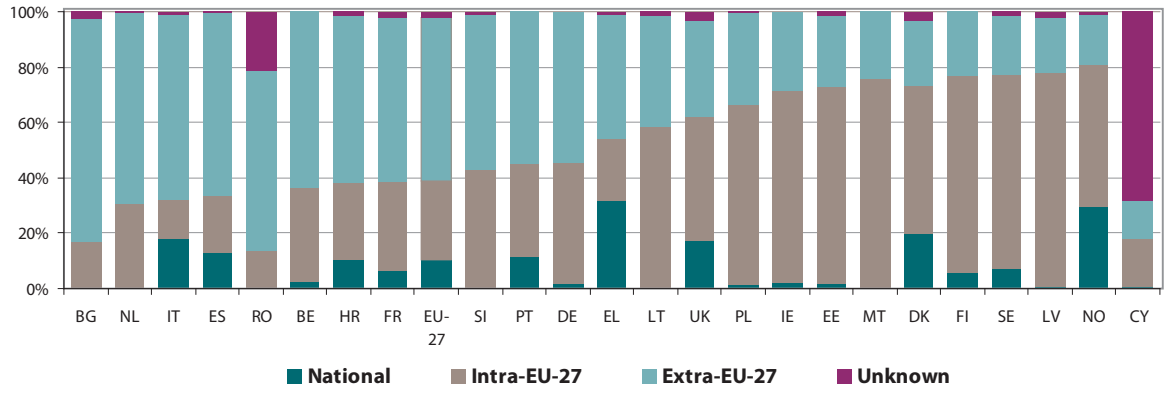
Source: Eurostat (Transport)

The top 20 ports in 2006 are depicted in Table 4.56. One must note that a reporting port ("statistical port") may actually represent the grouping of a number of ports in the statistics. These top-20 accounted for 38 % of the total weight of goods handled in the countries reporting data: the 22 concerned EU Member States, the candidate country Croatia, and EFTA members Iceland and Norway.

The port of Rotterdam alone accounted for 9 % of EU-27 total. Most of the transshipment in Rotterdam involves bulk goods such as oil products, chemicals, coal and ores, in addition to which it is Europe's largest container port. Rotterdam plays an important role in the transport of goods from/to overseas, including intercontinental origins/destinations such as the United States, the Far East, Brazil and South Africa.

Maritime goods transport - National and International

Figure 4.57: Seaborne transport of goods between main ports* in the reporting country and their partner ports, distribution by main geographical area, 2006 (% total gross weight of goods transported)



* ports handling over 1 million tonnes yearly

Source: Eurostat (Transport, Quarterly data)

Unlike the figures presented so far in this section, which show the total handling of goods in ports, Figure 4.57 and Table 4.58 are based on estimates of the weight of goods transported by sea between ports. These are based on the statistics declared by main ports vis-à-vis their partner (origin and destination) ports.

While, on average in the EU-27, National transport accounted for 11 % of the total Seaborne transport of goods, this share was higher in countries with a large number of islands, such as Greece (32 %) and Denmark (20 %), but also those that have long coasts, such as Norway (30 %), Italy (18 %) and the United Kingdom (17 %). One must note that, as a whole, the National seaborne transport of goods may be underestimated, as the figures cover ports handling over 1 million tonnes yearly.

Intra-EU transport made up 28 % of the EU-27's total Seaborne transport of goods.

Table 4.58: Seaborne transport of goods between main ports* in the reporting country and their partner ports, by main geographical area, 2006 (gross weight of goods transported, thousand tonnes)

	National	International		Unknown	Total
		Intra-EU-27	Extra-EU-27		
EU-27	328 339	885 438	1 835 765	57 902	3 107 444
BE	5 996	72 286	137 525	206	216 015
BG	8	4 651	22 182	672	27 513
DK	17 231	46 933	21 409	2 523	88 096
DE	4 017	130 716	159 734	8	294 478
EE	682	34 084	11 993	789	47 549
IE	1 085	32 956	13 647	19	47 709
EL	34 339	23 962	48 416	1 287	108 004
ES	50 852	79 087	255 001	1 895	386 836
FR	21 535	106 302	200 889	6 936	335 662
IT	77 953	62 359	291 615	3 466	435 393
CY	29	1 362	1 074	5 278	7 742
LV	180	42 990	11 517	1 032	55 719
LT	:	16 001	10 753	482	27 235
MT	:	2 702	874	1	3 577
NL	:	146 569	326 513	3 184	476 267
PL	825	34 146	17 422	264	52 657
PT	6 783	19 964	32 871	3	59 620
RO	:	6 145	30 020	9 840	46 005
SI	:	6 588	8 610	193	15 391
FI	5 626	69 496	22 736	4	97 862
SE	11 144	107 276	32 240	2 345	153 005
UK	90 054	234 520	178 721	17 475	520 768
HR	1 927	5 242	11 159	266	18 595
NO	50 009	87 150	30 375	1 706	169 242

* ports handling over 1 million tonnes yearly

No National transport figures reported by: LT, MT, NL, RO and SI.

Note: Unlike preceding data, the figures shown do not reflect the total handling of goods in ports, but they estimate the transport of goods by sea i.e. between ports. EU-27 National transport is the sum of the National transport of the Member States. International intra-EU-27 transport for individual Member States and international extra-EU-27 transport are based on the sum of inward and outward declarations.

Source: Eurostat (Transport, Quarterly data), Member States

It accounted for more than double this share in those Member States whose shorelines are entirely, or to the greater part, defined by the Baltic Sea: Latvia (77 %), Estonia (72 %), Finland (71 %), Sweden (70 %), Poland (65 %) and Lithuania (59 %), as well as in Malta (76 %) and Ireland (69 %).

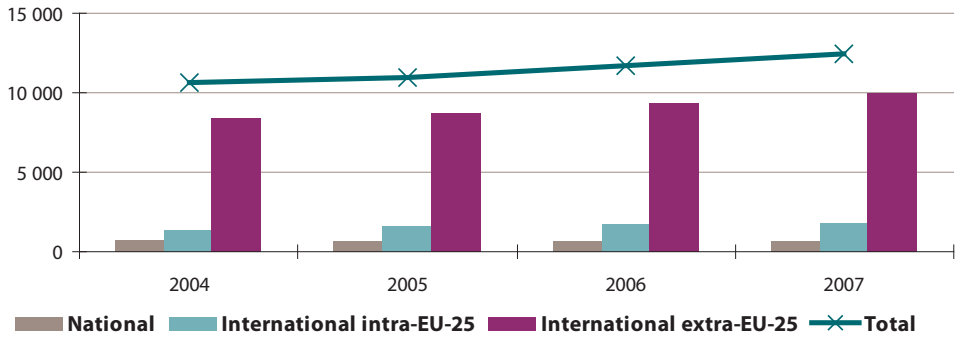
Extra-EU goods transport accounted for nearly 60 % of total EU-27 Seaborne transport in 2006. Five major economies together accounted for more than two thirds of the EU-27's extra-EU Seaborne transport: the Netherlands (18 %), Italy (16 %), Spain (14 %), France (11 %) and the United Kingdom (10 %). The share of total Seaborne transport made up by extra-EU transport was highest, after that of Bulgaria (81 %), in the first three: the Netherlands (69 %), Italy (67 %) and Spain (66 %).

4.1.6 Air freight and mail transport

Benefiting from a worldwide network of airports, Air freight and mail transport plays a role in national, intra- and extra-EU transport. This is however less pronounced than in passenger transport, as aircraft form an expensive mode in terms of tonne-kilometres performed. Generally, one may say that the importance of Air freight and mail transport grows as does the distance covered. For the swift intercontinental transport of lighter goods, this mode has no competitor.

The total number of tonnes of Air freight and mail transported to, from and within the EU-25 grew at an annual average rate of 5.4 % from 2004, to reach 12.4 million tonnes in 2007 (Figure 4.59). While this amount may appear small compared to the inland modes'performances, freight carried was certainly valuable.

Figure 4.59: Air freight and mail transport, EU-25, 2004 to 2007 (goods loaded and unloaded, thousand tonnes)



Source: Eurostat (Transport)

In 2007, EU-27 national transport accounted for 5 % and international intra-EU-27 transport for 15 %, while extra-EU transport accounted for the largest share of 80 % of total EU-27 Air freight and mail transport (Table 4.60). This distribution is to be expected given the competition offered by surface means of transport at the national level and between European countries.

From 2004 to 2007, the amount of Air freight carried on EU-25 domestic air services was in fact reduced, at an annual average rate of 5.4 %, most probably reflecting increased competition from Road and Rail. Intra-EU-25 Air freight and mail loaded and unloaded grew at 5.8 %. Reflecting strong growth in the European Union's external trade over the period, the volume of goods handled from and to extra-EU-25 destinations grew at an impressive yearly rate of 8.0 %. Extra-EU-25 transport accounted for 86 % of the absolute increase in the EU-25's total volume of Air freight and mail transport over the period.

The data in this section refer to freight and mail loaded and unloaded. Given that the same movement of goods may be reported as a departure by one airport and as an arrival by the partner airport, Air transport figures exclude the double-counting of goods in national transport. Similarly, in intra-EU international transport, the EU totals exclude double-counting. Data collection is based upon the first origin/destination of freight, and not the actual origin/destination in case of flight connections.

One must note that countries only report the handling performance of airports whose annual volumes are above a certain threshold. When comparing different years, volumes may sometimes appear erratic. A certain number of derogations have been granted to Member States in the reporting of Air freight and mail data. In addition, Sweden has not reported freight and mail data since 2005; data for Denmark do not include Copenhagen Kastrup airport, explaining why figures for Denmark are small; data for France are underestimated as the two Paris airports, Charles de Gaulle and Orly, do not report all freight and mail handled.

Five Member States accounted for over three quarters of the total tonnage of Air freight and mail handled in the EU-27 in 2007 (including intra-EU-27 double-counting): Germany (25 %), the United Kingdom (18 %), the Netherlands (13 %), France (12 %) and Belgium (9 %).

Table 4.60: Air freight and mail transport by main geographical area, 2007 (goods loaded and unloaded, thousand tonnes and %)

	National	International		TOTAL	AAGR '04 to '07
		intra-EU-27	extra-EU-27		
EU-27	636.6	1 822.5	10 012.7	12 471.8	5.4%*
BE	0.4	479.2	723.7	1 203.2	22%
BG	0	14.3	4.4	18.7	:
CZ	2.1	37.7	20.1	59.9	1%
DK	1.5	5.1	0.8	7.4	-2%
DE	106.1	680.4	2 631.8	3 418.4	7%
EE	0	5.9	16.7	22.6	65%
IE	10.8	70.0	51.9	132.8	29%
EL	13.5	60.4	29.1	103.0	-3%
ES	109.4	172.6	228.5	510.6	-1%
FR	161.5	304.5	1 240.7	1 706.8	5%
IT	75.8	295.9	535.3	907.0	5%
CY	0	33.5	8.5	42.0	4%
LV	0	4.7	2.5	7.2	-5%
LT	0	6.9	5.9	12.8	35%
LU	0.2	67.8	634.8	702.8	4%
HU	0	32.5	35.1	67.6	4%
MT	0	12.9	5.0	18.0	4%
NL	0	54.4	1 654.9	1 709.3	4%
AT	0.8	55.1	150.7	206.6	9%
PL	7.2	19.2	18.4	44.7	12%
PT	22.3	61.9	46.6	130.8	2%
RO	0.5	14.3	4.5	19.2	0%
SI	0	9.5	3.0	12.5	36%
SK	0	0.8	1.5	2.3	-35%
FI	4.4	68.9	72.9	146.1	6%
UK	120.0	438.1	1 885.3	2 443.4	0%
IS**	:	:	:	61.8	3%
CH	4.7	349.9		354.6	4%
NO	0.6	2.7		3.3	:

* EU-25 ** 2006 SE: not available

Source: Eurostat (Transport)

In the first three of these Member States, total Air freight and mail transport was particularly boosted by extra-EU-27 transport. Together with Luxembourg, they displayed the highest shares among Member States of extra-EU in total Air freight and mail transport. While, in Belgium, a significant share of Air freight and mail transport was accounted for by intra-EU-27 transport (40 %), domestic air transport played a greater role in France, accounting for 9 % of total Air freight and mail transport. This is explained by France's larger size, making domestic freight and mail flights worthwhile, as well as by transport to and from France's overseas territories. Domestic Air freight and mail transport appears to be more important in large countries such as Norway, where it made up 19 % of total, and in Poland (16 %), as well as in countries with more distant or numerous islands such as Spain (21 %), Denmark (20 %), Portugal (17 %) and Greece (13 %).

Four of the five Member States accounting for over three quarters of EU-27 Air freight and mail handled in 2007, Germany, Belgium, France and the Netherlands, stood behind 81 % of the increase in EU-27 Air freight and mail transport from 2004 to 2007 while, in the United Kingdom, volumes were close to unchanged.

The Member States that displayed the highest average annual growth rates over the period were new Member States of the 2004 enlargement. Air freight and mail transport grew most from 2004 to 2007 in Estonia (65 %, annually), Slovenia (36 %) and Lithuania (35 %) as well as in Ireland (29 %) and Belgium (22 %).

Table 4.61: Air freight and mail transport: main airports by main geographical area, 2007 (goods loaded and unloaded)

	National	Intra-EU-27	Extra-EU-27	Total
EU-27	Paris Charles de Gaulle (FR)	Köln-Bonn (DE)	Frankfurt am Main (DE)	
BE	Oostende	Bruxelles/Brussel		
BG	Sofia			
CZ	Praha Ruzyně			
DK	:			
DE	München	Köln-Bonn	Frankfurt am Main	
EE	–	Tallinn Ülemiste		
IE	Shannon	Dublin/Baile Átha Cliath		
EL	Athens			
ES	Madrid Barajas			
FR	Paris Charles de Gaulle			
IT	Roma Fiumicino	Milano Malpensa		
CY	Larnaka			
LV	–	Riga International		
LT	–	Vilnius	Kaunas	
LU	Luxembourg			
HU	Budapest Ferihegy			
MT	–	Malta Luqa		
NL	–	Amsterdam Schiphol		
AT	Wien Schwechat			
PL	Warszawa Okęcie			
PT	Lisboa			
RO	Bucuresti Baneasa	Bucuresti Otopeni		
SI	Ljubljana Jože Pučnik			
SK	Bratislava Ivanka			
FI	Helsinki Vantaa			
SE	:			
UK	Nottingham East Midlands		London Heathrow	
NO	Oslo Gardermoen	–	–	Oslo Gardermoen
CH	Genève/Genf	–	–	Zürich

* SE: not available; DK: Copenhagen Kastrup airport data not available

Source: Eurostat (Transport)

Based on loaded and unloaded data, Table 4.61 shows countries' main airports in 2007 for national, intra-EU, extra-EU and total Air freight and mail transport. It is interesting to compare these with the main airports in passenger transport (see: Table 4.90).

In 14 Member States [16] one airport was the main one for all destinations in Air freight and mail transport. In comparison, in 21 Member States, one national airport was the main one for all destinations in Passenger transport. In 11 Member States[17] the same international airport, situated in the capital city, was the main airport for all geographical destinations, in both Air freight and mail and Passenger transport.

Whereas in Spain (Madrid Barajas) and in France (Paris Charles de Gaulle), one single airport was the main handler for Air freight and mail on all three main types of routes, in Germany, Ireland, Italy, Romania and the United Kingdom, airports appear to specialise. New air cargo hubs have been developed to overcome the saturation of traditional airports. This can be said to be the case with Köln-Bonn, the main German airport for intra-EU Air freight and mail, as well as with Nottingham East Midlands, the main British airport for both national and intra-EU handling in 2007.

[16] excluding: SE and DK, Copenhagen Kastrup

[17] CZ, EL, ES, CY, LU, HU, AT, PL, PT, SI & FI

Table 4.62: Intra-EU-27 air freight and mail transport: top 20 airports*, 2004 and 2007 (goods loaded and unloaded, tonnes)

	2004	2007	AAGR '04 to '07
Köln-Bonn (DE)	330 433	379 284	5%
Bruxelles/Brussel (BE)	247 631	260 922	2%
Liège Bierset (BE)	:	211 636	:
Paris Charles de Gaulle (FR)	156 592	209 319	10%
Nottingham East Midlands (UK)	159 234	188 810	6%
Frankfurt am Main (DE)	200 344	178 781	-4%
London Heathrow (UK)	160 973	103 781	-14%
Milano Malpensa (IT)	71 112	98 560	11%
Bergamo Orio Al Serio (IT)	103 031	98 100	-2%
Madrid Barajas (ES)	85 318	77 531	-3%
Luxembourg (LU)	66 000	67 790	1%
Helsinki Vantaa (FI)	62 877	64 407	1%
Dublin/Baile Átha Cliath (IE)	8 138	61 301	96%
London Stansted (UK)	63 645	58 810	-3%
Athens (EL)	60 734	57 232	-2%
Amsterdam Schiphol (NL)	60 154	53 682	-4%
Wien Schwechat (AT)	52 117	53 373	1%
Barcelona (ES)	48 196	53 165	3%
Leipzig-Halle (DE)	663	51 551	327%
Lisboa (PT)	40 549	35 702	-4%

* main airports; DK & SE: airport data not fully available
Source: Eurostat (Transport), Member States

Table 4.63: Extra-EU-27 air freight and mail transport: top 20 airports*, 2004 and 2007 (goods loaded and unloaded, tonnes)

	2004	2007	AAGR '04 to '07
Frankfurt am Main (DE)	1 561 777	1 939 941	7%
Amsterdam Schiphol (NL)	1 406 858	1 597 285	4%
London Heathrow (UK)	1 241 762	1 288 840	1%
Paris Charles de Gaulle (FR)	1 020 921	1 147 045	4%
Luxembourg (LU)	550 583	634 814	5%
Bruxelles/Brussel (BE)	412 778	473 284	5%
Milano Malpensa (IT)	280 691	376 970	10%
Köln-Bonn (DE)	248 948	293 245	6%
München (DE)	121 928	198 177	18%
Madrid Barajas (ES)	178 159	189 228	2%
London Gatwick (UK)	210 643	167 595	-7%
Manchester (UK)	140 878	157 584	4%
Liège Bierset (BE)	:	151 961	:
Wien Schwechat (AT)	104 935	150 569	13%
London Stansted (UK)	149 621	137 237	-3%
Frankfurt-Hahn (DE)	63 175	104 124	18%
Roma Fiumicino (IT)	79 922	102 317	9%
Oostende (BE)	:	98 418	:
Helsinki Vantaa (FI)	50 378	72 756	13%
Maastricht-Aachen (NL)	39 936	57 615	13%

* main airports; DK & SE: airport data not fully available
Source: Eurostat (Transport), Member States

In the three new Member States that displayed particularly strong average annual growth rates, accession to the EU and, later for example, to the Schengen area, have been accompanied by rapid developments in Air transport infrastructure. Tallinn airport, for example, underwent a large expansion project beginning in 2006, contributing to the take-off in goods transport that year. Similar developments at Ljubljana, Slovenia's main airport, gave Air freight and mail activity a strong impulse after 2005. In Lithuania, the developments of Vilnius and Kaunas airports have contributed to market diversification. The former displayed specialisation in intra-EU and the latter in extra-EU Air freight and mail transport in 2007. In Slovakia and Latvia, in contrast, total volumes handled were reduced by 35 % and 5 % respectively from 2004 to 2007 (Table 4.60), perhaps reflecting the freeing of capacity as part of a stronger focus on Passenger transport.

Table 4.62 represents the EU-27's top-20 airports in terms of tonnes of Air freight and mail loaded and unloaded for intra-EU-27 transport. These airports are located in 13 Member States. The two specialised airports of Köln-Bonn and Nottingham East Midlands mentioned above, as well as Liège Bierset airport featured among the top-5. Located in the centre of the Paris-Amsterdam-Frankfurt 'golden triangle', the latter is mainly used for freight operations. Confirming specialisation trends, volumes of Air freight and mail handled were reduced at all top-4 airports for international Air passenger transport (see Tables 4.92 and 4.93) except Paris Charles de Gaulle.

Table 4.63 shows the EU-27's top 20 airports for extra-EU-27 Air freight and mail. Located in 10 Member States, these airports accounted for 93 % of the extra-EU-27 Air freight and mail loaded and unloaded, in 2007. In the Benelux countries, Austria and Finland, Top-20 airports accounted for the entirety of their home Member State's extra-EU-27 Air freight and mail whereas, in the larger economies, the airports depicted accounted for 90 % or more of Member States' total extra-EU-27 Air freight and mail volumes in Germany, the United Kingdom, France and Italy, and 83 % in Spain.

From 2004 to 2007, in all top 20 airports for extra-EU Air freight and mail with data available, except London Gatwick and Stansted, volumes handled grew. Average annual growth rates reached 18 % in the airports of Frankfurt-Hahn and München (Germany), 14 % in Wien Schwechat (Austria), 13 % in both Helsinki Vantaa (Finland) and Maastricht-Aachen (Netherlands), and 10 % in Milano Malpensa (Italy).

Table 4.64: Air freight and mail transport: Member State main extra-EU-27 airport pair*, by country, 2007 (goods loaded and unloaded, tonnes)

	Extra-EU-27 airport pair	Tonnes
BE	Liège Bierset - Tel-Aviv Ben Gurion (Israel)	80 451
BG	Sofia - Moscow Sheremetyevo (Russia)	763
DK	Billund - Keflavik (Iceland)	204
DE	Frankfurt am Main - Gimpo (Republic of Korea)	149 786
EE	Tallinn Ülemiste - Istanbul Sabiha Gökçen (Turkey)	10 949
IE**	Dublin/Baile Átha Cliath - New York John F. Kennedy International (USA)	9 866
EL**	Athens - New York John F. Kennedy International (USA)	5 413
ES	Madrid Barajas - Buenos Aires Ezeiza Ministro Pistarini (Argentina)	17 818
FR	Paris Charles de Gaulle - Dubai International (United Arab Emirates)	72 461
IT**	Milano Malpensa - Hong Kong International (Hong Kong)	41 435
CY	Larnaka - Dubai International (United Arab Emirates)	2 164
LV	Riga International - Moscow Sheremetyevo (Russia)	464
LT	Kaunas - Aktyubinsk (Kazakhstan)	1 370
LU	Luxembourg - Baku Heydar Aliyev International (Azerbaijan)	145 586
HU	Budapest Ferihegy - Hong Kong International (Hong Kong)	7 573
MT	Malta Luqa - Dubai International (United Arab Emirates)	2 188
NL	Amsterdam Schiphol - Shanghai Pudong (China)	161 772
AT	Wien Schwechat - Incheon (Republic of Korea)	50 045
PL**	Warszawa Okęcie - Chicago O'Hare International (USA)	3 717
PT	Lisboa - Luanda FIR/UIR (Angola)	8 402
RO**	Bucuresti Otopeni - Tel-Aviv Ben Gurion (Israel)	1 360
SI	Ljubljana Jože Pučnik - Zagreb Pleso (Croatia)	975
SK	Bratislava Ivanka - Baghdad International (Iraq)	391
FI	Helsinki Vantaa - Shanghai Pudong (China)	10 928
UK	London Heathrow - New York John F. Kennedy International (USA)	114 786

* main airports ** 2006: not available: CZ and SE; data for Denmark do not include Copenhagen Kastrup airport

Source: Eurostat (Transport), Member States

Table 4.64 shows the Member States' main extra-EU-27 airport pairs in Air freight and mail transport in 2007, based on goods loaded and unloaded. In all of the Member States for which data are available, except for Belgium, the main airport pair was flown to and from the Member State's main airport for extra-EU-27 Air freight and mail transport (see: Table 4.61).

Although the airport pairs depicted accounted for less than 10 % of total extra-EU-27 Air freight and mail transport in 2007, they do reflect strong, both new and traditional ties that individual EU-27 Member States have with trading partners throughout the world.

Involving the transport of more than 145 thousand tonnes of Air freight and mail, the three largest airport pairs in 2007 each connected the EU-27 with Asian partner countries: Amsterdam Schiphol - Shanghai Pudong (China); Frankfurt am Main - Seoul Gimpo (Korea, Rep.); and Luxembourg - Baku Heydar Aliyev Int. (Azerbaijan).

4.2 Passenger transport

4.2.1 Introduction

Close to half a billion EU-27 citizens enjoy an extensive, diversified and, in large part safe and effcient passenger transport system. Collected in varying ways, according to means of transport's specificities, the modes' passenger transport statistics are analysed and compared in this section.

In the EU-27, some 6.2 trillion passenger-kilometres (pkm) were performed by six main modes in 2006 (Table 4.65). Passenger transport performed by those modes in the USA in 2006 was around 8.6 trillion pkm, some 37 % more.

Table 4.65: Passenger transport performance: EU-27, USA, Japan, China and Russia, by transport mode, 2006 (billion pkm)

	EU-27			USA			Japan			China			Russia		
	pkm	% pkm	1000 pkm / inhab.	pkm	% pkm	1000 pkm / inhab.	pkm	% pkm	1000 pkm / inhab.	pkm	% pkm	1000 pkm / inhab.	pkm	% pkm	1000 pkm / inhab.
Passenger car	4 601.7	74%	9.3	7317.1**	85%	24.3	724.0***	:	5.7	1013.1****	:	0.8	:	:	:
Bus + trolley-bus + coach	522.6	8%	1.1	275.4	3%	0.9	89.0	:	0.7	:	:	:	138.8	:	1.0
Railway	384.0	6%	0.8	23.7	0%	0.1	396.0	:	3.1	662.2	:	0.5	177.4	:	1.2
Tram + metro	83.9	1%	0.2	19.7	0%	0.1	:	:	:	:	:	:	55.3	:	0.4
Waterborne	39.9	1%	0.1	0.6	0%	0.0	3.8	:	0.0	7.4	:	0.0	0.6	:	0.0
Air (domestic / intra-EU-25)	547.0	9%	1.1	950.5	11%	3.2	86.0	:	0.7	237.1	:	0.2	93.9	:	0.7
Total, six modes	6 179.1	100%	12.6	8,587.0	100%	28.5	:	:	:	:	:	:	:	:	:

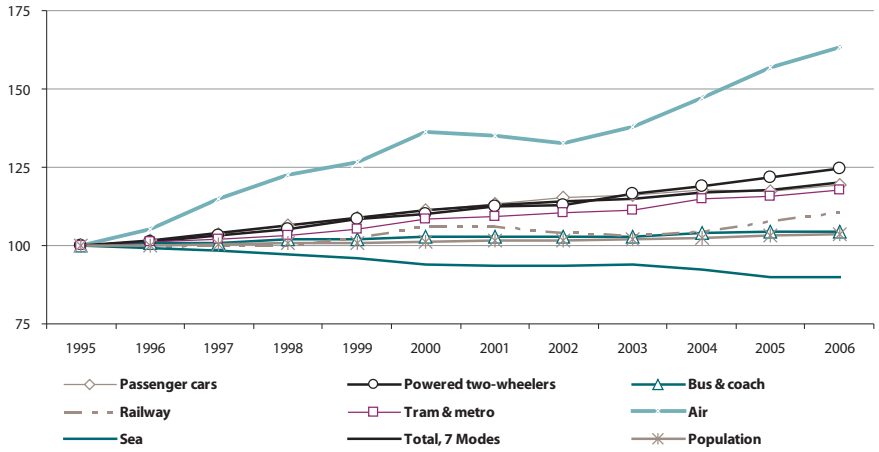
* estimated, 2005 ** including light trucks / vans *** including light vehicles **** Including buses and coaches

Note: Powered two-wheelers are not included. The data concerning different geographical entities are not fully comparable.

Source: DG Energy and Transport, Eurostat, US Bureau of Transportation Statisitics, Japan Statistics Bureau, National Bureau of Statistics of China, Goskom STAT (Russia), International Transport Forum

The individual modes' 1995-to-2006 trends in passenger transport performance are depicted in index form (Figure 4.66). Over that period, Air passenger transport displayed by far the largest average annual growth rate (4.6 %). Performance by passengers' preferred mode, the Car, grew at 1.6 % whilst Powered two-wheeler performance is estimated to have grown at a somewhat greater 2 %. Rail's passenger transport performance grew at close to 1 % while Sea transport fell at around that rate.

Figure 4.66: EU-27 passenger transport by mode, on the basis of pkm perfomed, 1995 to 2006 (Index 1995 = 100)



Air and Sea: only domestic and intra-EU-25 transport; provisional estimates

Source: DG Energy and Transport

Table 4.67: Passenger transport performance, by transport mode, EU-27, 1995 to 2006 (billion pkm)

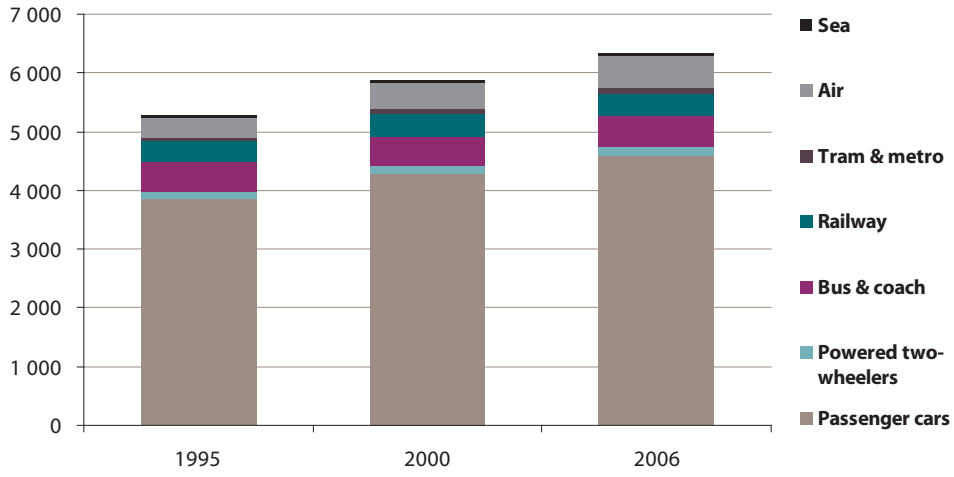
	Passenger cars	Powered two-wheelers	Bus & coach	Railway	Tram & metro	Air	Sea	Total
2006	4 602	154	523	384	84	547	40	6 333
2005	4 524	150	523	374	82	526	40	6 220
2004	4 533	147	521	363	82	493	41	6 181
2002	4 441	139	514	362	79	445	42	6 022
2000	4 283	136	514	368	77	456	42	5 876
1995	3 855	123	501	348	71	335	44	5 277
AAGR 1995 - 2006	1.6%	2.0%	0.4%	0.9%	1.5%	4.6%	-1.0%	1.7%

Air and Sea: only domestic and intra-EU-25 transport; provisional estimates

Source: DG Energy and Transport

The EU-27's main means of transport for passengers, Cars accounted for somewhat under three quarters (73%) of the total performance of the seven modes depicted in 2006 (Table 4.67). Taking into account gradually growing motorisation in the, on average, more prosperous EU-15, added to sometimes very rapidly increasing rates of motorisation in the Member States of the 2004 and 2007 accessions (NMS-12), Passenger cars' share in total (its 'modal share') appeared unchanged compared to its share in 1995.

Figure 4.68: Passenger transport performance, by motorised means of transport, EU-27, 1995, 2000 & 2006 (billion pkm)



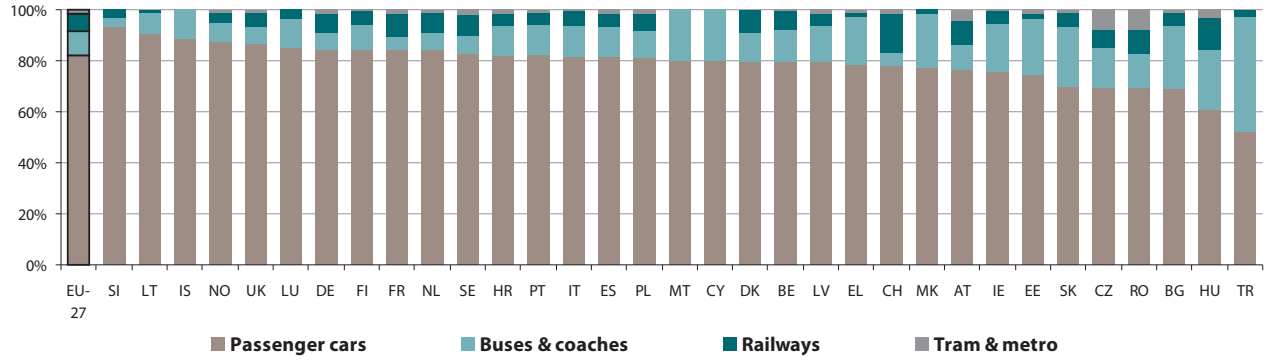
Air and Sea: only domestic and intra-EU-25 transport; provisional estimates

Source: DG Energy and Transport

Looking at total EU-27 passenger transport performance at five-year intervals further underlines trends in the transport modes' contributive, modal shares (Figure 4.68). One can discern that Passenger cars maintained the strength of their transport performance. Their modal share in fact fell slightly, by somewhat under one half percentage point from 73.1 % 1995 to 72.7 % in 2006.

Apart from the slight decline in Sea's transport weight, one does notice a significant rise in the importance of Air passenger transport. Its modal share, was the one that changed most between 1995 and 2006, from 6.3 % to 8.6 %. Air overtook Buses and coaches in 2005 to take second place as performer of transport in the EU-27.

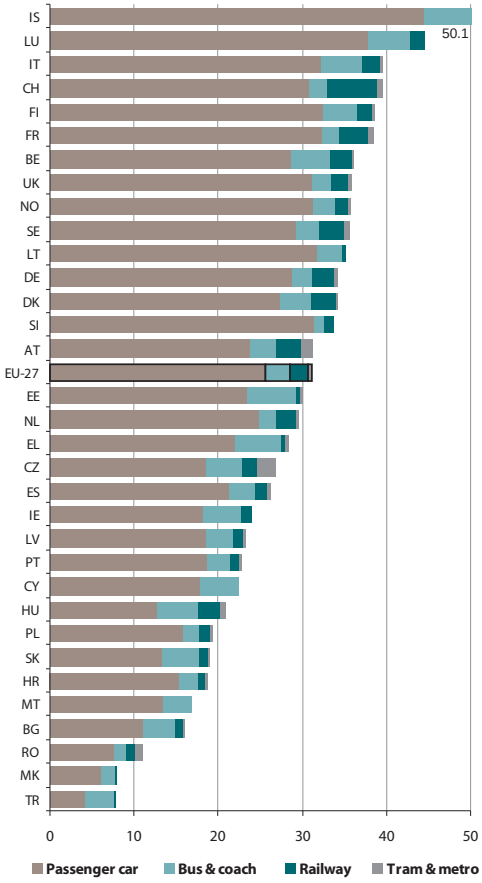
Figure 4.69: Modal split of land passenger transport*, based on pkm performed, 2006 (%)



* Excluding powered two-wheelers. Were these to be included, they would account for 2.7% of EU-27 total.

Source: DG Energy and Transport

Figure 4.70: Average daily distance travelled per inhabitant by means of land transport, 2006 (kilometres)



Inland modes not covered here include: powered two-wheelers, bicycles, horses and walking.

Source: DG Energy and Transport

Focus is here on the four main EU-27 inland passenger transport modes: Passenger cars, Buses and coaches, Railways, and Trams and metros. Broadly speaking, the first two run on roads and the latter two on rails. The EU-27 Member States as well as Candidate Countries and EFTA members' distributions of passenger transport according to performance in the four modes are depicted (Figure 4.69).

In the EU-27 in 2006, the total average distance travelled per inhabitant by all four modes was 31 km (Figure 4.70). Reflecting their particular mobility and versatility, Passenger cars accounted for 26 km, the lion's share of the average distance travelled daily, 82 %.

Both in terms of modal share and of the average distance travelled by means of the four modes, countries display specificities that are influenced by a large number of factors. A major one of these clearly is the size of countries' vehicle stocks, (covered in detail in Chapter 3) which, in-turn, for example, depend to an important extent on average income.

One must note that figures are not fully comparable between Member States as data collection is not harmonised.

The major roles played by Member States in the modes' performance are highlighted in the following sections, which focus on the four individual inland modes as well as on Maritime and Air passenger transport.

4.2.2 Passenger car transport

Table 4.71: Transport performed by passenger cars, 1990 to 2006 (billion pkm)

	1990	1995	2000	2005	2006	AAGR 1990 - 2006	AAGR 1995 - 2006	pkm / inhabitant, 2006
EU-27	:	3 855	4 283	4 524	4 600	:	1.6%	9 366
EU-15	3 101	3 521	3 859	4 013	4 052	1.7%	1.3%	10 451
BE	90	98	106	109	110	1.2%	1.0%	10 457
BG	:	18	23	29	31	:	5.1%	4 016
CZ	:	55	64	69	70	:	2.3%	6 792
DK	48	49	51	53	54	0.8%	0.9%	9 948
DE	683	815	831	857	869	1.5%	0.6%	10 541
EE	:	6	8	10	10	:	4.2%	7 403
IE	13	16	21	26	28	5.2%	5.5%	6 652
EL	35	44	63	85	90	6.1%	6.7%	8 090
ES	174	250	303	338	341	4.3%	2.8%	7 791
FR	586	640	700	727	724	1.3%	1.1%	11 833
IT	523	615	727	689	693	1.8%	1.1%	11 790
CY	:	3	4	5	5	:	3.6%	6 524
LV	:	8	11	14	16	:	6.8%	6 755
LT	:	16	26	35	39	:	8.6%	11 598
LU	4	5	6	6	7	3.1%	3.0%	13 857
HU	47	45	46	47	47	0.0%	0.3%	4 649
MT	:	2	2	2	2	:	1.5%	4 938
NL	137	131	141	149	148	0.5%	1.1%	9 061
AT	56	62	67	71	72	1.6%	1.3%	8 696
PL	:	111	150	197	219	:	6.4%	5 746
PT	28	41	58	70	72	6.2%	5.3%	6 812
RO	:	36	45	56	60	:	4.8%	2 776
SI	13	16	20	23	23	3.5%	3.2%	11 484
SK	:	18	24	26	26	:	3.5%	4 888
FI	51	50	56	62	62	1.2%	2.0%	11 884
SE	86	87	92	97	97	0.7%	1.0%	10 721
UK	588	618	640	674	686	1.0%	1.0%	11 359
HR	:	13	20	24	25	:	6.5%	5 627
MK	:	4	4	5	5	:	2.0%	2 257
TR	34	53	79	100	108	7.4%	6.7%	1 489
IS	:	3	4	5	5	:	4.4%	16 226
NO	43	45	49	53	53	1.3%	1.6%	11 449
CH	73	76	81	86	87	1.1%	1.3%	11 664

Data are not harmonised and therefore not fully comparable. BE: includes pkm by vehicles registered as light goods vehicles but used as personal cars. BE and AT: completely revised series. DE: includes DE-E: 1990 = 90.3. UK: data refer to Great Britain only and include pkm by vans.

Source: DG Energy and Transport, Member States

EU-27 Passenger car transport performance grew at 1.6% annually on average from 1995, to reach 4.6 trillion pkm in 2006 (Table 4.71). Performance grew more in the NMS-12 (4.6 %) than in the EU-15 (1.3 %).

In 2006, accounting for 53 % of the EU-27's total population, the four Member States with the largest populations accounted for nearly two thirds of total Passenger car performance: Germany (19 %), France (16 %), Italy and the United Kingdom (both 15 %).

The highest average annual growth rates were displayed, from 1995 to 2006, by the NMS-12 Lithuania (8.6 %), Latvia (6.8 %) and Poland (6.4 %), but also by Greece (6.7 %), Ireland (5.5 %) and Portugal (5.3 %). They belong to the eight Member States whose car stocks grew most from 1990 to 2006 (see Table 3.1). Growth was also strong in Turkey (6.7 %) and Croatia (6.5 %).

On average in the EU-27, Passenger cars performed 9 370 pkm per inhabitant in 2006, and 10 450 in the EU-15. Luxembourg recorded most performance (13 850) as many of its cars are driven by perhaps international commuters. Performance per inhabitant also stood above 11 000 pkm in Finland, France, Italy, Lithuania, Slovenia and the United Kingdom, while it was lowest in Romania (2 780) and Bulgaria (4 000).

4.2.3 Bus and coach passenger transport

Table 4.72: Passenger transport performed by buses and coaches, 1990 to 2006 (billion pkm)

	1990	1995	2000	2005	2006	AAGR 1990 - 2006	AAGR 1995 - 2006	pkm / inhabitant, 2006
EU-27	:	496.8	514.9	525.6	523.4	:	0.5%	1 066
EU-15	367.2	377.2	401.5	416.9	416.9	0.8%	0.9%	1 075
BE	11.4	13.1	13.3	17.5	18.1	2.9%	3.0%	1 719
BG	25.9	11.6	14.6	13.7	12.9	-4.3%	1.0%	1 443
CZ	:	18.6	16.2	15.6	16.0	:	-1.4%	1 562
DK	6.4	7.3	7.4	7.4	7.5	1.0%	0.3%	1 381
DE	73.1	68.5	69.0	67.1	66.2	-0.6%	-0.3%	803
EE	4.5	2.0	2.6	2.7	2.9	-2.7%	3.2%	2 143
IE	3.9	5.2	6.1	6.7	6.9	3.7%	2.7%	1 639
EL	17.7	20.2	21.7	21.7	21.8	1.3%	0.7%	1 960
ES	33.4	39.6	50.3	53.2	49.4	2.5%	2.0%	1 128
FR	41.3	41.6	43.0	43.9	44.9	0.5%	0.7%	734
IT	84.0	87.1	93.6	101.2	102.7	1.3%	1.5%	1 748
CY	:	1.0	1.1	1.3	1.3	:	2.1%	1 644
LV	5.9	1.8	2.3	2.9	2.8	-4.6%	3.8%	1 212
LT	7.9	4.2	2.8	3.7	3.7	-4.6%	-1.1%	1 086
LU	0.5	0.5	0.6	0.8	0.8	3.4%	3.9%	1 748
HU	19.3	16.6	18.7	17.8	17.9	-0.4%	0.7%	1 779
MT	:	0.4	0.5	0.5	0.5	:	1.8%	1 235
NL	13.0	12.0	11.3	11.8	12.0	-0.5%	0.0%	735
AT	7.9	8.7	9.2	9.3	9.3	1.0%	0.6%	1 129
PL	46.3	34.0	31.7	29.3	28.1	-3.1%	-1.7%	738
PT	10.3	11.3	11.8	11.0	11.1	0.5%	-0.2%	1 050
RO	24.0	12.3	12.0	11.8	11.7	-4.4%	-0.5%	543
SI	6.4	2.5	1.6	0.9	0.9	-11.6%	-8.9%	449
SK	:	14.4	9.3	8.5	7.7	:	-5.6%	1 429
FI	8.5	8.0	7.7	7.5	7.5	-0.7%	-0.5%	1 435
SE	9.7	9.7	9.5	8.8	8.7	-0.7%	-1.0%	962
UK	46.2	44.3	47.0	49.0	50.0	0.5%	1.1%	828
HR	7.0	4.1	3.3	3.4	3.5	-4.2%	-1.2%	796
MK	:	1.5	1.4	1.3	1.3	:	-1.6%	613
TR	:	85.7	87.4	90.0	95.0	:	0.9%	1 310
IS	:	0.4	0.5	0.6	0.6	:	4.4%	2 074
NO	3.9	3.8	4.1	4.3	4.3	0.6%	1.2%	918
CH	3.3	5.5	5.3	5.7	6.0	3.8%	0.7%	804

Data are not harmonised and therefore not fully comparable. AT: completely revised series. RO and SI: data include only regular interurban transport. UK: data refer to Great Britain only. DE: includes DE-E: 1990 = 16.5.

Source: DG Energy and Transport, Member States

The third main inland mode for passenger transport in the EU-27 since 2005, Buses and coaches performed 523 billion pkm in 2006 (Table 4.72), which was equivalent to 11.4 % of Passenger car performance. Over half of EU-27 Bus and coach performance was together accounted for by Italy (20 %), Germany (13 %), the United Kingdom (10 %) and Spain (9 %).

Bus and coach performance grew in the EU-27 at an average annual rate of 0.4 % from 1995 to 2006, yet noticeably more in the EU-15 (0.9 %) than in the NMS-12 (-1.4 %). Performance grew most annually on average in Luxembourg and Latvia (both 4 %), in Estonia (3 %) as well as in Iceland (4 %).

Due to major restructuring of public Bus and coach services, important reductions in performance took place during the first half of the 1990s in a number of NMS-12. Performance fell in 12 of the 23 Member States for which data are available, from 1990 to 2006. The 8 NMS-12 among these, as well as Croatia, displayed higher, and in each case significantly different growth rates over the 1995-to-2006 period.

This mode performed most passenger-kilometres per inhabitant in Estonia (2 140) and Greece (1 960) in 2006, while performance per inhabitant also stood above 1 700 pkm in Hungary, Luxembourg, Italy and Belgium, together with Iceland.

4.2.4 Rail passenger transport

Table 4.73: Passenger transport performed by railways, 1990 to 2006 (billion pkm)

	1990	1995	2000	2005	2006	AAGR 1990 - 2006	AAGR 1995 - 2006	pkm / inhabitant, 2006
EU-27	400.7	347.7	368.0	373.8	384.0	-0.3%	0.9%	782
EU-15	268.9	273.3	306.6	324.5	334.2	1.4%	1.8%	862
BE	6.5	6.8	7.7	9.2	9.6	2.4%	3.3%	916
BG	7.8	4.7	3.5	2.4	2.4	-7.0%	-5.8%	314
CZ	13.3	8.0	7.3	6.7	6.9	-4.0%	-1.3%	675
DK	5.1	4.9	5.5	5.9	6.1	1.2%	2.0%	1 118
DE	61.0	71.0	75.4	76.8	79.0	1.6%	1.0%	958
EE	1.5	0.4	0.3	0.2	0.3	-10.5%	-4.4%	190
IE	1.2	1.3	1.4	1.8	1.9	2.7%	3.4%	445
EL	2.0	1.6	1.6	1.9	1.8	-0.5%	1.4%	164
ES	15.5	16.6	20.1	21.6	22.1	2.3%	2.7%	505
FR	63.7	55.6	69.9	76.5	78.8	1.3%	3.2%	1 288
IT	44.7	43.9	47.1	46.1	46.4	0.2%	0.5%	790
CY	–	–	–	–	–	–	–	–
LV	5.4	1.4	0.7	0.9	1.0	-10.0%	-2.9%	432
LT	3.6	1.1	0.6	0.4	0.4	-12.5%	-8.4%	126
LU	0.2	0.3	0.3	0.3	0.3	2.3%	0.3%	633
HU	11.4	8.4	9.7	9.9	9.7	-1.0%	1.2%	958
MT	–	–	–	–	–	–	–	–
NL	11.1	16.4	14.7	14.7	14.7	1.8%	-1.0%	899
AT	8.9	10.1	8.7	9.1	9.3	0.3%	-0.8%	1 125
PL	50.4	26.6	24.1	17.9	18.1	-6.2%	-3.5%	474
PT	5.7	4.8	4.0	3.8	3.9	-2.3%	-1.9%	367
RO	30.6	18.9	11.6	8.0	8.1	-8.0%	-7.4%	374
SI	1.4	0.6	0.7	0.8	0.8	-3.6%	2.6%	396
SK	:	4.2	2.9	2.2	2.2	:	-5.7%	411
FI	3.3	3.2	3.4	3.5	3.6	0.5%	1.1%	686
SE	6.6	6.8	8.2	8.9	9.6	2.4%	3.2%	1 066
UK	33.4	30.3	38.4	44.4	47.0	2.2%	4.1%	779
HR	3.4	1.1	1.2	1.3	1.3	-5.7%	1.9%	304
MK	:	0.1	0.1	0.1	0.1	:	0.1%	50
TR	6.4	5.8	5.8	5.0	5.3	-1.2%	-0.8%	73
IS	–	–	–	–	–	–	–	–
NO	2.1	2.4	2.6	2.7	2.7	1.7%	1.3%	590
CH	12.7	11.7	12.6	16.1	16.8	1.8%	3.3%	2 252

DE: includes DE-E: 1990 = 17.5; CY & MT: no railways

Source: DG Energy and Transport, Member States

EU-27 Railways performed 384 billion passenger-kilometres in 2006, equivalent to 8.3 % of Passenger car transport that year (Table 4.73). The three Member States with the largest populations (they made up 42 % of EU-27 total) together accounted for over half (53 %) of Rail passenger performance. Germany and France (both 21 %) as well as the United Kingdom (12 %) are in fact Member States with long traditions in railways.

In the EU-27, 782 pkm were performed per inhabitant by Railways in 2006 on average. France recorded 1 288 pkm per inhabitant, the highest performance, bolstered by a developed high-speed rail network. Austria, Denmark and Sweden followed, also recording above 1 000 pkm per inhabitant. In Switzerland, in comparison, Rail passenger transport performed a strong 2 212 pkm per inhabitant.

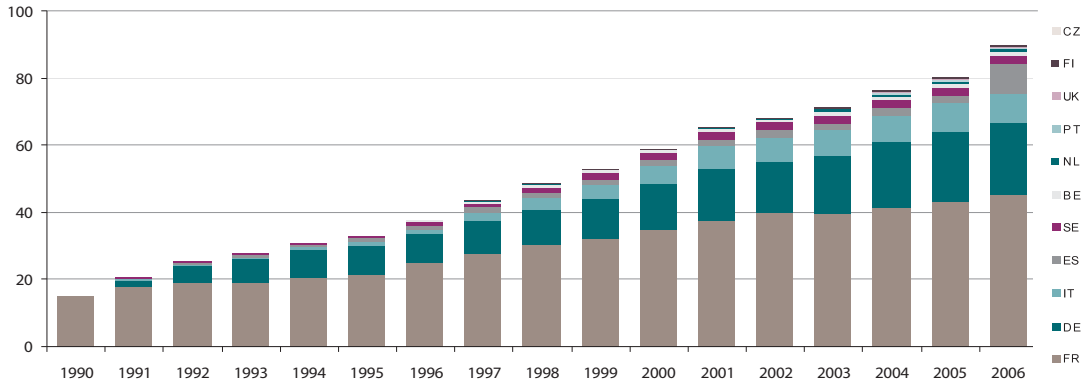
As in the transport of goods (see previous section), major changes in EU-27 Rail passenger transport appear to have taken place during the period under analysis, which are to be explained by strong restructuring in the NMS-12 during the 1990s and, to a lesser extent, by the rapid progression of high-speed rail.

From 1990 to 2006, Railway passenger transport performance in the EU-27 fell slightly, at an estimated average annual rate of 0.3 %. This resulted from growth at an estimated 1.4 % in the EU-15 yet reduction at an estimated 5.9 % in the NMS-12.

Trends in Railway passenger transport also appear to be linked to reductions in rolling stock over the period (see Table 3.6). Given that the number of Passenger transport vehicles declined at an estimated yearly 1.6 % from 1990 to 2006 in the EU-27, overall efficiency gains appear to have been made.

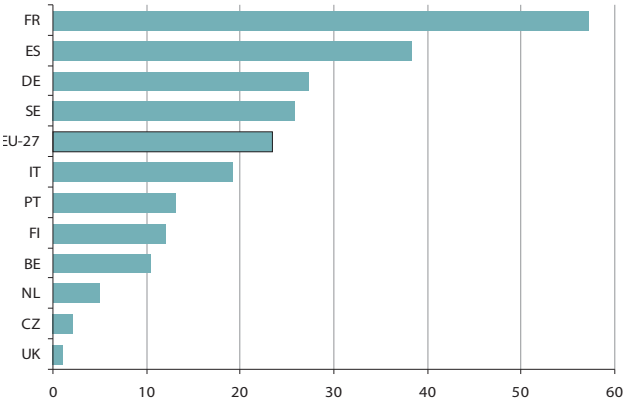
In nine of the central and eastern European NMS-12 (Cyprus and Malta do not have railways), performance was reduced between 1990 and 2006. In some of these NMS-12, one can however discern strong growth after 1995. Poland saw its performance reduced by nearly two thirds from 1990, when that Member State ranked third among the EU-27 witha share of 12.6 %, to 2006, when it ranked sixth and made up a share of 4.7 %.

Figure 4.74: Passenger transport performed by high-speed railways, 1990 to 2006 (billion pkm)



Source: DG Energy and Transport, Union Internationale des Chemins de Fer, National statistics

Figure 4.75: Share of high-speed rail in total rail passenger transport, 2006 (% pkm)



Source: DG Energy and Transport, Union Internationale des Chemins de Fer, National statistics

In contrast, Railway passenger transport performance grew, in all of the EU-15 Member States except in Portugal and Greece. The highest 1990-to-2006 average annual growth rates were displayed by Ireland (2.7 %), Belgium and Sweden (both 2.4 %), Spain and Luxembourg (both 2.3 %) as well as by the United Kingdom (2.2 %).

In 2006, close to 90 billion pkm, somewhat under a quarter (23.4 %) of EU-27 Railway passenger transport performance, were yielded by the high-speed rail networks of 11 Member States (Figure 4.74).

This swift, clean mode's passenger-kilometres rose at an impressive 11.7 % rate annually, on average from 1990 to 2006. A major share of the 75 billion pkm increase in EU-27 high-speed rail's transport performance from 1990 to 2006 is accounted for by the contributions from France (40 %), Germany (29 %), Italy (12 %) and Spain (11 %).

In 2006, over a quarter of Railway passenger transport was performed by high-speed rail trains in three of those Member

Rail passenger transport - National and International

Table 4.76: Passenger transport performed by railways, national and international*, 2006 (million pkm)

	National	International	Total	% International
EU-27	361 305	21 161	388 645	5.4%
BE	8 190	774	8 964	8.6%
BG	2 366	56	2 422	2.3%
CZ	6 564	358	6 922	5.2%
DK	5 531	359	6 097	5.9%
DE	75 263	3 472	78 735	4.4%
EE	231	26	257	10.1%
IE	1 872	0	1 872	0.0%
EL	1 748	63	1 811	3.5%
ES	20 260	714	22 334	3.2%
FR	72 359	7 476	79 835	9.4%
IT	43 712	2 726	50 185	5.4%
LV	893	93	986	9.4%
LT	246	22	268	8.2%
LU	219	79	298	26.5%
HU	9 190	334	9 524	3.5%
NL	15 445	251	15 889	1.6%
AT	7 051	1 211	8 907	13.6%
PL	17 675	565	18 240	3.1%
PT	3 821	55	3 876	1.4%
RO	7 902	164	8 092	2.0%
SI	675	48	724	6.6%
SK	2 043	170	2 213	7.7%
FI	3 447	93	3 540	2.6%
SE	9 037	580	9 617	6.0%
UK	45 565	1 472	47 037	3.1%
HR	1 257	65	1 322	4.9%
TR	5 201	76	5 277	1.4%
LI	:	:	1	:
NO	2 779	41	2 833	1.4%

* AT, DK, ES, IT, NL, NO & RO: Total does not equal National + International; Total includes passenger transport performance of railway undertakings under simplified and detailed reporting (all undertakings operating on a country's territory), while National and International transport performance figures include passenger transport of railway undertakings under detailed reporting only. The difference between Total and (National + International) shows the total transport performance of railway undertakings under simplified reporting.
Please see box, p. 59. CY & MT: no railway.

Source: Eurostat (Transport), Member States

Rail is the only passenger transport mode for which international passenger-kilometre statistics are collected. This provides valuable information on the role the mode plays in the Internal Market. Intermodal comparisons are difficult however at this level. Of the 388.6 billion passenger-kilometres performed in the EU-27 in 2006[18], 21.2 billion (5.4 %) were performed internationally (Table 4.76). A slightly greater share was international in the EU-15 (5.7 %) (data not shown). The four main contributors to total Railway passenger-kilometre performance in the EU-27 in 2006 (see above) were also the main contributors to total international passenger-kilometres. While, together they accounted for two thirds (66 %) of total (both national and international) performance, they contributed in approach of three quarters (72 %) of the EU-27's international performance in 2006: France (35 %), Germany (16 %), Italy (13 %) and the United Kingdom (7 %).

France's impressive share in EU-27 total international Rail passenger-kilometre performance of over one third is explained by the Member State's geographical location on some of Europe's main north-south and east-to-Atlantic (including cross-Channel) axes, as well as by its extensive and in some parts border-crossing high-speed rail network. The United Kingdom's more modest share of total EU-27 international Rail passenger transport performance was also impressive when one considers that it is an island.

Some smaller Member States with important geographical locations for Railway transport, together with France, displayed high shares of international in total Railway passenger transport performance. Luxembourg (27 %) holds a key position on north-south and east-west routes, but is also a major regional employer. Austria (14 %) is situated on one of Europe's major east-west gateways. Followed Estonia (10 %), Latvia, France and Belgium (all three: 9 %) and the third Baltic state, Lithuania (8 %).

Table 4.77: Top 5 intra-EU-27 country-pairs in rail passenger transport*, 2006

Rank	Embarking	Disembarking	Passengers (million)
1	France	United Kingdom**	6.5
	United Kingdom**	France	6.5
2	Sweden	Denmark**	4.1
	Denmark	Sweden**	3.9
3	Belgium**	France	1.9
	France	Belgium**	1.8
4	Belgium	United Kingdom**	1.2
	United Kingdom**	Belgium	1.2
5	Luxembourg**	France	1.2
	France	Luxembourg**	1.1

* data from detailed reporting only, see p. 59 ** reported by this Member State

Source: Eurostat (Transport)

Table 4.77 depicts the five main country-pairs in intra-EU-27 Railway passenger transport. The largest two are attributable to the Channel Tunnel, connecting France and the United Kingdom, and to the Øresund Bridge, joining Sweden and Denmark.

[18] A different calculation method explains this figure's not fully coinciding with the total in Table 4.73.

4.2.5 Tram and metro passenger transport

Table 4.78: Transport performed by tram and metro, 1990 to 2006 (billion pkm)

	1990	1995	2000	2005	2006	AAGR 1990 - 2006	AAGR 1995 - 2006	pkm / inhabitant, 2006
EU-27*	:	71.2	77.1	82.4	83.9	:	1.5%	171
EU-15*	49.0	48.8	54.7	60.0	61.5	1.4%	2.1%	159
BE	0.7	0.8	0.9	0.9	1.0	1.6%	1.6%	90
BG	:	0.3	0.4	0.5	0.5	:	1.8%	60
CZ	:	7.7	8.1	7.9	7.8	:	0.1%	761
DK	:	:	:	0.2	0.2	:	:	30
DE	15.1	14.4	14.6	15.5	15.6	0.2%	0.7%	189
EE		0.1	0.1	0.1	0.1	:	0.0%	74
IE	:	:	:	0.1	0.1	:	:	27
EL	0.8	0.7	1.2	1.5	1.5	3.8%	6.6%	135
ES	4.4	4.3	5.2	6.0	6.2	2.2%	3.5%	142
FR	10.2	8.9	10.9	12.4	12.7	1.4%	3.3%	208
IT	4.2	5.3	5.6	6.0	6.1	2.4%	1.4%	105
CY	–	–	–	–	–	–	–	–
LV	0.7	0.3	0.3	0.3	0.3	-5.8%	-0.8%	122
LT	–	–	–	–	–	–	–	–
LU	–	–	–	–	–	–	–	–
HU	:	2.5	2.6	2.4	2.3	:	-0.8%	227
MT	–	–	–	–	–	–	–	–
NL	1.3	1.4	1.4	1.5	1.5	1.1%	0.8%	92
AT	2.8	3.3	3.6	3.8	3.9	2.0%	1.4%	468
PL	:	5.0	4.7	4.4	4.4	:	-1.2%	115
PT	0.7	0.5	0.5	0.8	1.0	2.5%	5.8%	93
RO	:	6.0	6.0	6.6	6.8	:	1.1%	315
SI	–	–	–	–	–	–	–	–
SK	:	0.4	0.3	0.3	0.3	:	-3.4%	56
FI	0.4	0.4	0.5	0.5	0.5	2.6%	2.8%	100
SE	2.0	1.9	2.0	2.0	2.2	0.5%	1.0%	240
UK	6.5	6.8	8.3	8.6	9.1	2.1%	2.6%	150
HR	:	0.5	0.5	0.5	0.6	:	0.6%	126
MK	–	–	–	–	–	–	–	–
TR	:	:	:	:	:	:	:	:
IS	–	–	–	–	–	–	–	–
NO	0.4	0.4	0.5	0.5	0.5	1.2%	2.6%	109
CH	:	1.5	1.4	1.5	1.5	:	-0.3%	195

* estimated

Data collection methods may differ from country to country and data are therefore not fully comparable.

DE: includes DE-E: 1990 = 6.50. FR: data refer to the Paris Metro and RER (Réseau Express Régional) systems and to metros in other French cities. PT: data refer only to Lisbon and Porto Metro. CY, LT, LU, MT & SI: no tram nor metro.

Source: DG Energy and Transport

Trams and metros performed 83.9 billion pkm in the EU-27 in 2006 (Table 4.78). This is equivalent, for example, to only 1.8 % of Road passenger cars performance. Yet Trams and metros play an irreplaceable role in what would otherwise be very congested urban areas.

Underlining, together with their size, the mode's importance in those Member States' urban areas, Germany (19 %), France (15 %), the United Kingdom (11 %), the Czech Republic (9 %), Romania (8 %) and Spain (7 %) accounted for over two thirds of total EU-27 Tram and metro transport performance in 2006.

Compared to an EU-27 average of 171, the Czech Republic (761), Austria (468), Romania (315), Sweden (240) and Hungary (227) performed most passenger-kilometres per inhabitant in 2006.

In the 20 Member States with data available, over the 1990-to-2006 period, Tram and metro performance grew at rates of close to or above 2 % in Greece (6.6 %), Portugal (5.8 %), Spain (3.5 %), France (3.3 %), Finland (2.8 %), the United Kingdom (2.6 %) and Bulgaria (1.8 %). From 1995 to 2006, performance appears to have fallen in four NMS-12: Slovakia (-3.4 %), Poland (-1.2 %), Hungary and Latvia (both -0.8 %). This possibly reflects factors similar to those that strongly influenced Railway performance (see previous sub-section), yet inferences drawn should be interpreted with care.

4.2.6 Maritime passenger transport

Table 4.79: Maritime passengers embarked and disembarked*, 1997 to 2006 (thousand)

	1997	2000	2003	2006	AAGR 1997 - 2006	AAGR 2000 - 2006
EU-27**	:	:	419 581	405 149		
BE	1 946	1 520	739	891	-8.3%	-8.5%
BG	:	:	4	15	:	:
DK	75 928	51 830	48 653	48 145	-4.9%	-1.2%
DE	:	31 378	32 146	29 256	:	-1.2%
EE	:	:	5 172	6 691	:	:
IE	4 380	4 218	3 747	3 207	-3.4%	-4.5%
EL	32 259	27 867	102 760	90 402	12.1%	21.7%
ES	13 939	14 582	20 041	22 167	5.3%	7.2%
FR	33 124	27 881	27 405	26 402	-2.5%	-0.9%
IT	80 181	86 376	82 576	85 984	0.8%	-0.1%
CY	:	:	480	671	:	:
LV	:	:	118	217	:	:
LT	:	:	135	190	:	:
MT	:	:	6 942	7 328	:	:
NL	1 964	2 004	2 015	2 127	0.9%	1.0%
PL	:	:	3 188	1 737	:	:
PT	34	534	616	686	39.6%	4.3%
RO	:	:	:	:	:	:
SI	:	:	47	30	:	:
FI	15 191	15 964	16 341	16 739	1.1%	0.8%
SE	40 949	36 573	32 748	32 334	-2.6%	-2.0%
UK	36 287	33 851	33 708	29 930	-2.1%	-2.0%
HR	:	14 940	19 483	23 061	:	7.5%
IS	:	318	407	433	:	5.3%
NO	:	:	4 656	6 280	:	:

* all ports ** excluding RO

EL 1997 to 2001: partial data; up to 2003, excluding cruise passengers; BG (2003 & 2006); NL & PT: excluding cruise passengers

excluding land-bound Member States: CZ, LU, HU, AT & SK

Source: Eurostat (Transport)

Table 4.79 shows the number of passengers embarked and disembarked in all ports by country. Care must be taken when interpreting the total figures (inwards + outwards) as a measure of "transport of passengers" as these totals may include some double-counting (the same passengers are counted in both the port of embarkation and the port of disembarkation: the double-counting arises from both ports' reporting data to Eurostat). This especially applies to Greece and Italy, where national transport plays an important role.

Over 400 million maritime passengers were handled in EU-27 ports (embarked and disembarked) in 2006. The proportions of passengers embarked and disembarked were even (see further for explanation).

Data include cruise passengers, who accounted for a small share of approximately 2 % of passengers handled in EU-27 ports.

Air transport as well as tunnels and bridges, for example the Channel tunnel (FR-UK), the Øresund Bridge (DK-SE) and the Charilaos Trikoupis Bridge (EL), compete with Maritime passenger transport in or between certain Member States. Fixed infrastructure may represent longer journeys on land to engage in one of the bridge's or tunnel's extremities, yet swifter travel over or under, rather than across the sea is enabled, as is the possible reduction of risks, such as those of storms.

Maritime passenger transport - National and International

Table 4.80: National maritime passengers handled (embarked and disembarked) in main ports*, 2006 (thousand)

	Passengers handled (1000)		% Total handling
	Embarked	Disembarked	
EU-27	109 490	109 515	53%
DK	8 749	8 761	25%
DE	8 130	8 054	41%
EL	40 774	40 719	94%
ES	7 872	7 930	73%
FR**	2 039	2 161	19%
IT	39 156	39 129	89%
MT	3 554	3 554	:
PL	25	25	3%
PT	323	323	100%
FI	471	442	3%
SE	1 472	1 472	5%
UK	1 573	1 569	12%
HR	10 038	9 974	94%

* ports handling 200 000 passengers or more per year
** including Départements d'Outre-mer

Source: Eurostat (Transport)

Table 4.81: International maritime passengers handled (embarked and disembarked) in main ports*, 2006 (thousand)

	Intra-EU-27	Extra-EU-27	Total international
EU-27	136 653	13 218	149 871
BE	750	0	750
DK	22 549	3 967	26 516
DE	11 175	850	12 025
EE	6 446	1	6 447
IE	2 099	0	2 099
EL	2 537	99	2 636
ES	664	3 951	4 615
FR	16 964	1 014	17 978
IT	3 471	1 730	5 201
LT	188	2	190
NL	2 065	63	2 128
PL	1 511	35	1 546
FI	15 413	7	15 420
SE	27 510	1 345	28 855
UK	23 311	154	23 465
HR	664	2	666
NO	6 230	2	6 232

* ports handling 200 000 passengers or more per year

Source: Eurostat (Transport)

Passengers travelling by sea often return along the same routes, unlike in the case of the maritime transport of goods, which usually travel once to be consumed at destination, as part of the usually more imbalanced exchanges of goods that form trade.

As is the case with goods, passengers are counted twice: once at the port of embarkation and once at the port of disembarkation. EU-27 maritime passenger transport especially takes place between EU-27 ports. Numbers of passengers embarked and disembarked are therefore often very similar.

Greece (37 % of EU-27 total) and Italy (36 %) together accounted for nearly three quarters of the number of passengers travelling nationally by sea, embarking and disembarking in EU-27 ports in 2006 (Table 4.80)[19]. These Member States have topologies (coasts, islands, relatively calmer seas) which make maritime transport particularly viable.

Whereas domestic maritime transport in Denmark (8 %) is carried out across a mainland, main islands and an archipelago, in Germany (7 %) passengers mainly travel to and from North-Sea Frisian islands. In Spain (7 %), national sea travel mainly takes places between the mainland and the islands of Mallorca and Tenerife.

Intra-EU-27 maritime passengers accounted for 91 % of the international passengers handled in the EU-27 in 2006 (Table 4.81). When this figure is adjusted for double-counting, and the number of passengers transported is estimated, intra-EU-27 accounted for a somewhat lesser 87 % of EU-27 international sea passenger transport.

In eight, that is nearly half of the countries shown, intra-EU-27 passengers handled at ports made up a great majority of international total (99 % or 100 %).

[19] Including Greek and Italian ports which handle less than 200 000 passengers per year would result in a greater proportional contribution by these Member States to EU-27 total.

Most intra-EU-27-travelling passengers were recorded in Sweden's ports (27.5 million), journeying especially to Denmark, but also to Finland and to other Member States on the Baltic. The United Kingdom was second in terms of intra-EU-27 maritime passengers handled (23.3 million), especially bound for or arriving from France and Ireland, but also Belgium and the Netherlands. Denmark's ports handled 22.5 million intra-EU-27 passengers, while France's Channel, Mediterranean and Atlantic ports together handled 17.0 million intra-EU-27 passengers in 2006.

Extra-EU-27 journeys accounted for an estimated 13 % of international Maritime passenger transport in the EU-27 in 2006. In terms of the number of passengers handled in ports, in Spain (86 %), Italy (33 %) and Denmark (15 %), the share exceeded this EU-27 Maritime transport average.

Denmark and Spain both handled close to 4 million extra-EU-27 passengers in 2006. Ports of Spain made this the only Member State with higher proportions of extra-EU-27 than intra-EU-27 international maritime passengers handled. This is explained by ferry services running between Europe and the not-so-distant African continent. The Strait of Gibraltar, at its narrowest, is 14.2 km (7.7 nautical miles) wide. Denmark had significant sea-passenger traffic with Norway while Italian extra-EU-27 passenger ferries especially served Croatian and Albanian destinations.

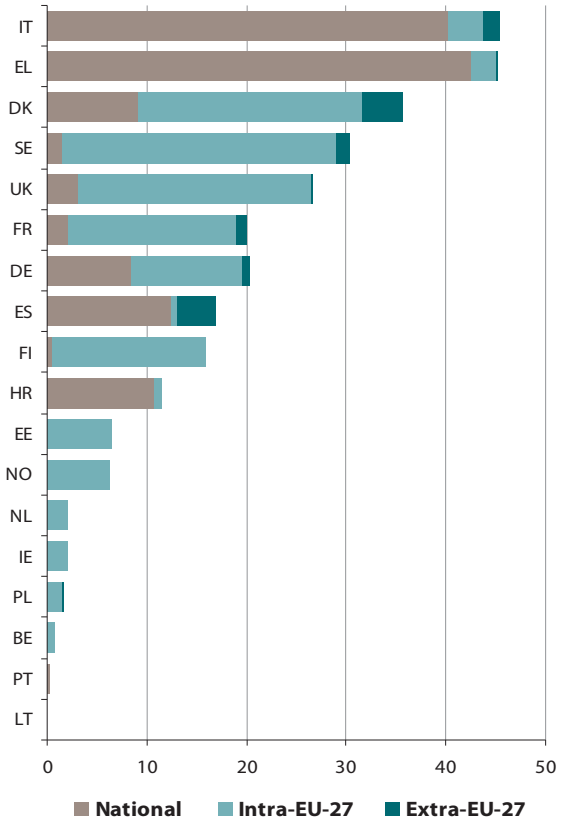
Having looked at the numbers of passengers handled in both national and international Maritime transport, Figure 4.82 presents an overall picture of the Member States', Croatia and Norway's total Maritime passenger between main ports. This is based upon data that estimate the Maritime transport of passengers between main ports, rather than the number of passengers handled in ports.

National transport played an important part in Maritime transport in Italy (89 % of total) and Greece (94 %), the two Member States ranking first and second respectively in 2006, in terms of total passenger transport. While the entirety of Portugal's Maritime passenger transport was national, significant shares of transport were also performed nationally in Spain (73 %), Germany (41 %) as well as Croatia (94 %).

Ranking third to seventh respectively in the EU-27 in 2006 in terms of their total Maritme passenger transport, Denmark (63 %), Sweden (91 %), the United Kingdom (88 %), France (85 %) and Germany (55 %) all displayed significant shares of intra-EU-27 transport. In Finland, Estonia, Norway, the Netherlands, Ireland, Poland, Belgium and Lithuania, transport consisted to at least 95 % of the intra-EU-27 Maritime transport of passengers between main ports.

Extra-EU-27 passenger transport accounted for 23 % of total in Spain and 11 % in Denmark.

Figure 4.82: Estimated maritime transport of passengers* between main ports** in the reporting country and their partner ports, grouped by main geographical area, 2006 (million)



* excluding cruise passengers

** ports handling 200 000 passengers yearly or more; inward and outward

not available: BG, CY, LV, MT, RO & SI

no maritime passenger transport: CZ, LU, HU, AT & SK

Source: Eurostat (Transport)

Table 4.83: National maritime passenger transport: top 15 ports, 2006 (1000 passengers disembarked and embarked)

2007	Port	Inward	Outward	Total
1	Paloukia Salaminas (EL)	6 060	5 920	11 980
2	Perama (EL)	5 920	6 060	11 980
3	Piraeus (EL)	5 446	5 757	11 203
4	Messina (IT)	5 524	5 308	10 832
5	Reggio Di Calabria (IT)	5 215	5 455	10 670
6	Napoli (IT)	3 417	3 382	6 799
7	Capri (IT)	2 477	2 463	4 940
8	Palma Mallorca (ES)	2 229	2 182	4 411
9	Santa Cruz De Tenerife (ES)	2 103	2 089	4 192
10	Piombino (IT)	1 982	1 966	3 948
11	Olbia (IT)	1 845	1 821	3 666
12	Cirkewwa (MT)	1 796	1 759	3 555
13	Mgarr, Gozo (MT)	1 759	1 796	3 555
14	Porto D'Ischia (IT)	1 735	1 709	3 444
15	Portoferraio (IT)	1 598	1 594	3 192

Source: Eurostat (Transport)

Table 4.84: Intra-EU-27 maritime passenger transport: top 15 ports, 2006 (1000 passengers disembarked and embarked)

2007	Port	Inward	Outward	Total
1	Dover (UK)	6 865	6 935	13 800
2	Calais (FR)	5 739	5 721	11 460
3	Helsingborg (SE)	5 382	5 349	10 731
4	Helsingør (DK)	5 344	5 377	10 721
5	Helsinki (FI)	4 256	4 254	8 510
6	Stockholm (SE)	3 981	4 050	8 031
7	Rødby (Faergehavn) (DK)	3 395	3 395	6 790
8	Puttgarden (DE)	3 327	3 462	6 789
9	Tallinn (EE)	3 233	3 214	6 447
10	Turku (FI)	1 590	1 572	3 162
11	Mariehamn (FI)	1 337	1 342	2 679
12	Rostock (DE)	1 142	1 136	2 278
13	Portsmouth (UK)	1 073	1 091	2 164
14	Göteborg (SE)	1 061	1 078	2 139
15	Holyhead (UK)	1 001	1 055	2 056

Source: Eurostat (Transport)

Table 4.85: Extra-EU-27 maritime passenger transport: top 15 ports, 2006 (1000 passengers disembarked and embarked)

2007	Port	Inward	Outward	Total
1	Algeciras (ES)	1 302	1 470	2 772
2	Hirtshals (DK)	962	954	1 916
3	Strömstad (SE)	835	416	1 251
4	Frederikshavn (DK)	543	485	1 028
5	Almeria (ES)	436	452	888
6	Kiel (DE)	395	415	810
7	Marseille (FR)	354	412	766
8	København (DK)	361	360	721
9	Bari (IT)	353	352	705
10	Ancona (IT)	224	213	437
11	Hanstholm (DK)	151	150	301
12	Alicante (ES)	134	147	281
13	Genova (IT)	113	119	232
14	Sete (FR)	98	97	195
15	Venezia (IT)	84	87	171

Source: Eurostat (Transport)

In no contradiction with the importance that Maritime passenger transport has in those Member States, as highlighted above, the top seven ports in National Maritime passenger transport, in terms of passengers disembarked and embarked, all belonged to Greece and Italy (Table 4.83).

In fact three ports in Greece and eight ports in Italy featured among the top-15 ports for National Maritime passenger transport. Two other of those ports belonged to Spain and two to Malta, both of which also southern-European Member States. A more mixed, northern-European, picture is discernable when one looks at the top-15 ports in intra-EU-27 maritime passenger transport (Table 4.84).

Handling close to 14 million inward and outward passengers in total in 2006, Dover was the largest port in EU-27 Maritime passenger transport in these terms. All of its passengers were bound for or returning from France. Some 35 km (18.4 nautical miles) distant, on the other side of the Channel / la Manche, the port of Calais was the second main port in intra-EU-27 Maritime passenger transport. Linking Sweden and Denmark for passengers, by means of the Maritime mode, the ports of Helsingborg and Helsingør ranked third and fourth respectively in intra-EU-27 Maritime passenger transport. They both recorded more than 10 million embarkations or disembarkations in 2006.

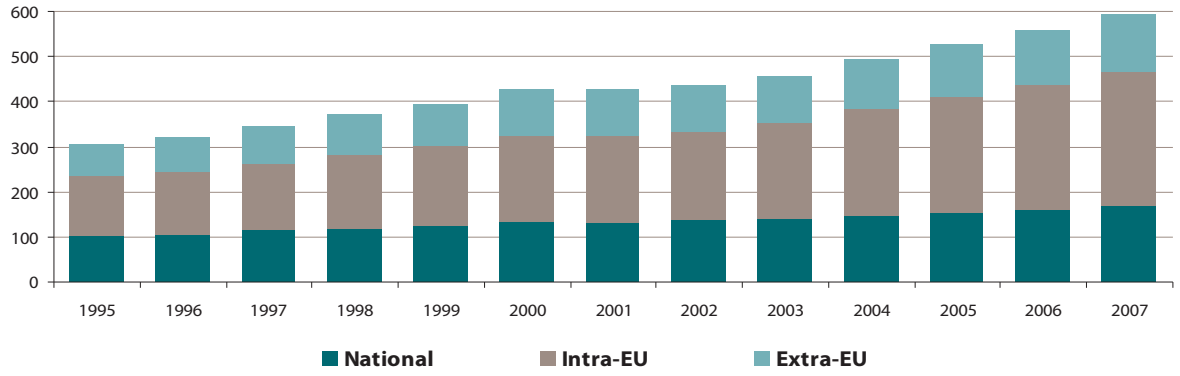
Handling smaller volumes of Maritime passengers inwards and outwards, the top 15 ports in extra-EU-27 Maritime passenger transport especially belonged to Member States which are peripherally located in the EU-27 (Table 4.85).

Extra-EU-27 passengers handled in Spain's three top-15 ports are accounted for by the ferry services they offer to and from Morocco (Algeciras and Almeria) as well as to and from Algeria (Alicante and Almeria). The three ports' ferry services to and from Africa accounted for just under 30 % of all extra-EU-27 passengers handled in 2006.

All extra-EU-27 passengers embarked and disembarked in Denmark's top-15 ports of Hirtshals, Frederikshavn and København / Copenhagen were on journeys to or from Norway. Some passengers in Hanstholm were also bound to or from the Faroe Islands.

4.2.7 Air passenger transport - National and International

Figure 4.86: Air transport: Passengers carried (departures), EU-15*, 1995 to 2007 (million)



* missing Member State data estimated by applying interpolation and retropolation

Source: Eurostat (Transport)

Table 4.87: Air passenger transport by type of transport, 2007 (1000 passengers carried)

	National	International		Total
		Intra-EU	Extra-EU	
EU-27	175 764	346 037	270 954	792 755
BE	60	15 036	5 710	20 805
BG	99	4 928	1 045	6 071
CZ	268	9 485	3 345	13 098
DK	1 951	15 857	6 233	24 042
DE	24 378	85 635	53 831	163 844
EE	20	1 400	303	1 723
IE	888	25 712	3 239	29 840
EL	6 685	23 775	4 326	34 786
ES	44 171	101 017	18 335	163 523
FR	27 192	50 968	41 874	120 034
IT	28 670	58 381	19 240	106 291
CY	0	5 820	1 184	7 004
LV	15	2 418	723	3 156
LT	0.4	1 783	412	2 196
LU	0.1	1 340	294	1 634
HU	0.2	6 520	2 060	8 580.3
MT	0	2 698	273	2 971
NL	56	30 006	20 439	50 501
AT	666	15 371	6 889	22 926
PL	1 087	12 984	3 049	17 120
PT	2 953	17 285	4 087	24 324
RO	544	5 322	1 043	6 909
SI	0.2	941	563	1 504
SK	175	1 759	298	2 232
FI	2 887	8 994	2 583	14 465
SE	6 893	15 939	4 135	26 967
UK	26 106	125 744	65 439	217 288
IS*	:	:	:	2 278
NO	13 357	13 029		26 386
CH	668	33 870		34 538

Source: Eurostat (Transport)

Close to 800 million passengers were carried by aircraft in the EU-27 in 2007, of which 22% were accounted for by National transport, 44% by Intra-EU-27 and 34% by Extra-EU-27 Air transport (Table 4.87).

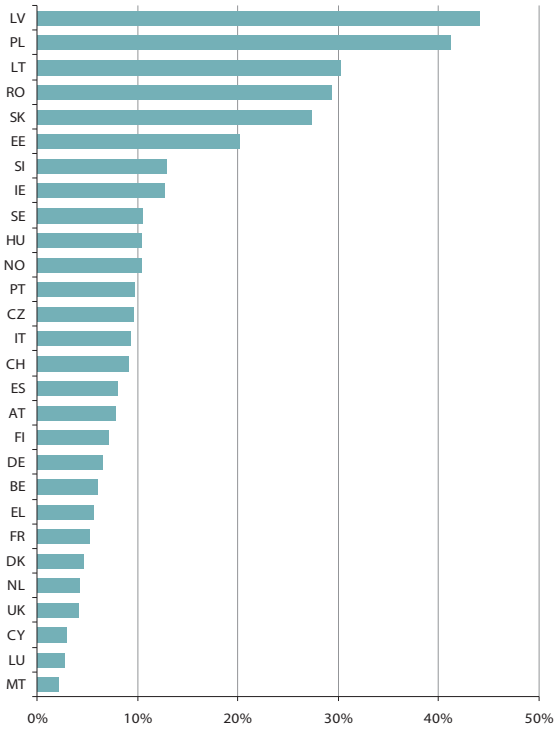
The number of passengers carried (departures) grew at an estimated average annual rate of 5.7 % from 1995 to 2007, Air passenger transport growing most on intra-EU-15 (6.9 %), followed by extra-EU-15 (5.0 %) and National routes (4.4 %) (Figure 4.86).

This overlooks the new Member States of the 2004 and 2007 enlargements, which recently have been displaying strong Air passenger transport performance. From 2004 to 2007, in the NMS-12 excluding Bulgaria, the total number of passengers carried rose by 18.5 % on annual average, compared to 6.5 % in the EU-15. Over the period, this resulted in robust 7.1 % growth for the EU-27 excluding Bulgaria.

As is the case with Air transport of freight and mail, passenger data collection is based upon the first origin/destination of passengers, and not the true origin/destination in case of flight connections. For example, a passenger departing in Mexico, changing flights in New York and arriving in Madrid is reported as a passenger coming from the USA and not from Mexico. This is due to the fact that Madrid airport only knows (and reports) the information about the flight arriving to it (from the USA).

Based on figures that include double-counting, growth may be overestimated due to improved reporting over the period. Yet a number of factors can confidently be said to have propelled EU-27 Air passenger transport in its upward trend.

Figure 4.88: Air passenger transport, AAGR 2004-2007 (%)



BG: not available

Source: Eurostat (Transport)

As strong world demand boosted extra-EU-27 Air passenger transport, the Union's enlargement and the Internal Market's on-going integration, of which Air-market liberalisation is an example, explain buoyant intra-EU-27 transport performance. At a National level, low-cost carriers made EU-27 Air transport increasingly competitive compared to other modes.

Infrastructural development and the opening of a multitude of new Air passenger routes at all three main levels - National, intra- and extra-EU-27 - were further contributors to average annual growth in excess of 20 % in a number of central and eastern European NMS-12 (Figure 4.88).

Rising most in the Baltic states together with Poland, Romania and Slovakia, from relatively low levels, Air passenger transport increased at an exceptionally high yearly average rate of 44 % in Latvia from 2004 to 2007.

The 'half-square' matrix (Table 4.89) details country-to-country passenger numbers in intra-EU-27 Air transport. The twelve largest country-to-country passenger flows accounted for nearly half (49 %) of intra-EU-27 total. They involved Germany, Ireland, Spain, France, Italy, the Netherlands and the United Kingdom. Six of these country-to-country passenger flows involved the United Kingdom.

The top three country-to-country pairs were: Spain - United Kingdom (35.7 million passengers), Germany - Spain (22.3 million) and Ireland - United Kingdom (12.3 million).

Table 4.89: Intra-EU-27 country-to-country flows, 2007 (1000 passengers)

	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK
BE																											
BG	111																										
CZ	276	308																									
DK	453	168	254																								
DE	1 360	1 274	1 106	2 118																							
EE	32	10	99	145	184																						
IE	394	97	281	230	1 521	18																					
EL	789	118	728	671	4 997	48	158																				
ES	3 491	154	807	2 081	22 279	57	3 645	517																			
FR	1 089	202	772	1 210	7 385	23	1 920	1 586	8 123																		
IT	2 371	347	903	905	11 208	37	1 224	2 489	10 480	7 903																	
CY	50	75	83	69	343	0	59	1 201	3	125	78																
LV	49	5	92	174	488	43	232	49	51	35	86	5															
LT	49	6	100	231	260	53	204	55	42	26	66	5	29														
LU	3	8	0	73	215	0	10	60	237	150	108	8	0	0													
HU	291	125	171	190	1 453	0	178	298	304	500	575	60	0	0	0												
MT	79	14	8	46	426	1	59	21	55	139	475	20	1	4	5	18											
NL	220	129	406	1 043	2 611	76	778	1 567	5 090	2 414	2 865	105	109	87	76	416	73										
AT	468	338	184	388	5 602	21	198	936	1 151	924	979	154	66	37	50	82	56	544									
PL	330	118	156	393	2 602	21	1 362	480	493	777	969	53	35	52	0	129	7	361	258								
PT	720	8	57	199	2 451	5	650	7	3 065	2 182	979	0	1	0	121	47	6	1 000	81	60							
RO	130	30	128	25	912	0	6	275	609	477	1 629	72	0	0	3	294	9	299	417	122	15						
SI	92	7	37	21	206	0	4	96	21	127	7	1	0	0	0	21	5	19	79	11	0	1					
SK	2	89	231	20	163	1	129	155	70	115	207	6	0	0	0	0	0	52	34	1	2	8	0				
FI	227	119	134	750	1 551	176	105	347	1 025	459	404	42	190	91	0	191	19	443	191	160	110	20	26	0			
SE	399	176	123	1 790	2 413	177	208	746	2 058	1 173	729	231	202	53	2	268	51	955	320	474	167	1	0	16	1 312		
UK	1 630	894	2 070	2 361	11 593	182	12 301	5 482	35 682	12 118	11 228	2 978	481	339	238	915	1 138	8 369	1 875	4 415	5 298	333	166	524	943	2 270	

Source: Eurostat (Transport), Member States

Based on the number of passengers carried, Table 4.90 shows the Member States´ main airports by type of transport in 2007: National, intra-EU-27, extra-EU-27 as well as total. In the EU-27, the main airport for National Air passenger transport was Madrid Barajas, while it was Amsterdam Schiphol for intra-EU-27 transport, and the main airport was London Heathrow for extra-EU-27 as well as in total, for all types of destinations.

Table 4.90: Air passenger transport: main airports by type of transport, 2007 (passengers carried)

	National	Intra-EU-27	Extra-EU-27	Total
EU-27	Madrid Barajas	Amsterdam Schiphol	London Heathrow	
BE	Liege Bierset	Bruxelles National		
BG	Sofia		Varna	Sofia
CZ	Praha Ruzyně			
DK	København Kastrup			
DE	München	Frankfurt am Main		
EE	Tallinn Ülemiste			
IE	Dublin/Baile Átha Cliath			
EL	Athens			
ES	Madrid Barajas			
FR	Paris Orly	Paris Charles de Gaulle		
IT	Roma Fiumicino		Milano Malpensa	Roma Fiumicino
CY	Larnaka			
LV	Riga International			
LT	Vilnius			
LU	Luxembourg			
HU	Budapest Ferihegy			
MT	Malta Luqa			
NL	Amsterdam Schiphol			
AT	Wien Schwechat			
PL	Warszawa Okęcie			
PT	Lisboa			
RO	Bucuresti Otopeni			
SI	Ljubljana Jože Pučnik			
SK	Košice	Bratislava Ivanka		
FI	Helsinki Vantaa			
SE	Stockholm Arlanda			
UK	London Heathrow			
CH	Zürich	:	:	:
NO	Oslo Gardermoen	:	:	:

Source: Eurostat (Transport)

In most cases, Member States have one main airport, which is the main one for all types of passenger transport. In these cases, the airport is always in or close to the capital city. Via the other main passenger transport modes, these main airports rapidly connect on to a Member State´s administrative and business centre, as well as to tourist sites, be they further afield. The airports offer a range of flights to all types of destinations and thus connect, via Air, to further national and international destinations.

Unlike in Air freight and mail transport, in which airports´ work on different hauls has, in part, been re-located, resulting in `de-centralised´ specialisation (see: Table 4.61), the main Air passenger airports tend to specialise in serving all main routes, and thus maintain their central locations.

Belgium, Bulgaria, Germany, France and Slovakia however have more than one main airport for different types of destinations. In France´s capital, Paris, for example, airports appear to specialise in national (Orly) and international (Charles de Gaulle) Air passenger transport. In Bulgaria, Varna was the main airport for extra-EU-27 Air passenger transport as, being a popular holiday resort, it flies many services for tourists from the Ukraine and Russia. München/Munich was the main airport for domestic flights in Germany due to the major city´s peripheral location within a large country.

Table 4.91: National air passenger transport: top 15 airports, 2004 and 2007 (million passengers carried)

Rank 2007	Airport	2004	2007	AAGR '04 to '07
1	Madrid Barajas (ES)	18.4	22.6	7.1%
2	Paris Orly (FR)	15.4	15.3	-0.2%
3	Barcelona (ES)	11.7	15.1	8.9%
4	Roma Fiumicino (IT)	12.4	13.5	2.9%
5	München (DE)	8.7	9.9	4.4%
6	Oslo Gardermoen (NO)	7.1	9.0	8.2%
7	Milano Linate (IT)	6.5	7.4	4.4%
8	Frankfurt am Main (DE)	7.3	6.7	-2.8%
9	Berlin Tegel (DE)	5.8	6.6	4.4%
10	Palma de Mallorca (ES)	5.7	6.6	5.0%
11	Athens (EL)	5.1	6.0	5.6%
12	London Heathrow (UK)	6.9	5.8	-5.6%
13	Edinburgh (UK)	5.8	5.6	-1.2%
14	Hamburg (DE)	4.3	5.4	7.9%
15	Paris Charles de Gaulle (FR)	5.1	5.2	0.6%

Source: Eurostat (Transport)

Table 4.92: Intra-EU-27 air passenger transport: top 15 airports, 2004 and 2007 (million passengers carried)

Rank 2007	Airport	2004*	2007	AAGR '04 to '07
1	Amsterdam Schiphol (NL)	23.7	27.4	5.0%
2	Paris Charles de Gaulle (FR)	21.3	25.7	6.5%
3	London Heathrow (UK)	25.2	24.2	-1.3%
4	Frankfurt am Main (DE)	18.4	20.5	3.7%
5	Dublin/Baile Átha Cliath (IE)	14.8	19.9	10.4%
6	London Stansted (UK)	17.2	19.6	4.5%
7	London Gatwick (UK)	17.0	18.7	3.2%
8	Madrid Barajas (ES)	11.6	17.5	14.7%
9	Palma de Mallorca (ES)	14.1	15.7	3.6%
10	München (DE)	11.2	15.0	10.2%
11	Barcelona (ES)	10.6	14.4	10.8%
12	København Kastrup (DK)	12.0	13.6	4.3%
13	Manchester (UK)	12.7	12.4	-0.8%
14	Roma Fiumicino (IT)	9.3	12.4	10.1%
15	Bruxelles National (BE)	11.0	12.3	3.8%

* Intra-EU-25

Source: Eurostat (Transport)

Table 4.93: Extra-EU-27 air passenger transport: top 15 airports, 2004 and 2007 (million passengers carried)

Rank 2007	Airport	2004	2007	AAGR '04 to '07
1	London Heathrow (UK)	35.0	37.9	2.7%
2	Paris Charles de Gaulle (FR)	24.6	28.7	5.3%
3	Frankfurt am Main (DE)	25.1	26.7	2.1%
4	Amsterdam Schiphol (NL)	18.6	20.3	3.0%
5	London Gatwick (UK)	10.5	12.4	5.7%
6	Madrid Barajas (ES)	8.2	11.2	11.0%
7	München (DE)	6.8	8.9	9.4%
8	Milano Malpensa (IT)	7.0	8.4	6.3%
9	Roma Fiumicino (IT)	5.4	6.5	6.4%
10	Wien Schwechat (AT)	5.5	6.3	4.6%
11	Manchester (UK)	5.0	6.3	8.0%
12	København Kastrup (DK)	5.4	5.8	2.4%
13	Bruxelles National (BE)	4.4	5.5	7.7%
14	Paris Orly (FR)	4.4	5.4	7.1%
15	Düsseldorf (DE)	4.2	4.9	5.3%

Source: Eurostat (Transport)

Aircraft form the swiftest means for travelling from one end of the EU-27 to another, as well as within the larger countries. In fact, underlining Air's contribution to the domestic mobility of citizens, the four main airport-pairs within the EU-27 (both national and intra-EU-27) were all national flight routes: Spain's Madrid-Barajas - Barcelona (4.6 million passengers carried in 2007), Italy's Roma Fiumicino - Milano Linate (2.5 million), and France's Paris Orly - Toulouse Blagnac and Paris Orly - Nice Côte d'Azur (both 2.3 million) (data not shown)[20].

It is not surprising that, out of the seven airports involved, four were the EU-27's main airports for national Air passenger transport in terms of passengers carried. Three of these four airports were located in capital cities (Table 4.91).

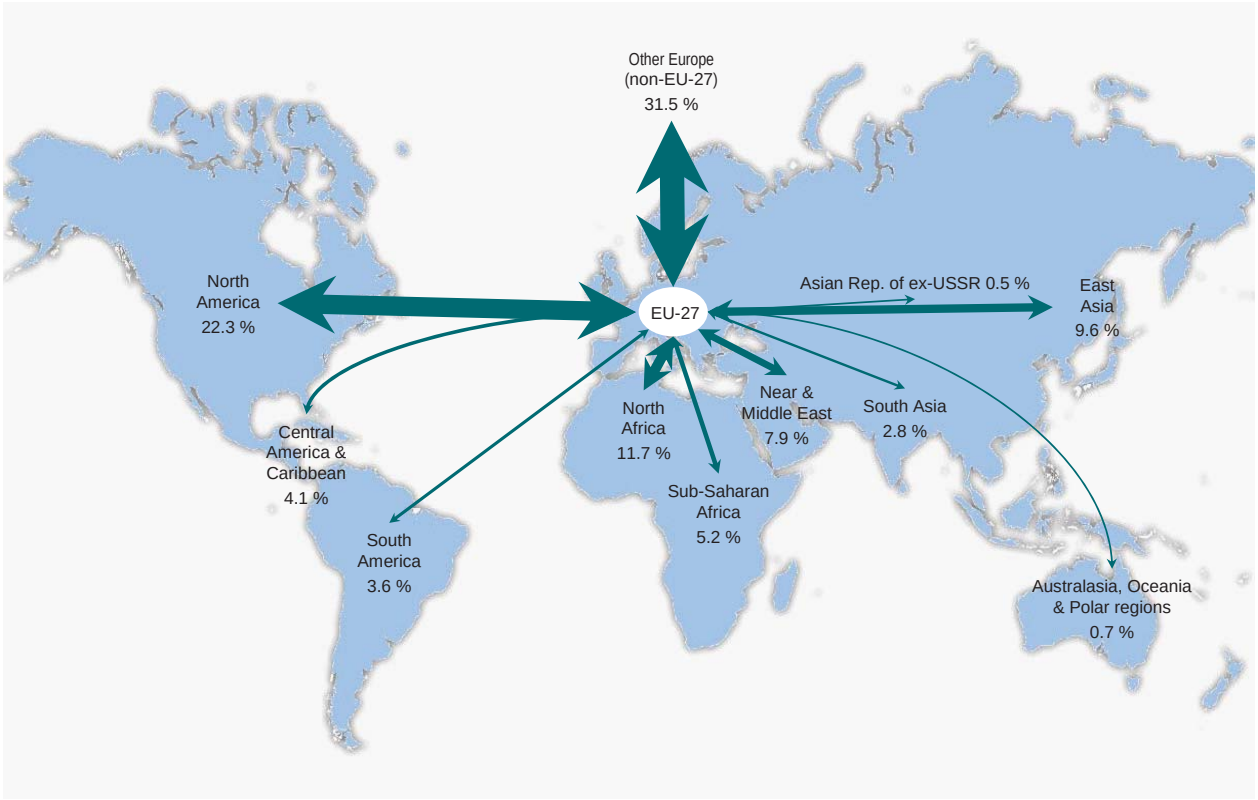
The next three main airport pairs within the EU in 2007 were flights between Member States: Dublin/Baile Átha Cliath (IE) - London Heathrow (UK) (2.0 million), Amsterdam Schiphol (NL) - London Heathrow (UK) (1.8 million) and Paris Charles de Gaulle (FR) - London Heathrow (UK) (1.8 million). Ranking 17th among the airport-pairs of flights taking place within the EU-27, the next-main intra-EU-27 airport-pair was London Heathrow (UK) - Frankfurt am Main (DE) (1.4 million).

All five of the airports involved in these top intra-EU-27 airport-pairs, three of which are in capital cities, formed the group of five top airports for intra-EU-27 passenger flights (Table 4.92).

The top six extra-EU-27 airport-pairs in 2007 all flew to and from London Heathrow (UK) except for the second, which flew from Paris Charles de Gaulle (FR). These two airports were the two top airports for extra-EU-27 Air passenger transport in 2007 (Table 4.93).

[20] See: Tables 6 and 7, Statistics in Focus "Air passenger transport in Europe in 2007", (KS-SF-09-001-EN-N), 2009

Map 4.94: International extra-EU-27 air passenger transport flows, by world region, 2007 (% passengers carried)



Source: Eurostat (Transport)

Together accounting for nearly two thirds of extra-EU-27 transport in 2007, the three main regions to or from which passengers were carried by Air beyond the EU-27 and throughout the world were 'non-EU Europe', especially: Norway, Switzerland and Turkey, 'North America', consisting principally of the USA and Canada, and 'North Africa', where the Maghreb countries Morocco, Algeria, Tunisia, but also Egypt were popular air-flight destinations (Map 4.94).

Extra-EU-25 Air passenger transport grew at an average annual rate of 6.1 % from 2004 to 2007, rising fastest with the Indian sub-continent (12.6 %), the Near and Middle East (10.3 %) and North Africa (9.3 %).

The United Kingdom accounted for close to a quarter of extra-EU-27 Air passenger transport in 2006, being the main EU-27 partner of 6 out of 11 world regions (Table 4.95).

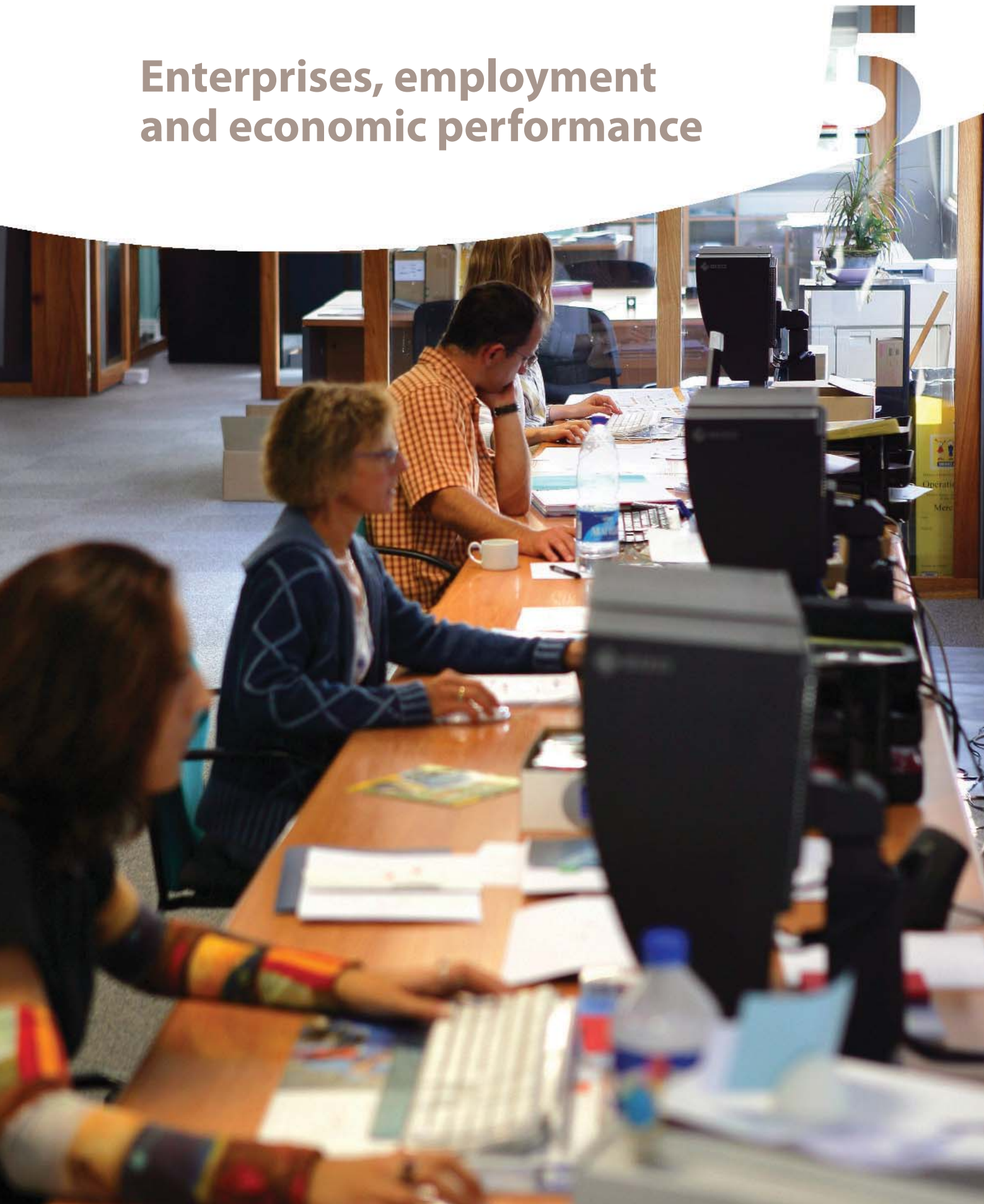
Table 4.95: International extra-EU passenger transport by world region, 2007

World Region	Passengers (1000)	AAGR* 2004-2007	Main EU-27 partner	
			Member State	Share
Total Extra EU-27	**270 920**	**6.1%**	**United Kingdom**	**24.2%**
Europe except EU	85 213	5.5%	Germany	26.1%
North America	60 153	4.2%	United Kingdom	37.3%
Central America and Caribbean	11 183	1.6%	United Kingdom	29.3%
South America	9 811	8.1%	Spain	38.0%
Asian Republics of the Former-USSR	1 380	6.4%	Germany	31.7%
Near and Middle East	21 418	10.3%	United Kingdom	32.1%
Indian Sub-Continent	7 665	12.6%	United Kingdom	49.0%
Far East	26 059	6.0%	Germany	24.4%
Australasia, S. Sea Is. & Antarctica	1 807	4.2%	United Kingdom	86.0%
North Africa	31 487	9.3%	France	35.2%
Sub-Saharan Africa	14 095	5.6%	France	30.6%

* EU-25

Source: Eurostat (Transport), Member States

5 Enterprises, employment and economic performance



Transport services: a key economic player

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

Based on Structural Business Statistics[1], in 2005, 1.1 million EU-27 enterprises with Transport services as their main activity employed 8.7 million persons and they generated EUR 380.1 billion value added.

Transport services accounted for 6.9 % of the persons employed and for 7.1 % of the value added in the EU-27's non-financial business economy (NACE Divisions C to I and K).

The wealth created by Transport services is clearly much more than these figures indicate as there is a strong connection between the transport sector and other sectors of the economy. For instance, the transport sector provides services to a large number of enterprises whose main activity is not transport but whose activities nevertheless necessitate the transport of persons and goods.

In addition, the transport equipment manufacturing sector principally sells its products to Transport service enterprises (see box). Transport services therefore have a wider catalytic economic impact, also acting among others as a facilitator of international trade, tourism and social development.

In this chapter, the transport sector covered corresponds to the four NACE Rev.1.1 Divisions: Land transport (i.e. railway, road, and pipelines) (NACE I 60), Water transport (Maritime and Inland waterway) (NACE I 61), Air transport (NACE I 62) and Supporting and auxiliary transport activities (NACE I 63).

The latter include the operation of infrastructure and terminals (roads, railways, inland waterways, sea and air ports, etc.), navigational services (waterway navigation and air traffic control), berthing, parking and towing services, cargo handling, storage, warehousing. Because of their key role in organising and selling Transport services, travel operators and agents (NACE 63.3) are also included.

Readers should note that enterprises managing infrastructure and terminals are considered as Supporting transport activities, and they are therefore classified under NACE 63 (notably 63.2), and not under the individual transport activities (NACE 60, 61 and 62). Yet there may well be instances in which the operation and management of infrastructure is looked after by the same enterprise. In that case, the enterprise is classified under the activity heading of its principal activity. These points must be borne in mind when looking at individual transport activities, particularly in the context of market liberalisation.

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

[1] For more information on Structural Business Statistics, please visit Eurostat's website and the dedicated section on European Business: http://ec.europa.eu/eurostat/europeanbusiness

The wider or catalytic impact of Transport services

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

The Manufacture of transport equipment (NACE Subsection DM) is the most obvious domain in which the impact of Transport services is tangibly felt for, without the demand for Transport services, cars, lorries, buses, trains, aeroplanes and ships would not be manufactured.

In 2005, the EU-27 Manufacture of transport equipment employed 3.2 million persons while generating a value added of EUR 182 billion. It contributed a share of 2.5 % to the number of persons employed in EU-27's non-financial business economy compared to Transport services' share of 6.9 %. In terms of value added, the Manufacture of transport equipment contributed 3.4% to the non-financial business economy, which is equivalent to somewhat under half the contribution made by Transport services (7.1%).

In the case of persons employed, the Manufacture of transport equipment appears to have made up a slightly smaller share of the non-financial business economy in 2005 than it did in the EU-25 in 2000 (2.7 %) while the share of Transport services grew compared to that of the EU-25 in 2000 (6.6 %). The shares of the value added of both the Manufacture of transport equipment and Transport services in the EU-25 non-financial business economy remained identical compared to the equivalent shares in 2000.

Of the fourteen manufacturing sectors, the Manufacture of transport equipment was the fifth largest in terms of persons employed and the fourth largest in terms of value added. These rankings appear to be persistent as they were the same in the EU-25 in 1990.

Moreover, based on the Industrial Production Index (which describes the trend in value added at factor cost, at constant prices), the Manufacture of transport equipment (2.5 %) displayed the third highest average annual growth rate from 1990 to 2007 among the Manufacturing Divisions, after the Manufacture of electrical and optical equipment (NACE DL) (3.7 %) and the Manufacture of chemicals, chemical products and man-made fibres (NACE DG) (3.3 %).

Unsurprisingly, and reflecting the trends in the modal shares described in this publication, the EU-27's transport equipment sector was dominated by the Manufacture of motor vehicles, trailers and semi-trailers (NACE Division DM 34). This activity represented over 70 % of the persons employed and value added in the Manufacture of transport equipment in 2005, or 6.5 % of the number of persons employed in EU-27 Manufacturing (NACE D) and 8.1 % of Manufacturing value added.

Of course, one could cast the net wider to include, for example, construction with its involvement in the building of transport infrastructure and the providers of building materials (e.g. iron, steel, concrete and tar-MacAdam™) and of the energy that powers transport vehicles. One can also look at the more catalytic effects in terms of trade and repair, as well as tourism and international trade. Altogether, the jobs and the wealth stemming directly or indirectly from Transport services thus would appear to run into much higher sums.

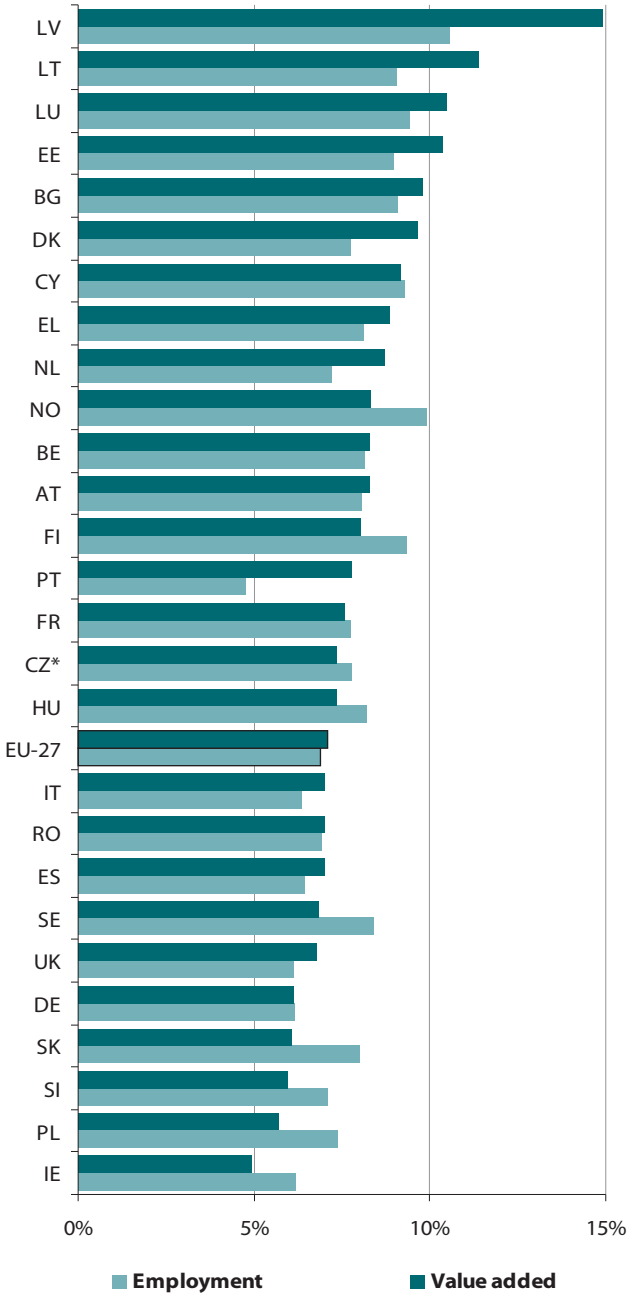
Transport services most important in Latvia and Lithuania

Transport services contributed the highest shares of value added to the non-financial business economy in Latvia (15 %), Lithuania (11 %) as well as Luxembourg, Estonia, Bulgaria and Denmark (all four: 10 %) (Figure 4.1). Transport services in Latvia also made the largest contribution to employment in the non-financial business economy (11 %), followed by EFTA member Norway (10 %).

In a large number of Member States, both in terms of value added and of employment, the Transport services sector contributed higher shares to the non-financial business economy than it did on average in the EU-27. This is explained by the important role that Transport services have taken on in some of the new Member States, noticeably in the Baltic states, and the relatively smaller size the sector has in some of the EU-27's largest economies.

The importance of Transport services was more pronounced in terms of value added than in terms of employment in 15 of the 26 Member States for which data are available. This indicates higher apparent labour productivity than on average in the non-financial business economy. It was especially the case in Portugal, where the share of Transport services in the economy's value added was 1.6 times that of employment, as well as in Latvia (1.4) and Lithuania (1.3). In contrast, the weight of employment in the non-financial business economy was 1.3 times that of value added in Slovakia, Poland and Ireland.

Figure 5.1: Contribution of Transport services (NACE 60 to 63) to the non-financial business economy (NACE C to I and K),value added and employment, 2005 (%)



CZ and NL NACE E: 2004
IE: excluding NACE E
CY: excluding NACE K73
Excluding: MT

Source: Eurostat (SBS)

United Kingdom and Germany: 36 % of EU-27 value added

Table 5.2: Top ten contributors to Transport services in the EU-27, 2005

Number of persons employed			Number of enterprises			Value added (at factor cost)			Turnover		
	1 000s	% share		1 000s	% share		EUR billion	% share		EUR billion	% share
EU-27	8 725.6	100.0	**EU-27**	1 104.3	100.0	**EU-27**	380.1	100.0	**EU-27**	1 115.0	100.0
Germany	1 274.1	14.6	**Spain**	223.3	20.2	**United Kingdom**	69.3	18.2	**United Kingdom**	205.0	18.4
France	1 116.9	12.8	**Italy**	154.4	14.0	**Germany**	66.1	17.4	**Germany**	181.5	16.3
United Kingdom	1 105.9	12.7	**Poland**	131.9	11.9	**France**	57.5	15.1	**France**	156.4	14.0
Italy	954.7	10.9	**France**	93.5	8.5	**Italy**	41.5	10.9	**Italy**	126.6	11.4
Spain	863.7	9.9	**Germany**	84.1	7.6	**Spain**	34.6	9.1	**Spain**	97.3	8.7
Poland	557.5	6.4	**Greece**	68.2	6.2	**Netherlands**	21.1	5.5	**Netherlands**	58.6	5.3
Netherlands	282.5	3.2	**United Kingdom**	65.8	6.0	**Belgium**	11.9	3.1	**Sweden**	41.2	3.7
Romania	280.5	3.2	**Czech Republic**	44.9	4.1	**Denmark**	10.6	2.8	**Belgium**	40.3	3.6
Czech Republic	268.2	3.1	**Hungary**	34.5	3.1	**Austria**	10.6	2.8	**Denmark**	38.6	3.5
Sweden	221.0	2.5	**Sweden**	31.1	2.8	**Sweden**	10.3	2.7	**Sweden**	32.8	2.9

excluding MT

Source: Eurostat (SBS), Member States

While the largest Member States were generally also those contributing most to EU-27 Transport services, their ranking varied according to the principal indicators (Table 5.2). Germany was the top contributor to employment, accounting for 14.6 % of EU-27 total, while Spain was the largest in terms of the number of enterprises, contributing 20.2 % to EU-27 total.

The top six contributors to EU-27 turnover and value added ranked in the same order, led by the United Kingdom with above 18 % and followed by Germany, France, Italy, Spain and the Netherlands. Together, these six Member States made up close to three quarters of both turnover and value added in EU-27 Transport services in 2005.

Spain, Italy and Poland together accounted for 46 % of the number of enterprises in the EU-27, yet making up only 27 % of the total number of persons employed, which points at the smaller average size of Transport service enterprises in those Member States.

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 those three Member States as well as in Greece and Bulgaria (Table 5.3).

Table 5.3: Share of unpaid workers in Transport services (NACE 60 to 63), 2005, % of persons employed*

	% share
SK	0.5
LV	0.6
EE	1.4
RO	1.4
PT	1.7
LU	2.2
LT	4.0
FR	4.0
UK	4.7
AT	6.2
BE	6.7
DE	7.0
DK	7.1
NL	8.0
IE	8.5
NO	10.4
EU-27	12.4
HU	12.7
FI	12.8
CY	14.2
SI	14.5
SE	15.0
CZ	15.2
IT	21.6
ES	24.1
PL	25.9
BG	27.1
EL	39.9

* e.g. entrepreneurs and unpaid family workers

MT: not available

Source: Eurostat (SBS), Member States

Road and other land transport main employer

Table 5.4: Selected economic indicators in Transport services, by transport service, EU-27, 2005

	Number of persons employed		Number of enterprises		Value added at factor cost		Turnover	
	1 000s	% share	1 000s	% share	EUR billion	% share	EUR billion	% share
Total transport services (NACE 60-63)	8 725.6	100.0	1 104.3	100.0	380.1	100.0	1 115.0	100.0
Land transport; transport via pipelines (60)	5 500.0	63.0	900.0	81.5	180.0	47.4	420.0	37.7
Railway transport (60.1)	880.7	10.1	0.8	0.1	31.9	8.4	66.6	6.0
Road and other land transport (NACE 60.2: 'Other land transport')	4 616.0	52.9	925.6	83.8	141.7	37.3	342.8	30.7
Other scheduled passenger land transport; taxi operation; other land passenger transport (60.21-23)	*1 863.3*	*21.4*	*329.9*	*29.9*	*50.8*	*13.4*	*86.8*	*7.8*
Freight transport by road (60.24)	*2 752.7*	*31.5*	*595.7*	*53.9*	*90.9*	*23.9*	*256.0*	*23.0*
Transport via pipelines (60.3)	:c	:c	:c	:c	:c	:c	11.0	1.0
Water transport (61)	213.5	2.4	19.0	1.7	25.0	6.6	88.0	7.9
Sea and coastal water transport (61.1)	171.9	2.0	9.6	0.9	23.3	6.1	82.9	7.4
Inland water transport (61.2)	41.6	0.5	9.0	0.8	2.0	0.5	:c	:c
Air transport (62)	400.0	4.6	3.5	0.3	27.2	7.2	110.0	9.9
Supporting/auxiliary transport activities incl. travel agencies (63)	2 612.1	29.9	181.8	16.5	147.9	38.9	497.0	44.6
Cargo handling and storage; other supporting transport activities (63.1, 63.2 and 63.4)	2 127.5	24.4	107.0	9.7	128.4	33.8	349.5	31.3
Travel agencies/tour operators; tourist assistance n.e.c.(63.3)	484.6	5.6	74.7	6.8	19.5	5.1	147.5	13.2

" :c " confidential.

Note: Some figures are estimated and unreliable. This explains differences between totals and components.

Source: Eurostat (SBS)

Of the 8.7 million persons employed in EU-27 Transport services in 2005, over a half were accounted for by persons employed in Road and other land transport (NACE 60.2) (52.9 %) (Table 5.4).

Road and other land transport consists of Road freight (NACE 60.24), the largest subsector, which made up a share of 31.5 % of total employment, and Other passenger road and land transport (NACE 60.21 to 60.23), which mainly covers taxi, bus and coach services. While most of these involved road transport, readers should note that this category also includes other forms of land transport such as underground trains, tramways, elevated and funicular railways, which are not included in rail transport and, although the overall impact will be quite small, data still need to be interpreted with caution.

Supporting and auxiliary transport activities including travel agencies (NACE 63) was the other main category of Transport services, contributing 29.9 % of employment in EU-27 Transport services in 2005. The subsector Cargo handling and storage, and other supporting activities (NACE 63.1, 63.2 and 63.4) alone made up close to a quarter (24.4 %) of the total number of persons employed in EU-27 Transport services.

Looking at the data detailing employment in the subsectors of Transport services (Table 5.5), in the 20 Member States for which data are available, the share of Road and other land transport in Transport services was highest in Spain (64.4 %), Portugal (63.4 %), Lithuania (63.4 %) and Poland (62.1 %). Reflecting the greater importance of other transport modes in Cyprus, the share of Road was lowest in this Member State (24.6 %). The importance of Road and other land transport in the Member States is also shown in Figure 5.6.

The share of Supporting and auxiliary transport activities in Transport services employment stood above one third in Germany (41.2 %), Cyprus (38.9 %), the United Kingdom (37.7 %), Italy (36.4 %) and Ireland (35.3 %).

Table 5.5: Share of persons employed in Transport services, by transport service, 2005 (%)

	Number of persons employed in Transport services (1 000)	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 supporting transport activities (63.1, 63.2 & 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-27	8 725.6	10.1	21.4	31.5	:c	2.0	0.5	4.6	24.4	5.6
BE	196.3	:c	17.8	32.2	:c	0.3	0.4	2.8	22.9	4.2
BG	165.2	:c	:c	29.5	:c	:c	:c	1.4	21.8	4.0
CZ	268.2	:c	17.8	37.7	:c	0.0	:c	:c	11.0	4.6
DK	132.8	6.4	:c	30.4	:c	:c	:c	4.3	21.1	4.8
DE	1 274.1	6.3	22.4	22.8	0.1	1.9	0.7	4.7	36.0	5.2
EE	35.7	9.9	17.2	37.1	0.0	:c	:c	2.0	25.6	5.0
IE	60.5	:c	14.8	:c	:c	:c	:c	:c	24.9	10.4
EL	202.2	:c	39.8	:c	:c	9.5	0.0	1.9	17.1	7.2
ES	863.7	2.4	19.3	45.2	0.0	0.8	0.0	4.5	21.7	6.1
FR	1 116.9	:c	19.3	30.6	:c	1.2	0.3	6.5	22.7	3.7
IT	954.7	7.2	15.3	35.6	0.3	2.5	0.3	2.4	31.7	4.7
CY	19.6	0.0	12.4	12.3	0.0	24.1	0.0	12.4	24.1	14.8
LV	65.8	23.0	21.9	24.6	0.6	1.1	0.0	1.4	23.9	3.4
LT	79.3	:c	23.7	39.6	:c	2.1	0.2	1.2	15.7	3.1
LU	19.3	15.9	12.3	39.5	0.0	0.2	0.2	17.6	11.1	3.3
HU	206.4	22.7	26.0	33.1	0.3	0.0	0.6	1.8	12.5	2.9
NL	336.7	:c	:c	34.1	0.0	:c	3.7	:c	20.4	7.0
AT	191.4	8.3	23.8	30.1	0.1	0.0	0.2	4.7	26.4	6.4
PL	557.5	21.8	27.0	35.0	0.6	0.3	0.2	0.9	11.0	3.0
PT	156.5	:c	23.7	39.7	:c	0.6	0.9	6.0	20.2	5.7
RO	280.5	15.1	29.8	24.3	2.8	0.4	1.1	1.2	22.7	2.7
SI	40.6	:c	:c	:c	0.0	0.5	0.1	1.6	17.6	4.0
SK	74.1	:c	20.3	13.5	:c	0.0	1.0	1.3	10.9	3.0
FI	114.8	7.0	21.0	34.5	0.0	6.8	0.2	6.1	20.1	4.4
SE	221.0	3.7	26.2	30.6	0.0	7.2	0.5	3.4	23.0	5.4
UK	1 105.9	5.0	19.6	27.9	0.0	1.5	0.1	8.2	27.1	10.6
NO	127.4	3.8	26.4	21.4	0.5	18.0	0.0	5.6	19.7	4.6

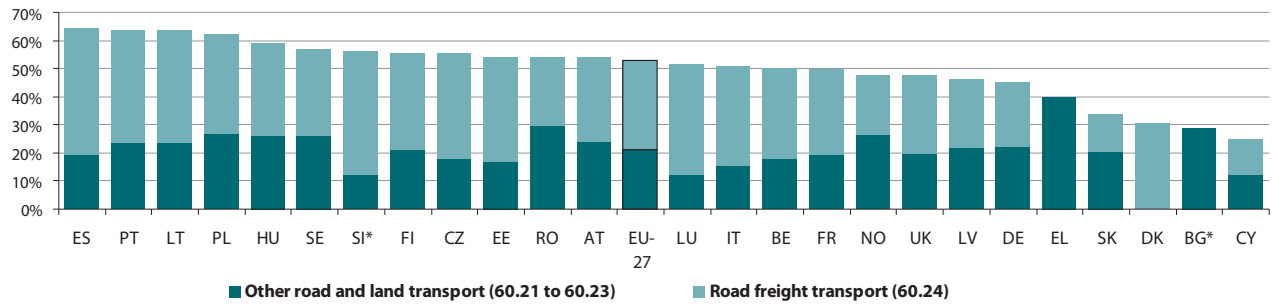
excluding: MT; " :c " confidential

Source: Eurostat (SBS), Member States

Employment in Railway transport (NACE 60.1) made up 10.1 % of total employment in Transport services. Its share in total was above one fifth in Latvia (23.0 %), Hungary (22.7 %) and Poland (21.8 %).

Representing 4.6 % of the persons employed in Transport services in the EU-27, Air transport (NACE 62) was an important employer in Luxembourg (17.6 %), Cyprus (12.4 %) and the United Kingdom (8.2 %).

Figure 5.6: Share of Road and other land transport (NACE 60.2) in Transport services employment, by Member State, 2005 (%)



* 2004; excluding IE, MT and NL; BG & EL: 'Road freight transport' confidential; DK: 'Other road and land transport' confidential

Source: Eurostat (SBS)

Supporting and auxiliary transport activities: main generator of wealth

Given the importance of Road and other land transport, Supporting and auxiliary transport activities (NACE 63) contributed most to the wealth generated by EU-27 Transport services, in particular in terms of turnover. In 2005, this activity was responsible for 44.6 % of EU-27 Transport services turnover and for 38.9 % of value added (Table 5.4). Road and other land transport, in comparison, generated 30.7 % of turnover and 37.3 % of value added.

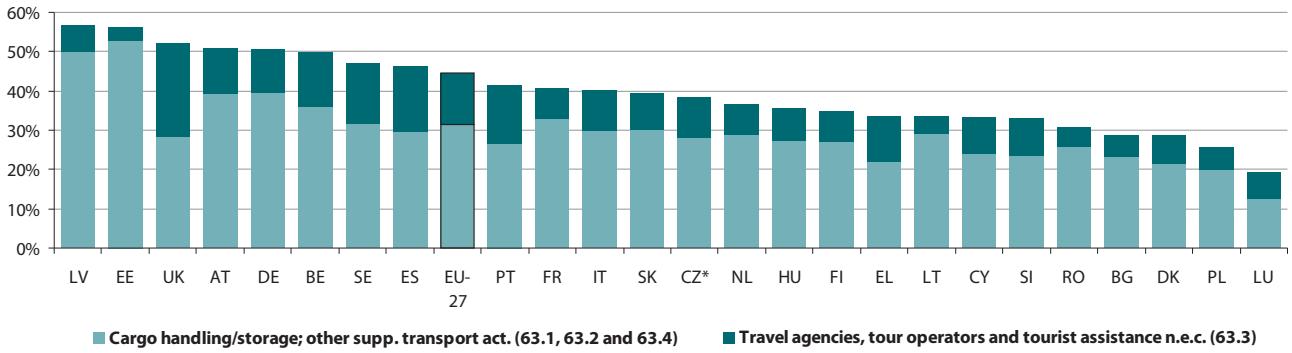
Supporting and auxiliary transport activities include the operation of infrastructure and terminals (roads, railways, inland waterways, airports, etc.), navigational services (air traffic control and waterway navigation), berthing, parking and towing services, cargo handling, storage warehousing and tourist operators. The diversity of these activities needs to be borne in mind when interpreting data for each of the transport modes. For example, road infrastructure is generally included in Supporting and auxiliary transport activities and not, as one might think, in Road and other land transport. Within the context of rail liberalisation, one must also consider this distinction for Railway transport.

Cargo handling and storage and other supporting transport activities (NACE 63.1, 63.2 and 63.4) made up by far the largest subsector of Supporting and auxiliary transport activities as they generated 31.3 % of EU-27 Transport services turnover and 33.8 % of value added in 2005.

Looking at the individual Member States, Supporting and auxiliary transport activities accounted for more than half of Transport services turnover in Latvia (56.7 %), Estonia (56.2 %), the United Kingdom (52.0 %), Austria (51.0 %) and Germany (50.6 %) (Figure 5.7).

In Latvia and Estonia, but also in Austria and Germany, turnover was to more than three quarters generated by Cargo handling/ storage and other supporting transport activities. In contrast, in the United Kingdom, Travel agencies, tour operators and tourist assistance generated 23.9 % of Transport services turnover.

Figure 5.7: Share of Supporting and auxiliary transport activities (NACE 63) in Transport services turnover, by Member State, 2005 (%)



excluding: IE and MT

* 2004

Source: Eurostat (SBS)

Most enterprises active in Road transport

In 2005, 1.1 million enterprises in the EU-27 had Transport services as their main activity (Table 5.4). The largest share, 926 thousand (83.8 % of total), were active in Road and other land transport, especially due to the importance of Road freight (53.9 %). From national data (not shown), among the 23 Member States for which data are available, more than 85 % of Transport services enterprises were active in Road and other land transport in Poland, Spain, Finland, Slovenia and Portugal.

Supporting and auxiliary transport activities (16.5%) made up the second largest group of enterprises, followed by enterprises active in Water transport (Maritime and Inland) as well as Air transport, which made up respectively 1.7 % and 0.3 % of the total in Transport services.

Small- and medium-sized enterprises provide most employment

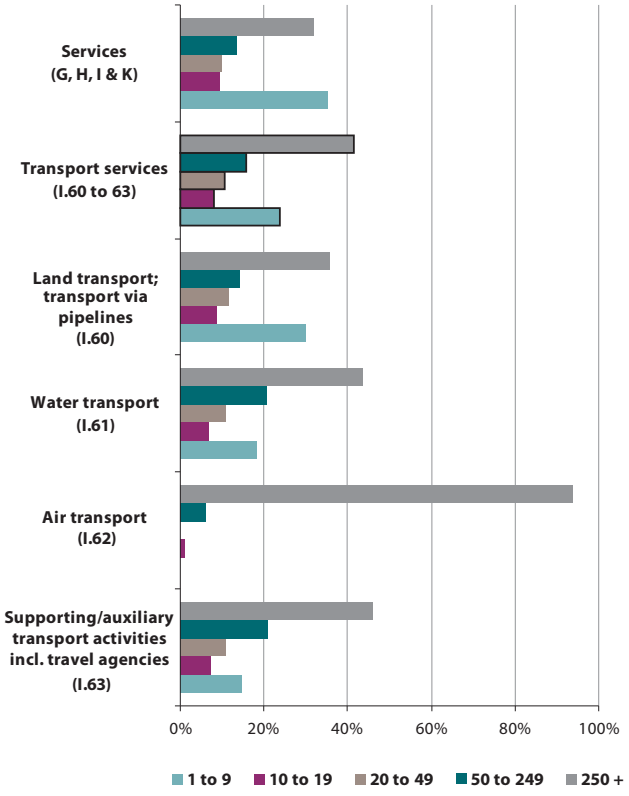
A share of 58 % of persons employed in EU-27 Transport services in 2005 were employed by SMEs (small- and medium-sized enterprises employing up to 249 persons) (Figure 5.8) compared to a share of 68 % in Services on average. A share of 24% of the Transport services workforce was employed in micro-enterprises (employing between 1 and 9 persons) compared to 35% in Services, while the proportions of persons employed in the categories '10 to 19', '20 to 49' and '50 to 249' were similar to those in Services.

In the individual Member States, high shares of employment in SMEs were recorded in Road and other land transport (especially in Road freight), in Water transport (especially in Inland water transport), but also in Travel agencies, tour operators and tourist assistance n.e.c. (Table 5.9).

In contrast, small shares of persons were employed in SMEs in rail and air transport, given the large size of infrastructure in those sectors. Generally, in the Member States, the average shares of persons employed in SMEs in Transport services would tend to reflect the subsectors of Transport services that they specialised in.

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

Figure 5.8: Transport services employment, by enterprise size-class, EU-27, 2005



Source: Eurostat (SBS)

Table 5.9: Share of persons employed in SMEs, by transport service, 2005 (%)

	Transport services average (60 to 63)	Railways (60.1)	Road and other land transport (60.2)		Maritime water transport (61)		Air transport (62)	Supporting and auxiliary transport activities (63)	
			Other passenger road and land transport (60.21 to 60.23)	Road freight (60.24)	Sea and coastal water transport (61.1)	Inland water transport (61.2)		Cargo handling, storage; other supp. transport activities (63.1, 63.2 & 63.4)	Travel agencies, tour operators and tourist assistance n.e.c. (63.3)
EU-27	58.4	:	:	:	:	:	10.8	:	:
BE	57.1	:	:	93.8	100.0	100.0	15.3	63.4	67.5
BG*	62.0	:	74.8	:	:	:	:	31.3	100.0
CZ	51.7	0.7	37.2	88.2	na	57.6	6.5	63.7	93.7
DK	62.6	3.4	:	:	:	:	:	55.8	85.7
DE	61.8	6.3	71.2	92.6	:	:	6.4	50.2	79.1
EE*	79.6	:	:	100.0	:	100.0	:	:	100.0
IE	:	:	:	:	:	:	:	55.9	:
EL	79.4	:	78.3	100.0	:	na	:	:	:
ES	75.4	:	75.4	:	50.6	100.0	3.9	60.3	65.5
FR	48.6	:	53.8	83.9	:	:	3.6	39.9	70.5
IT	66.5	:	:	:	:	:	21.3	59.6	92.5
CY	:	na	100.0	100.0	43.5	na	:	:	:
LV	55.6	2.2	36.9	98.4	100.0	100.0	42.6	73.7	100.0
LT	:	:	:	95.4	6.1	100.0	:	71.3	100.0
LU	:	0.0	:	:	:	:	:	:	100.0
HU	48.6	:	24.6	90.3	100.0	:	:	70.3	:
NL	62.8	:	:	84.2	:	100.0	:	59.4	:
AT	:	3.7	64.8	88.5	100.0	100.0	:	:	:
PL	60.1	:	61.0	94.5	:	100.0	:	59.8	90.8
PT**	67.0	:	:	89.2	100.0	:	:	:	:
RO	49.7	3.1	55.8	89.1	68.2	71.8	19.1	31.1	100.0
SI	:	:	:	:	100.0	100.0	:	48.7	100.0
SK	25.2	:	:	91.2	na	:	:	73.1	100.0
FI	63.7	:	77.2	89.6	30.8	:	:	55.0	62.8
SE	63.3	:	55.0	:	36.2	100.0	26.9	47.5	63.7
UK*	42.0	1.7	42.4	61.0	49.2	100.0	11.1	36.4	45.6
NO	61.3	7.0	65.0	99.1	38.3	100.0	15.1	54.8	88.4

* 2004 (detail) ** 2004 (Total); Insufficient data: MT; " na ": not applicable

Source: Eurostat (SBS), Member States

Highest share of women in Air transport

Based on the Labour Force Survey, 21.0 % of the labour force in Transport services were women in 2006, 23 percentage points less than on average in Services (Table 5.10). This difference was close to 30 percentage points in Slovakia, Latvia and Poland, while it was close to 10 percentage points in Cyprus and Malta. Of course, a country's share of female employment in Transport services is influenced by the subsectors that it specialises in.

As illustrated in Table 5.11, in Air transport (40.1 %), the share of women was almost double that, on average, in Transport services, most likely reflecting the high shares of women among air cabin crew and ground staff. The lowest share of women was in Land transport (13.8 %), in which the largest shares of employment are in Road and other land transport, i.e. lorry, bus and taxi drivers, among others, which are professions that are traditionally dominated by men.

Share of part-timers lower than average

Part-time work seems to be less commonplace in EU-27 Transport services, when compared to Services as a whole. In 2006, the share of part-time workers in Transport services was 9.2 %, which was 10.8 percentage points below the Services average. In the 17 Member States for which data are available, this difference ranged between 3.4 percentage points in both Hungary and Portugal and 18.6 percentage points in the Netherlands, the Member State also displaying by far the highest share of part-time workers in Services. The share of part-timers was highest in Air (16.9 %) and lowest in Water transport (6.0 %).

Table 5.10: Share of women and of part-time employment in Transport services (NACE 60 to 63) employment, compared to Services average (NACE G, H, I and K), 2006 (%)

	Share of women employed		Share of persons employed part-time	
	Transport services	Services (NACE G, H, I & K)	Transport services	Services (NACE G, H, I & K)
EU-27	21.0	44.1	9.2	20.0
BE	20.0	41.3	11.5	21.5
BG	17.7	46.4	:	2.1
CZ	20.0	45.0	:	5.9
DK	25.0	41.5	12.2	27.3
DE	26.1	47.2	15.6	29.9
EE	27.4	51.0	:	8.2
IE	21.5	45.2	:	:
EL	16.4	39.3	:	5.1
ES	17.4	45.4	6.7	15.0
FR*	22.7	42.8	8.2	16.1
IT	17.5	40.3	6.9	16.7
CY	35.9	45.1	:	8.8
LV	23.1	53.1	:	4.2
LT	21.8	49.8	:	7.7
LU	19.7	40.9	4.4	15.2
HU	19.7	46.2	1.3	4.7
MT*	19.6	29.7	5.6	13.4
NL	23.4	41.2	26.7	45.4
AT	22.5	50.2	11.4	26.1
PL	15.2	45.1	3.8	9.5
PT	20.5	44.7	3.6	7.1
RO	17.2	44.8	:	2.3
SI*	21.3	45.9	4.8	8.7
SK	16.4	47.4	:	3.2
FI	21.5	44.9	7.1	17.9
SE	23.1	38.9	13.4	22.3
UK	23.0	43.4	12.8	29.5

* share of persons employed part-time: 2005

Source: Eurostat (LFS)

Table 5.11: Share of women and part-time employment in Transport services (NACE 60 to 63), by NACE Division, EU-27, 2006 (%)

	Women	Part-time
Total transport (NACE 60-63)	21.0	9.2
Land transport (NACE 60)	13.8	7.3
Water transport (NACE 61)	17.2	6.0
Air transport (NACE 62)	40.1	16.9
Supporting & auxiliary transport activities (NACE 63)	32.9	12.0

Source: Eurostat (LFS)

Labour costs lowest in central and eastern Europe

Average labour costs per employee in EU-27 Transport services were EUR 30 700 in 2005 (Table 5.4), 17 % above the Services average (NACE G, H, I and K). However, readers should note that these higher costs can partly be explained by the higher share of full-time workers in transport services (see previous section). Transport services employees were most expensive in Luxembourg, Norway, Belgium and Denmark, whereas labour costs were lowest in the ten central and eastern European Member States.

Apparent labour productivity (value added per person employed) reached EUR 43 600 in EU-27 Transport services in 2005, which is 11 % above the Services average. Apparent labour productivity was highest in Norway, Denmark, Ireland, Luxembourg and the United Kingdom, while it was lowest in the group of ten central and eastern European Member States.

Table 5.12: Selected cost, productivity, profitability and investment indicators, Transport services (NACE 60 to 63), 2005

	Labour cost per employee	Apparent labour productivity	Wage adjusted labour productivity	Gross operating rate	Investment rate
	EUR 1000	EUR 1000	%	%	%
EU-27	30.7	43.6	141.9	12.9	31.2
BE	45.0	60.5	134.4	9.0	32.5
BG	3.9	5.8	149.6	13.1	51.3
CZ	10.7	15.9	149.2	13.2	29.8
DK	42.5	80.1	188.3	14.0	37.7
DE	32.7	51.9	158.7	15.1	23.5
EE	8.6	17.1	197.7	9.4	42.6
IE	39.5	74.5	188.7	18.5	36.0
EL	26.8	28.2	105.5	20.4	23.7
ES	30.3	40.0	132.1	15.1	24.9
FR	40.0	51.5	128.8	9.4	37.6
IT	35.7	43.5	121.7	11.6	34.9
CY	26.3	32.4	123.2	15.4	6.2
LV	5.3	15.4	289.7	23.8	46.4
LT	5.9	11.9	201.0	16.1	46.9
LU	51.3	70.8	138.1	10.5	24.7
HU	11.0	14.3	130.5	9.4	106.8
NL	41.4	62.6	151.1	14.1	18.1
AT	39.3	55.6	141.5	10.0	41.1
PL	8.1	12.5	154.0	15.8	43.6
PT	21.7	34.3	158.3	12.5	78.7
RO	4.2	7.0	169.0	11.8	72.5
SI	18.7	21.0	112.2	6.2	95.4
SK	8.1	12.4	152.7	11.5	89.1
FI	40.1	52.8	131.8	11.7	23.2
SE	40.4	46.4	115.0	6.5	30.1
UK	37.9	62.6	165.1	14.3	25.7
NO	48.8	96.8	198.2	18.8	69.1

excluding MT; AT (Gross operating rate): 2004

Source: Eurostat (SBS), Member States

Wage adjusted labour productivity highest in the Baltic States

In 2005, wage adjusted labour productivity (apparent labour productivity divided by average personnel costs) was 142 % in EU-27 Transport services, somewhat below the Services average of 150 %. The highest rates of wage adjusted labour productivity were displayed by Latvia, Lithuania and Estonia, as well as by Norway, Ireland and Denmark. This contributes to explaining the importance that Transport services have acquired in the Baltic states' economies (Figure 5.1).

The gross operating rate (gross operating surplus in percentage of turnover) was 12.9 % in EU-27 Transport services in 2005 which, in these terms, was above the profitability of Services (11.1 %) and that of the non-financial business economy as a whole (10.0 %). The gross operating rate was highest in Latvia (23.8 %), also scoring strongly in Greece, Norway, Ireland and Lithuania.

The investment rate (gross investment in tangible goods as a share of value added) reached 31.2 % in EU-27 Transport services, three times that in Services (10.3 %). Reflecting growth in the sector, nine out of the ten central and eastern European Member States displayed the highest investment rates in the EU-27 together with Norway and Portugal.

Pipelines most profitable

Table 5.13: Selected cost, productivity, profitability and investment indicators, by transport service, EU-27, 2005

	Labour cost per employee	Apparent labour productivity	Wage adjusted labour productivity	Gross operating rate	Investment rate
	EUR 1 000	EUR 1 000	%	%	%
Total transport services (NACE 60 to 63)	30.7	43.6	141.9	12.5	31.2
Land transport; transport via pipelines (60)	26.5	32.0	122.0	13.0	27.0
Railway transport (60.1)	30.4	36.2	118.9	7.7	:
Road and other land transport (NACE 60.2: 'Other land transport')	25.6	30.7	120.1	13.6	22.5
Other scheduled passenger land transport; taxi operation; other land passenger transport (60.21 to 23)	*25.2*	*27.3*	*108.5*	*13.9*	*30.6*
Freight transport by road (60.24)	*25.8*	*33.0*	*127.7*	*13.4*	*18.0*
Transport via pipelines (60.3)	42.1**	374.9**	890.2**	40.0	30.0*
Water transport (61)	42.2	120.0	280.0	20.0	45.0
Sea and coastal water transport (61.1)	45.1	135.3	300.1	19.4	45.0
Inland water transport (61.2)	27.9	50.0	175.0	22.0	40.0
Air transport (62)	58.0	70.0	120.0	4.0*	24.8
Supporting/auxiliary transport activities incl. travel agencies (63)	33.3	56.6	170.1	13.3	34.1
Cargo handling and storage; other supporting transport act. (63.1, 63.2 and 63.4)	34.6	60.3	174.6	16.7	38.3
Travel agencies/tour operators; tourist assistance n.e.c. (63.3)	27.2	40.3	147.9	5.3	7.0

* 2004

** 2004, EU-25

Source: Eurostat (SBS)

The cost productivity and profitability indicators presented in Table 5.12 are detailed by Transport-service activity in Table 5.13. Averaging EUR 30 700 in EU-27 Transport services in 2005, the Labour cost per employee ranged between EUR 25 200 in Other land transport and EUR 58 000 in Air transport.

Apparent labour productivity was lowest at EUR 27 300 in Other land transport and it was highest at EUR 374 900 in Transport via pipelines (EU-25, 2004). The latter was also the smallest mode of transport in terms of employment and value added.

Wage adjusted labour productivity ranged between 108.5 % in Other road transport and 890.2 % in Transport via pipelines[2] (EU-25, 2004) and 300.1 % in Sea and coastal water transport.

Compared to a Gross operating rate of 12.5 % in EU-27 Transport services in 2005, Transport via pipelines (40.0 %) (EU-25, 2004) and Inland water transport (22.0 %) were the most profitable activities by this measure. The activities displaying the smallest margins in terms of this indicator were Travel agencies/tour operators, tourist assistance n.e.c. (5.3 %) and Railway transport (7.7 %). One must note that the gross operating surplus is generally higher for capital-intensive activities and lower for those activities in which personnel costs account for a higher proportion of costs.

Investment plays an important role in the transport sector, and it varies quite strongly according to the transport mode. Reaching 31.2 % on average in EU-27 Transport services in 2005, the Investment rate ranged from 7.0 % in Travel agencies/ tour operators, tourist assistance n.e.c. to 45.0 % in Sea and coastal water transport.

In Road and Water transport, investment mainly involves the acquisition of transport vehicles while, in Rail transport, it may also include investment in infrastructure such as railway tracks and stations. Investment in Cargo handling, storage and warehousing infrastructure is not negligible and, in Air transport, investment may also include runways and terminals.

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), while investment in transport equipment, office premises, office equipment, etc. is generally included under the respective transport activity.

[2] In the case of Transport via pipelines, it must be noted that the wage adjusted labour productivity indicator is being applied to a very capital-intensive industry.

Transport modes display different cost structures

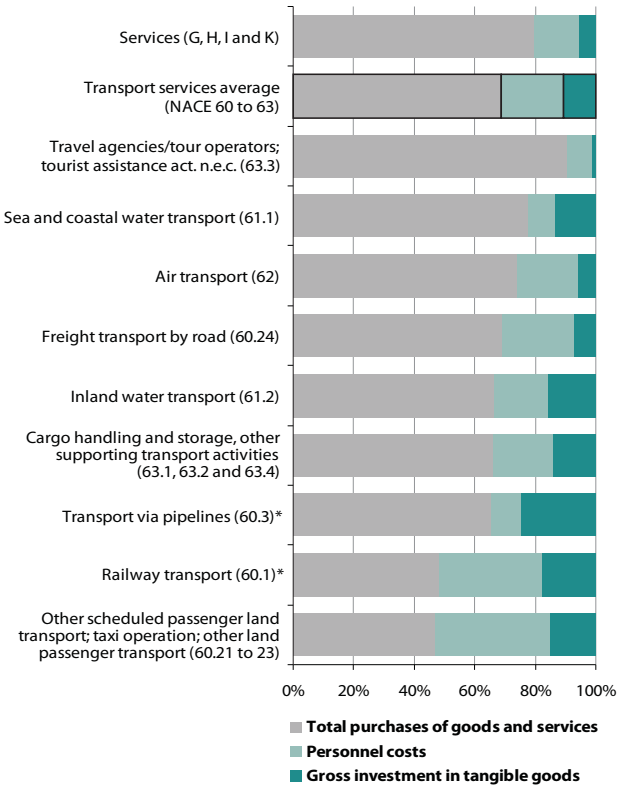
Looking at the weight of the three main categories that made up the total expenditure of EU-27 Transport services in 2005 – purchases of goods and services and personnel costs (together making up operating expenditure) and gross investment in tangible goods (capital expenditure) – one notices that personnel costs (20.9 %) and gross investment in tangible goods (10.5 %) made up higher shares of total expenditure than they did in Services as a whole (14.7 % and 5.4 % respectively) (Figure 5.14). It may however be expected that a recently witnessed rise in fuel prices has added to the weight of purchases of goods and services in the cost distribution of Transport services.

Acting as retailers of transport services, accommodation and leisure activities, Travel agencies/tour operators; tourist assistance activities n.e.c. displayed the highest share of purchases of goods and services (90.6 %) and the lowest share of personnel costs (8.4 %) and investment (1.0 %), a cost structure which is more typical of the distributive trades, whose business is built essentially on the resale of goods purchased. Sea and coastal water transport displayed the second highest share of purchases of goods and services in total expenditure (77.8 %).

Standing at 37.8 %, the share of personnel costs in expenditure was highest in Other scheduled passenger land transport; taxi operation, and other land passenger transport, for which labour costs per employee were also lowest (Table 5.13). The second highest share of personnel costs in expenditure (34.5 %) was that of Railway transport (EU-25, 2004).

The share of gross investment in tangible goods in expenditure was highest in Pipelines (EU-25, 2004), where it accounted for 24.7 % of total. One must note that this activity has no mobile plant, explaining a lower share of operating expenditure compared to that in the other transport modes. With weights of 17.6 % and 15.9 % respectively in their total expenditure, Rail transport and Inland waterways also displayed high shares of gross investment in tangible goods.

Figure 5.14: Distribution of total expenditure in Transport services (NACE 60 to 63)*, EU-27, 2005



* Rail transport (60.1) and Transport via pipelines (60.3): rounded estimate based on non-confidential data, EU-25, 2004

Source: Eurostat (SBS)

Employment grows yearly by 2.2 % and value added by 4.9 %

Based on data available for the EU-25 (i.e. for the EU-27 excluding Bulgaria and Romania) covering the 2000-to-2005 period, employment in EU-25 Transport services grew by 2.2 % yearly on average, while value added grew at a yearly rate of 4.9 % (Figure 5.15).

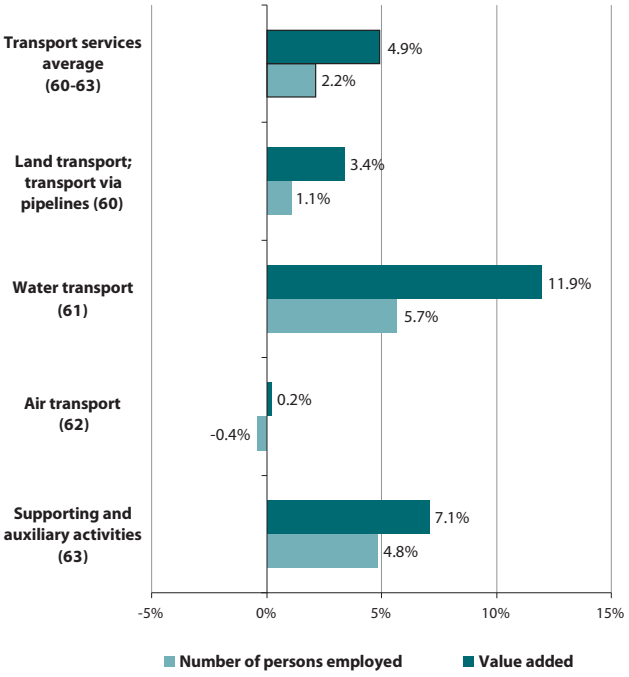
Water transport recorded the highest growth rates from 2000 to 2005, both in employment (5.7 %) and in value added (11.9 %), in large part due to a strong expansion in Sea and coastal water transport driven by international trade.

Supporting and auxiliary activities displayed robust annual growth rates in employment (4.8 %) and value added (7.1 %), which are especially explained by economic expansion in Cargo handling/storage and other supporting transport activities.

Employment in Land transport and transport via pipelines grew at an estimated yearly average rate of 1.1 %, while value added rose by 3.4 % annually. However, not all Land transport services did record growth (data not shown).

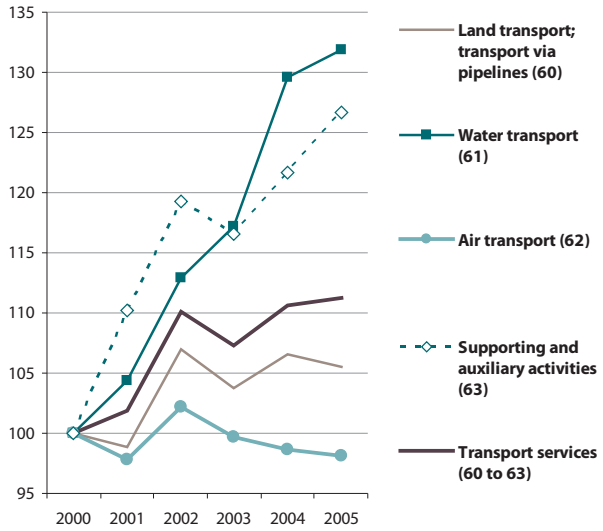
While Pipelines saw a strong growth rate in employment (EU-25, 2000 to 2004), employment and value added growth rates in Road transport grew in line with the Transport-services averages. Railway transport witnessed an estimated 5 % annual contraction in employment, while value added fell at an estimated yearly rate of 1 %.

Figure 5.15: Value added and employment in Transport services, AAGR, EU-25, 2000 to 2005



Source: Eurostat (SBS)

Figure 5.16: Transport services employment trends, EU-25, 2000 to 2005 (index 2000 = 100)



Source: Eurostat (SBS)

EU-25 Air transport saw only 0.2 % yearly growth in value added from 2000 to 2005, while employment in the subsector recorded a contraction of 0.4 % per annum.

In Figure 5.16, the indices (index 2000 = 100) illustrate the yearly progression of employment in Transport services. One may note the similarity of trends in Transport services as a whole, and in Land transport, the sector's main employer. In the latter, as well as in Supporting and auxiliary activities and in Air transport, a reduction in employment took place between 2002 and 2003.

Employment grows most in Hungary and value added in Lithuania

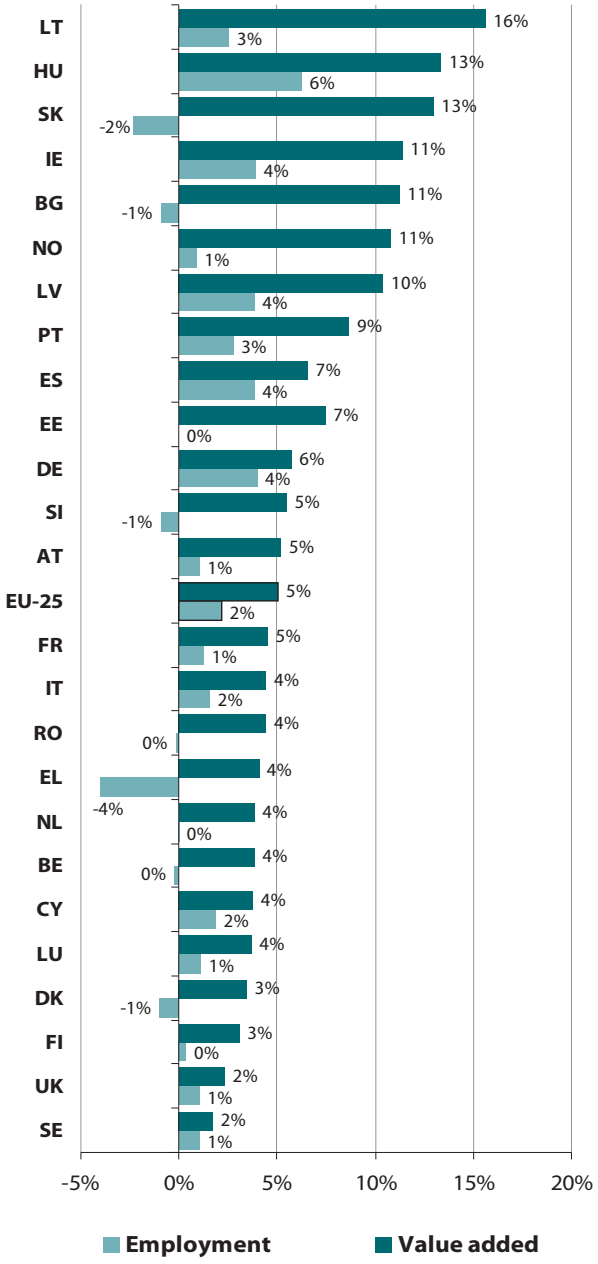
Comparing the average yearly growth rates in the Member States, employment in Transport services grew most in Hungary, at a yearly rate of 6 %. The latter was especially due to an increase in the number of persons employed in Land transport, particularly in Road freight.

In Germany, Ireland, Spain and Latvia, the number of persons employed in Transport services grew at an average annual rate of 4 % from 2000 to 2005. In the first two Member States, employment grew most in Cargo handling/storage and other supporting transport activities while in the latter two, employment growth was in large part driven by Road freight. At 3 %, the yearly growth rate of the number of persons employed in Transport services from 2000 and 2005 also stood above EU-25 average in Portugal and Lithuania.

Value added in Transport services grew most over the period at a yearly rate of 16 % on average in Lithuania, 13 % in Hungary and Slovakia, 11 % in Ireland, Bulgaria and Norway, and 10 % in Latvia. In the first three, as well as in Latvia, growth in value added was especially generated in Land transport and, to a lesser extent, in Supporting and auxiliary transport activities, and activities of travel agencies. In Ireland, 44 % of growth in value added was due to Cargo handling/storage and other supporting transport activities. In Bulgaria, over half of growth in value added was accounted for by developments in Supporting and auxiliary transport activities, and activities of travel agencies. From 2000 to 2005, the EFTA member Norway's growth in Transport services value added was to more than two thirds due to increases in Water transport.

It is interesting to note that eight out of the nine Member States displaying the highest growth rates in Transport services value added from 2000 to 2005 belonged to the group of the ten Member States with the highest GDP growth rates in the EU-27 over that period. The latter is particularly made up of central European NMS-12, in which domestic demand grew rapidly, but which have also gained shares of this international market thanks especially to lower costs.

Figure 5.17: Value added and employment in Transport services, AAGR, by Member State, 2000 to 2005



Note: LU: 2001 to 2005; SI: 2002 to 2005; excluding: CZ, MT & PL

Source: Eurostat (SBS)

6

Transport safety

Freedom of movement… safely

An overturned car, a train accident, an air crash, an oil spillage: these are all external risks of transport. They are multiplied by the increasing traffic numbers on roads, rails, water and in the air, as well as by the ever-growing number of interconnections between national transport networks in an enlarged European Union. It comes as no surprise that transport safety was reiterated as being a priority in 'Keep Europe Moving', the mid-term review of the 2001 Transport White Paper.

Based on the data covered in this chapter, close to 44 400 lives were lost in traffic accidents on EU-27 territory in 2006 – road, rail and air traffic combined – with road accidents claiming the overwhelming majority (97 %) of those fatalities. But the true toll of deaths connected with transport would certainly be higher than that if one were to include accidents in water transport and those involving urban transport networks such as underground light rail.

The overall mortality rate in road, rail and air transport however appears to have steadily declined, as much has been done at EU level to reduce the risk of accidents and fatalities. Against a backdrop of EU-wide legal harmonisation, and the setting-up of specialised agencies, on-going efforts include a large number of safety initiatives in the individual transport modes together with support to projects that research safer transport.

In the case of road transport for example, measures have included the creation of a Road Safety Charter, the adoption of legislation regulating the driving and rest time of professional drivers, obligatory seat-belt wearing, higher safety standards for vehicles (e.g. Euro NCAP) and the recent publication of a road-safety scoreboard[1].

[1] http://ec.europa.eu/transport/roadsafety_library/scoreboard/scoreboard_2008.pdf

Cars and roads take most lives

The car is obviously people's preferred mode of transport but, at the same time, the transport mode causing the greatest number of accidents and the highest transport death toll in the EU-27. Based on data available from the CARE database (see: box), there were 1.3 million road accidents involving personal injuries in the EU-27 in 2006. This number has been falling steadily from a peak of close to 1.5 million in 2000.

In 2006, 42 950 persons lost their lives in road accidents: car drivers and passengers, occupants of buses and coaches, riders and passengers of powered two-wheelers, cyclists, pedestrians and commercial vehicle drivers. This corresponds to 87 fatalities per million inhabitants in the EU-27. This ratio has fallen steadily, nearly halving from 162 in 1990 as a result of the number of road fatalities themselves being reduced at an average yearly rate of 3.5 % from 1990 to 2006, while the population of the EU-27 grew yearly at 0.3 % on average.

Further putting these figures into perspective, although occasional rail, maritime, air and urban transport accidents often result in high numbers of fatalities, if each individual road death were cumulated into equally-as-large news-breaking numbers, road deaths would clearly reach the headlines far more often.

Measuring transport safety

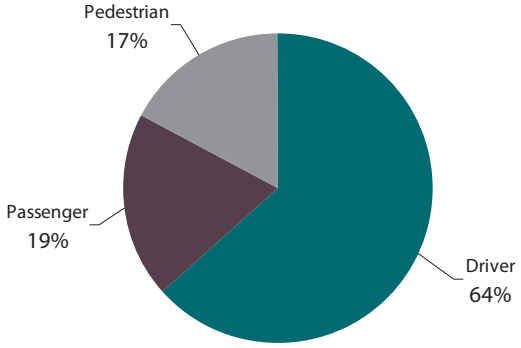
Measuring transport risk – and comparing it between countries – is not clear-cut, for there are different means of measurement. One method is to simply count the number of accidents and to divide it by the total population, resulting in the number of deaths per million inhabitants for example. Yet while the ratio of fatalities to population cancels out countries' different population sizes, it does not reflect the actual usage of, performance of nor safety of the transport modes.

For example, a train accident causing hundreds of deaths in a small country would result in a high ratio of deaths per million inhabitants, but if only a small share of the population use the train, and for short journeys, the statistic does not say much about the relative safety of rail travel, compared with that of the car. Linking the number of fatalities to the distance travelled serves as a better measure in this respect. It measures the frequency of fatalities per unit of distance covered per person.

When it comes to making comparisons with air transport, reliable statistics on accidents per passenger kilometres (pkm) in air traffic are scarce. What is more, even if pkm figures were obtainable, the picture would nevertheless be distorted, since only few accidents occur 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 important element is the differentiation between passenger, driver as well as third-party deaths (e.g. a pedestrian crossing the road). For a passenger faced with choosing between one transport mode or the other, data based on passenger fatalities are probably the most valuable, rather than a general indicator including drivers, pedestrians and passengers.

Figure 6.1: Road fatalities, by type of user, EU-27*, 2006** (%)



Note: persons deceased within 30 days of their accident

* estimate based on data from 20 Member States accounting for 87 % of EU-27 road fatalities in 2006; excluding: BG, CZ, LV, LT, RO, SI and SK

** 2005: EE, ES, MT, PL, FI and UK; 2004: IT; 2003: IE and NL; 2002: LU

Source: CARE Database

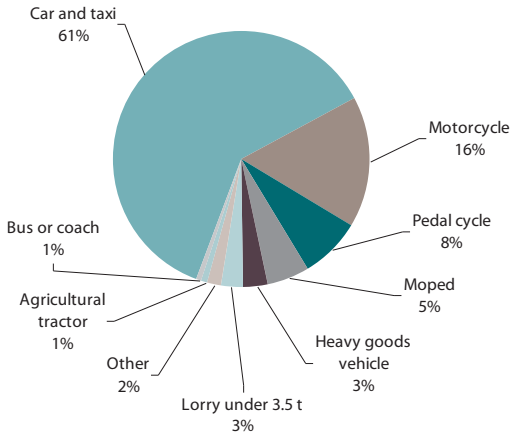
Based on figures from the CARE database covering 20 Member States, an estimated 64 % of fatalities on the road involved drivers, 19 % passengers and 17 % pedestrians in 2006.

Among the 20 Member States for which data are available, in Belgium and the Netherlands (2003), three quarters of road fatalities (75 %) were those of drivers, and 71 % in France. Malta (2005: 35 %) and Luxembourg (2002: 24 %) saw the highest shares of road fatalities accounted for by passengers, as well as Estonia and Spain (2005: both 23 %). High shares of road fatalities were made up by those of pedestrians in Malta (2005: 35 %), Poland (2005: 32 %) and Estonia (2005: 28 %).

Reflecting the high extent of car usage, cars and taxis accounted for an estimated 61 % of road fatalities in the 20 Member States for which data are available (Figure 6.2). Yet this is not to say that the car is the riskiest road vehicle, as these figures are not for example weighted by the number of vehicle-kilometres. Motorcycles accounted for the second largest number of deaths (16 %) followed by the other categories of two-wheelers: bicycles (8 %) and mopeds (5 %).

In Luxembourg (2002: 93 %), Finland (69 %) and Poland (68 %), the highest proportions of road fatalities were made up by cars. The share of road fatalities involving motorcycles was double the EU average in Greece (32 %). This share was also high in Cyprus (30 %) and Malta (27 %). An above-average proportion of road fatalities was accounted for by bicycles in the Netherlands (20 %) where they are a widespread means of transport, and in Poland (16 %). Mopeds contributed the highest proportions to road fatalities in Portugal (12 %), the Netherlands and Denmark (both: 10 %). One may note that Portugal and Denmark witnessed strong growth in their fleets of motorised two-wheelers between 1995 and 2006 (see Table 3.12).

Figure 6.2: Road fatalities of vehicle occupants (drivers and passengers), by type of vehicle, EU-27*, 2006** (%)



Note: Data cover persons deceased within 30 days of their accident

* estimate based on data from 20 Member States; excluding: BG, CZ, LV, LT, RO, SI and SK

** 2005: EE, ES, MT, PL, FI and UK; 2004: IT; 2003: IE and NL; 2002: LU

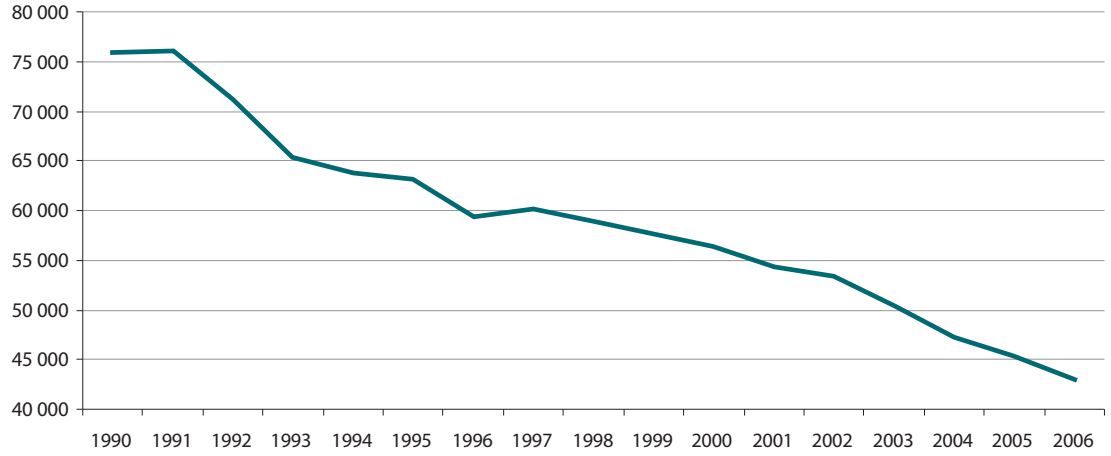
Source: CARE Database

CARE-ing for road users

The Community Road Accident Database – 'CARE' for short – is a European Community database of statistics on road accidents resulting in death or injury, which is 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. Its structure allows for maximum flexibility and potential with regard to analysing the information contained and it opens up a whole set of new possibilities in the field of accident analysis. The CARE database is maintained by DG Energy and Transport.

http://ec.europa.eu/transport/roadsafety/road_safety_observatory/care_en.htm

Figure 6.3: Road fatalities, EU-27, 1990 to 2006 (%)



Note: Persons killed are all persons deceased within 30 days of the accident. Corrective factors have been applied to the figures from Member States not currently using this definition.

Source: DG Energy and Transport

The total road death toll of 42 953 persons in the EU-27 in 2006 is shocking. Yet, over the 1990-to 2006 period, the total recorded has nearly constantly fallen from a peak of 76 076 fatalities in 1991 (Figure 6.3).

From 1990 to 2006, the number of road fatalities fell by an average 3.5 % yearly. Above-average reductions in the number of road fatalities in France, Germany and Spain especially contributed to the downward trend in the EU-27.

The decrease in yearly road fatalities is all the more encouraging when it is viewed against the simultaneous rise in road traffic over the same period (see Chapter 4). The reasons for which numbers of road deaths have been declining are many and they include: safer cars and infrastructure, both stricter laws and a better perception of the risks connected with not wearing seat belts and helmets, speeding and drink-driving.

Transport accidents major external cause of death among the under-20s in 2006

Transport accidents were a major cause of death among the under-20-year-olds in the EU-27 in 2006 as they made up 12.0 % of fatalities. Among the 17 Member States for which data are available for 2006[(2)], the share of transport accidents in the total number of deaths of under-20-year-olds ranged between 6.6 % in Romania and 7.1 % in the Netherlands, and 19.2 % in Greece and 20.6 % in Lithuania.

In the EU-27, the ratio of the number of male deaths caused by transport accidents to that of female deaths was 2.6 in this age category. In all the Member States for which data are available, the share of transport accidents in the total number of deaths was lower for females than for males.

In the case of females, the share of deaths of under-20-year-olds caused by transport accidents ranged between 5.9 % in both Ireland and Romania, and 19.6 % in Lithuania. In Greece, 26.6 % of the deaths of under-20-year-old males were caused by transport accidents and, in Lithuania, 21.1 %.

Source: Eurostat (Health)

[(2)] BG, CZ, DE, EE, EL, IE, ES, LV, LT, HU, NL, AT, PL, RO, SK, FI and SE

Country averages mask regional differences

Of course, country totals are only averages of the numerous regions making up those countries. When measured as persons killed per million passenger cars registered, regional data (NUTS) for 2004 show a very wide range in the fatality ratio around the EU-25.

For example, despite the progress noted over the last decade, many Greek regions continued to display high fatality rates. Among the 10 most dangerous regions in the EU-25, 7 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 (815). As no regional breakdown was available for Latvia, this Member State came fifth (752). The other non-Greek region in the top-10 was Észak-Alföld in Hungary (670).

See: Statistics in Focus, 'EU road safety 2004: Regional differences', Transport, 14/2007.

With road deaths taking the greatest toll among the transport modes, it is not surprising that road safety has been at the forefront of the EU's concerns. 'Keep Europe moving', the mid-term review of the 2001 Transport White paper reiterated the aim of halving the number of deaths on the EU's roads by 2010. This goal was also incorporated in the Commission's third Road Safety Action Programme[3]. At the yearly average rate of decrease of 3.5 % observed between 1990 and 2006, it would take just under 20 years to halve the number of road fatalities in the EU-27.

Table 6.4 shows that the number of road fatalities fell in nearly each Member State from 1990 to 2006. The only exception was Malta, where an increase was recorded due to a below-average number of fatalities in 1990. The highest yearly rates of decrease in the number of road fatalities were displayed by Portugal (-6.1 %), France (-5.3 %) and Latvia (-5.1 %). In contrast, apart from Malta, the number of road fatalities fell least in Cyprus (-1.0 %) the Czech Republic (-1.2 %) and Lithuania (-1.3 %).

In 2006, above 5 000 road fatalities were recorded in Italy (5 669), Poland (5 243) and Germany (5 091). After the latter, the Member States with the second and third highest population, France and the United Kingdom, recorded respectively 4 709 and 3 297 road fatalities in 2006.

[3] http://ec.europa.eu/transport/roadsafety/road_safety_observatory/rsap_en.htm

Table 6.4: Road fatalities, by country, 1990, 2006 and AAGR

	1990	2006	AAGR 1990 to 2006 (%)
EU-27	75 962	42 947	-3.5
BE	1 976	1 069	-3.8
BG	1 567	1 043	-2.5
CZ	1 291	1 063	-1.2
DK	634	306	-4.5
DE	11 046	5 091	-4.7
EE	436	204	-4.6
IE	478	365	-1.7
EL	2 050	1 657	-1.3
ES	9 032	4 104	-4.8
FR	11 215	4 709	-5.3
IT	7 151	5 669	-1.4
CY	101	86	-1.0
LV	947	407	-5.1
LT	933	759	-1.3
LU	70	36	-4.1
HU	2 432	1 303	-3.8
MT	4	10	5.9
NL	1 376	730	-3.9
AT	1 391	730	-3.9
PL	7 333	5 243	-2.1
PT	2 646	969	-6.1
RO	3 782	2 478	-2.6
SI	517	262	-4.2
SK	731	579	-1.4
FI	649	336	-4.0
SE	772	445	-3.4
UK	5 402	3 297	-3.0
HR	1 360	614	-4.8
MK	:	140	:
TR	6 286	4 633	-1.9
IS	24	31	1.6
NO	332	242	-2.0
CH	954	370	-5.7

Note: Persons killed are all persons deceased within 30 days of the accident. Corrective factors have been applied to the figures from Member States not currently using this definition.

Source: DG Energy and Transport, Member States

In Table 6.5, weighting the number of road fatalities by the populations of persons, by those of cars, as well as by the distance travelled per person in cars and motorised two-wheelers yields a quite different picture. On average in the EU-27, there were 87 road fatalities per one million inhabitants in 2006.

The Member States with the lowest number of deaths in terms of this indicator were Malta, the Netherlands and Sweden, with respectively 25, 45 and 49 road fatalities per one million inhabitants. The highest numbers were measured in the three Baltic states, in particular in Lithuania (224). In the latter Member State, the yearly average rate of reduction in this indicator from 1990 to 2006 (-0.8 %) was the lowest in the EU-27 (excluding Malta), compared to -3.8 % on average in the EU-27 and the highest rate of -6.4 % in Portugal.

Measured with respect to the total number of cars registered in a Member State, the number of road fatalities were also lowest in Malta, the Netherlands and Sweden in 2006, at 46, 102 and 107 deaths respectively per one million passenger cars. The ten central and eastern European Member States as well as Greece formed the group in which this indicator was highest.

There were 9 road fatalities on average per one billion passenger-kilometres in the EU-27 in 2006. Sweden (4.5) and the United Kingdom (4.8) scored better than in terms of the other indicators, and the Netherlands (4.8) and Malta (4.9) ranked third and fourth respectively. The number of road fatalities per billion passenger-kilometres was above double the EU-27 average in seven central and eastern European new Member States. The indicator reached its highest levels in Romania (39.8) and Bulgaria (32.8).

Table 6.5: Road fatality indicators, by country, 2006 (number of fatalities)

Road fatalities					
per million inhabitants		per million passenger cars		per billion pkm*	
LT	224	RO	711	RO	39.8
LV	178	BG	590	BG	32.8
EE	152	LV	520	HU	27.1
EL	149	LT	498	LV	25.6
PL	137	HU	446	PL	23.5
BG	135	SK	439	SK	21.5
SI	131	PL	408	LT	19.1
HU	129	EE	389	EE	17.5
RO	115	EL	375	EL	17.4
CY	111	SI	270	CY	16.7
SK	107	CZ	264	CZ	14.6
CZ	104	CY	236	PT	13.1
BE	101	PT	228	IE	13.0
IT	96	BE	216	ES	11.7
ES	93	IE	211	SI	11.3
PT	92	ES	201	AT	10.0
AT	88	EU-27	189	BE	9.6
EU-27	87	AT	175	EU-27	9.0
IE	86	IT	162	IT	7.4
FR	77	DK	154	FR	6.4
LU	76	FR	153	DE	5.7
FI	64	FI	136	DK	5.6
DE	62	LU	116	LU	5.4
DK	56	UK	116	FI	5.3
UK	54	DE	110	MT	4.9
SE	49	SE	107	NL	4.8
NL	45	NL	102	UK	4.8
MT	25	MT	46	SE	4.5

Note: All fatalities on the road: car drivers and passengers, bus and coach occupants, riders and passengers of powered two-wheelers, cyclists, pedestrians, commercial vehicle drivers.

* indicator based on passenger kilometres of cars and motorised two-wheelers only

Source: DG Energy and Transport, Member States

The European Road Safety Charter

The European Commission estimates the economic damages generated by road traffic accidents in the EU-27 in 2007 as amounting to EUR 200 billion, that is around 2% of the EU-27's GNP.

The European Road Safety Charter is an invitation by the European Commission to all stakeholders – institutions, associations and companies – to take concrete actions, assess results and further heighten awareness of the need to reduce road accident fatalities. Through this charter, the stakeholders are given the opportunity to share road safety ideas and practices across the EU-27.

http://www.erscharter.eu

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 sufficient in most Member States. Experts agree that more emphasis should be placed on preventive and active safety.

The EU's TRACE (TRaffic Accident Causation in Europe) project aims to identify and to assess, in terms of saved lives and avoided accidents, the most promising technology-based safety solutions that can assist the driver or any other road users in a normal road situation, in an emergency situation or, as a last resort, in mitigating the violence of crashes and protecting the vehicle occupants, the pedestrians, and the two-wheelers in case of a crash or a rollover.

TRACE determines and continuously updates the causes of road accidents, as well as the causes of injuries, by undertaking statistical analyses of road accident and driver behaviour figures. This is done from three research angles: road users, pre-accident driving situations and risk factors.

In collaboration with projects such as SafetyNet and Specific targeted research projects (STREPs), TRACE also assesses whether the existing technologies or those under current development address road users' real needs.

http://www.trace-project.org

The European Commission's Intelligent Car Initiative comes in here as a comprehensive answer to the safety needs of the citizens and industry. It aims to find common solutions to the EU-27's mobility problems and to improve the up-take of advanced information and communication technologies (ICTs) in road transport. In the long run, this helps to move towards a new situation with fewer accidents and less congestion.

ICTs can be incorporated into stand-alone onboard "Intelligent vehicle systems" or co-operative systems, including some applied to infrastructure. Offering new solutions to today's transport problems, these high-tech systems have great potential to: help drivers prevent or avoid traffic accidents; mitigate the consequences of accidents that do occur; provide drivers with real-time information about traffic on road networks, thereby avoiding congestion; find the most efficient routes for any journey; and optimise engine performance, thus improving overall energy efficiency.

Certain stand-alone systems are already in use, including anti-lock braking systems (ABS), and electronic stability programme (ESP) systems, which help the driver to maintain control of the vehicle in critical driving situations. A variety of newer systems are currently under development or being introduced onto the market. For example, '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, as well as hipovigilance systems for sleepy drivers.

http://ec.europa.eu/information_society/activities/intelligentcar

Rail travel is safer

Rail travel gave rise to far fewer fatalities than did road transport in 2006, as a total of 1 360 fatalities (excluding suicides) were due to railway accidents. This figure is smaller when compared to the road death toll. It translates into under 3 deaths due to railway accidents for every million inhabitants in the EU-27 in 2006 (compared to 87 in road transport) and under 4 deaths per billion passenger-kilometres performed by rail transport (compared to 9 in road transport).

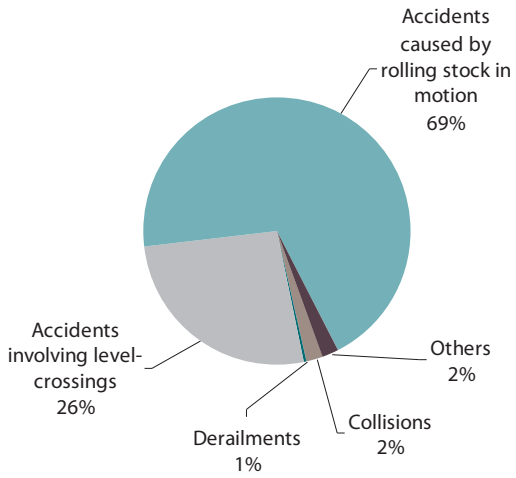
As shown in Figure 6.6, out of the total number of rail fatalities, 69 % of persons were killed in accidents caused by rolling stock in motion (people trespassing and walking on the line, and a small fraction of employees carrying out maintenance work and in shunting procedures) and 26 % in level-crossing accidents. Collisions accounted for 2 % and derailments for 1 % of rail fatalities.

A further 1 239 persons were seriously injured in railway accidents in the EU-27 in 2006 (data not shown), with accidents caused by rolling stock in motion accounting for 47 % of these injuries, accidents involving level-crossings for 33 % and collisions for 8 %.

The number of rail accidents generally appears to have declined in recent years. From 2004 to 2006, in the EU-25, they fell from 3 355 to 2 462, at an annual average rate of 14 %. Over this short period, while injuries saw an annual reduction of 20 %, the number of fatalities fell by 8 % yearly. This can be attributed to reduced numbers of accidents caused by rolling stock in motion and accidents involving level-crossings.

From 2004 to 2006, the number of fatal rail accidents fell in 15 of the 24 Member States for which data are available, while there were none in Ireland. One must note that a single major accident can however seriously influence statistical trends. This was, for example, the case with the rail accident of Eschede in Germany in 1998, which claimed over 100 lives.

Figure 6.6: Rail accident fatalities, by cause, EU-27, 2006



Source: Eurostat (Transport)

Table 6.7: Number of railway transport accidents involving dangerous goods, EU-27, 2006

	Number of accidents involving dangerous goods		Number of accidents releasing dangerous goods
	Total	per billion tkm of dangerous goods transport	
EU-27	51	1 *	24
BE	0	0	0
BG	2	1	2
CZ	0	0	0
DK	1	18	1
DE	3	0	1
EE	0	0	0
IE	0	0	0
EL	0	0	0
ES	14	8	0
FR	0	0	0
IT	0	0	0
CY	0	na	0
LV	0	0	0
LT	8	2	0
LU	0	0	0
HU	0	0	1
MT	0	na	0
NL	3	6	0
AT	17	12	15
PL	0	0	0
PT	0	0	0
RO	0	0	0
SI	0	0	0
SK	0	0	0
FI	0	0	0
SE	0	0	1
UK	3	:	3
LI	0	:	0
NO	1	14	1

* estimate (UK: 2005)

na: not applicable

Source: Eurostat (Transport)

As with any mode of transport, accidents involving dangerous goods can take on far greater proportions than for example the crash itself, opening the door to hazards such as fire, explosion, chemical leak and environmental pollution, as well as possibly affecting areas beyond the actual scene of the accident.

As shown in Table 6.7, there were 51 rail transport accidents involving dangerous goods in the EU-27 in 2006, of which 24, just under half, resulted in the release of dangerous goods. (e.g. spillage of substances, release of harmful gaseous substances, etc.).

The number of accidents involving dangerous goods was generally very low (zero or close to zero) in most Member States. With 17 such accidents, Austria recorded the highest number, and 15 of those were accidents in which dangerous goods were released. Spain followed with 14 accidents involving dangerous goods, yet in none were dangerous goods released.

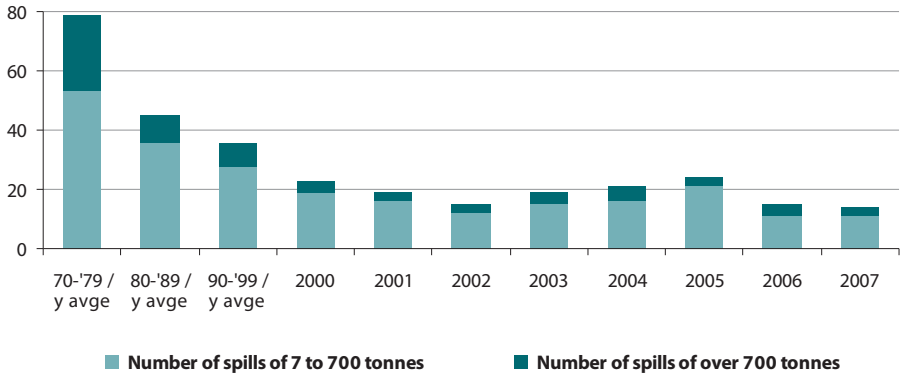
Looking at the number of accidents only provides a part of the picture. A fairer evaluation of the relative safety of transporting dangerous goods by rail is obtained by bringing transport performance into the equation and calculating the average number of transport accidents involving dangerous goods per billion tonne-kilometre (tkm) of dangerous-goods transport.

According to this indicator, somewhat under 0.9 accidents involving dangerous goods occurred in the EU-27 per billion tonne-kilometre of dangerous goods rail transport. Denmark recorded 18 accidents per billion tkm, the highest such number, ahead of Norway, Austria, Spain and the Netherlands, which recorded 14, 12, 8 and 6 accidents respectively per billion tkm of dangerous goods transport.

Maritime safety: casting the net wider

One certainly remembers 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. In more recent accidents, the *Erika* (1999) and the *Prestige* (2002) sank, wreaking havoc on the EU's coasts after spilling their toxic cargoes. As shown in Figure 6.8, thanks to the implementation of a number of maritime safety measures and in spite of rising maritime traffic, the average yearly number of oil spills at sea fell from 79 in the 1970s to 21 in the years 2000 to 2007. The share of spills releasing above 700 tonnes of oil also decreased, from 32 % in the 1970s to 19 % in the 2000s.

Figure 6.8: Number of Oil Spills at Sea



Source: DG Energy and Transport; International Tanker Owners Pollution Federation Ltd

This is of course without speaking of the numerous lives lost at sea on small fishing and leisure boats. Reliable data on the number of deaths occuring in maritime transport operations are not easy to obtain, a situation which can, in part, be explained by the phenomenon of flags of convenience mentioned in Chapter 3. A presentation of fatalities linked to EU-registered vessels alone would misrepresent the true situation. Based on Lloyds Register Fairplay data, total losses of merchant ships with a gross tonnage (gt) of 500 and over amounted to 517 worldwide over the five-year period from 2003 to 2008. According to fleet manager nationality, 117 (23 %) of those were EU-27 vessels. With 44 controlled vessels lost, Greece accounted for 38 % of EU-27 total, Germany 11 % and Spain 9 %. Due to different definitions of 'ownership', care must taken in comparing these figures with those that appear in Chapter 3.

Navigating the seas ahead

Since the early 1990s, in the wake of accidents such as those of the Erika and the Prestige, the EU has introduced extensive legislation aimed at improving the level of maritime safety and the prevention of accidental pollution by ships. From 2003 for example, single-hull oil tankers transporting heavy fuel oil were forbidden from entering or leaving European ports. A timetable was also adopted for the withdrawal of single-hull oil tankers by the year 2010.

Since 2003 the European Maritime Safety Agency has been responsible for monitoring the effective implementation of European maritime safety legislation. The 'Third set of measures in favour of maritime safety' (2005) is a package which is expected to be adopted shortly by the European Parliament and the Council. It will allow the Union to strengthen its legislation relating to the inspection of ships by the port state, and that relating to classification societies and to traffic monitoring and information systems, with the aim of improved traffic monitoring in European waters.

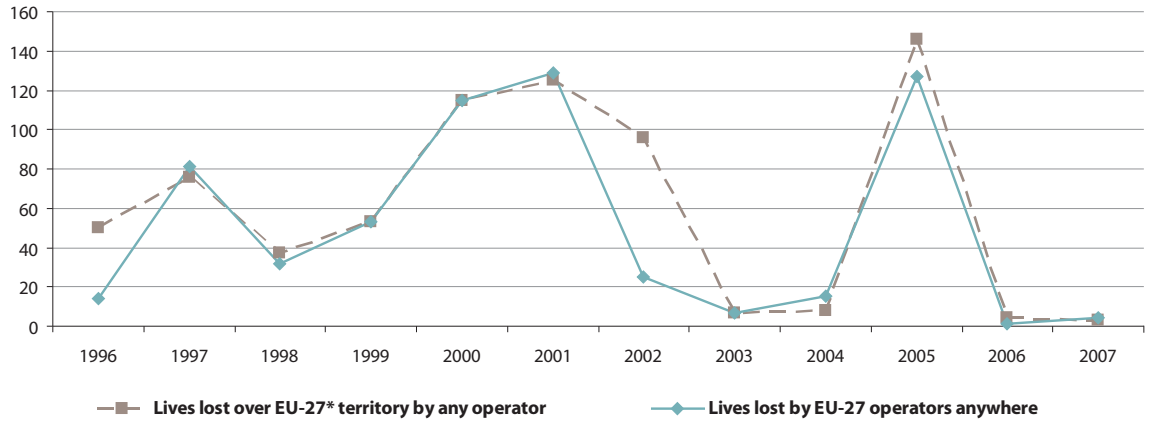
http://ec.europa.eu/transport/maritime/safety/2005_package_3_en.htm

Safety in the air

The safety of air transport has been at the top of the EU's priority list since the introduction of the common air transport policy. With the increase in air traffic and the opening-up of EU air space to the competition of numerous operators, its importance has grown. The terrorist air attacks in the USA on 11th September 2001 further emphasised the question of 'air security' – as opposed to 'air safety' – which targets the prevention of illegal acts in aviation.

Figure 6.9 shows the number of fatalities in air accidents, both those that took place over EU-27 territory (before 2006: EU-25) and those resulting from accidents involving EU operators anywhere in the world. This distinction is important, given that the aircraft flying over the EU-27 also come from non-EU countries. Air accident figures are useful to measures being taken to increase air safety, such as the setting of stringent safety standards for EU air carriers, as well as the banning of non-EU carriers that fail EU requirements (see box).

Figure 6.9: Number of fatalities in air accidents, EU-27, 1996 to 2006



Note: onboard fatalities only

* 1970-2005: EU-25 territory

Source: Ascend

Air safety gets extra thrust with airline blacklist, common technical requirements and administrative procedures

Two decisive steps towards enhancing European air safety and passenger protection were taken in 2006 with a regulation[4] allowing the European Commission to keep European airspace free from airlines and aircraft considered to be unsafe, as well as a regulation[5] also known as 'EU-OPS', bringing up to date technical requirements and administrative procedures in the field of civil aviation.

Since 2006, the European Commission has provided a regularly updated list online of airlines considered to be unsafe and therefore not permitted to fly passengers or cargo within European Union airspace. The first regulation also gives passengers the right to be informed about the identity of the airline that will operate the flight(s) for which they have made a reservation.

http://ec.europa.eu/transport/air_portal/safety/documents_en.htm

http://ec.europa.eu/transport/air-ban/

[4] Regulation (EC) 2111/2005 of the European Parliament and of the Council 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, 14.12.2005

[5] Regulation (EC) 1899/2006 of the European Parliament and of the Council amending Council Regulation (EEC) No 3922/91 on the harmonisation of technical requirements and administrative procedures in the field of civil aviation, 12.12.2006

The trend in the number of lives lost over EU-27 territory (before 2006: EU-25) follows closely that of lives lost by EU-27 operators anywhere, and looking at the specific accidents explains some of this overlap. For instance, the peaks in both indicators in 2000, 2001 and 2005 involved EU operators and the accidents happened over EU territory: Concorde in Paris in 2000 claiming 109 lives out of the 122 recorded for that year, the air accident in Milan in 2001 causing 110 of the 125 fatalities that year, and the air accident in Greece in 2005, accounting for 121 of the 135 lives lost that year. In 2002, the death tolls did not coincide as, of the 101 lives lost over the EU, 71 deaths are explained by the accident over German territory involving a non-EU registered aircraft.

Although caution should be exercised when studying their breakdown, the data do help to identify weak points. In addition to faulty equipment, many accidents have been ascribed to pilot- and communication error, and to failings in air traffic management such as the handover of flights between different air zones.

In 2004, the EU adopted a package of legislation as the first step in creating the Single European Sky (SES). This initiative seeks to promote a more rational organisation of EU airspace while increasing capacity and ensuring uniformly high safety standards in the EU. It aims to put in place a framework with a 'total systems approach' for decision-making and operational improvement that will enhance efficiency, safety and cost-effectiveness.

With the 'de-fragmentation' of EU-27 airspace its priority, the second SES package adopted in 2008 reiterates the importance of air safety. It for example estimates that air transport safety risk quadruples as traffic doubles.

European safety agencies

European Road Safety Observatory

http://www.erso.eu

Having road safety as its main concern, the European Road Safety Observatory (ERSO) coordinates all European Community activities in the fields of road accident and injury data collection and analysis. Resulting from SafetyNet, an Integrated Project funded by DG-TREN of the European Commission, ERSO is the forum in the EU for the exchange of information on road-safety best practice and, ultimately, it organises and manages Community best practice guidelines.

European Railway Agency

http://www.era.europa.eu

Opened for operation in 2005, the European Railway Agency (ERA) in Valenciennes, France, has the task of helping the EU-27 to construct a modern and economically viable, integrated European railway network by reinforcing the safety and interoperability of railways throughout the Union.

EMSA

http://emsa.europa.eu

Created after the Erika disaster (1999), the European Maritime Safety Agency (EMSA) contributes to the enhancement of the overall maritime safety system in the Community. With the goals of reducing the risk of maritime accidents, marine pollution from ships and the loss of human lives at sea, EMSA has been operational since 2002 and is located in Lisbon, Portugal.

http://www.easa.eu.int

Seated in Cologne, Germany, the European Aviation Safety Agency (EASA) is the centrepiece of the European Union's aviation safety strategy. Its mission is to promote the highest common standards of safety and environmental protection in civil aviation.

7

Energy consumption and the environment

On the road to sustainability

This chapter looks in detail at two further costs of transport: energy consumption and emissions. Energy consumption makes up one of the main current costs of transport while air pollution is a core external cost category of transport. The IMPACT handbook[1] describes the main cost drivers for marginal climate cost of transport as being the final consumption and carbon content of fuel. This points to the fact that energy consumption and emissions in transport are closely linked.

Transport occasions further external costs ('externalities') that are not covered in detail here and that include noise and the costs of up- and downstream processes such as, for example, the emissions of energy production for Rail transport, as well as the external costs of production, maintenance and disposal of both infrastructure and vehicles.

In the EU-27, during the 1990s and the first half of the 2000s, both developments of the legal framework and new vehicle technology have resulted in important improvements in energy consumption and emissions. Growing stocks and performance in transport however contributed to energy consumption in transport growing over the period at an average annual rate of 1.8 %, which compares to 1.5 % growth in the sector's emissions. From 1990 to 2006, trends in transport energy consumption and emissions were in some cases markedly different in the EU-15 and in the twelve new Member States of the 2004 and 2007 enlargements (NMS-12).

[1] "Handbook on estimation of external costs in the transport sector – Produced within the study Internalisation Measures and Policies for All external Cost of Transport (IMPACT)", Delft, 2008

7.1 Energy consumption

Final energy consumption covers all forms of energy, as they are delivered to the final consumer's door (industry, transport, households and other sectors), for all energy uses. Deliveries for transformation and the own-use of the energy producing industries as well as network losses are however not included. Data show the quantities of fuel consumed in the EU-27, expressed in tons of oil equivalent (toe). Counting in this energy unit allows the comparison and aggregation of fuel types with different physical properties.

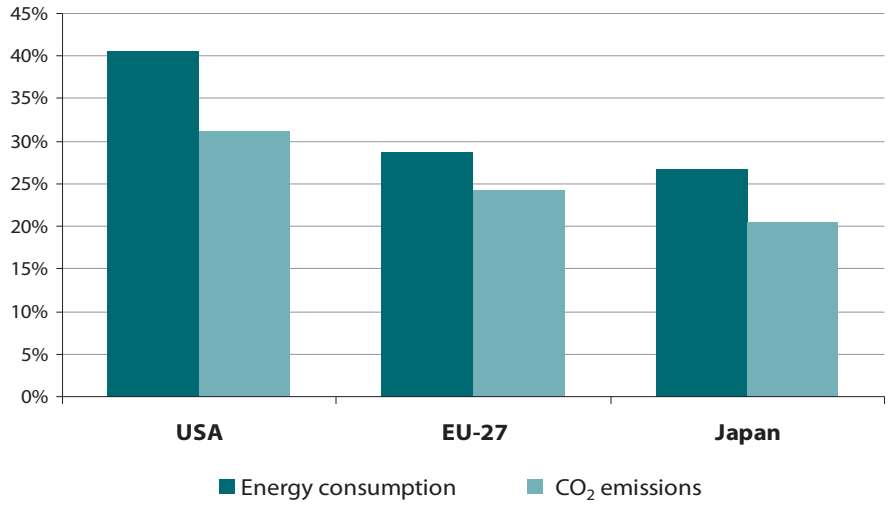
Final energy consumption in transport refers to fuel consumption in all transport activities irrespective of the economic sector the activity takes place in, i.e. fuel consumed in Land transport (NACE 60) excluding Pipelines; Water transport (NACE 61) excluding Maritime transport and Air transport (NACE 62).

Readers should note that, by the nature of certain types of transport, notably sea and air transport, as fuel may be consumed outside the EU-27 (e.g. on flights to non-EU countries), the energy consumption of aviation and maritime transport from international bunkers is not included, although an idea of their sizes is provided.

Inland water navigation energy consumption figures include consumption by small vessels (including leisure boats) performing coastal shipping and not using fuels from international maritime bunkers. this explains the term 'Inland Water Navigation' (IWN) employed, as opposed to the smaller aggregate 'Inland waterways' seen in previous chapters. It also explains figures for countries with no significant inland waterway network.

EU-27 performs better than the US, but worse than Japan

Figure 7.1: Share of transport in total final energy consumption (% toe) and share of transport in total CO_2 emissions* (% tonnes), USA, EU-27** and Japan, 2005



* CO_2 emissions are calculated using the IEA energy balances, the IPCC Sectoral Approach and the default emissions factors from the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. They may differ from National Communications submitted by the parties to the UNFCCC.

** provisional figures

Source: OECD/ IEA

Comparable OECD-International Energy Agency data[2] help to put the EU-27 transport sector's share in total final energy consumption and CO_2 emissions into a more international perspective (Figure 7.1).

According to these figures, transport accounted for 29 % of EU-27 energy consumption in 2005***. Industry, services and households accounted in large part for the remaining shares. The EU-27 transport sector's share was 12 percentage points below transport's share of total energy consumption in the United States (41 %), but 2 percentage points above that in Japan (27 %).

A similar pattern emerges with the share of transport in the economies' total CO_2 emissions. Whereas in the EU-27 transport made up 24 % of CO_2 emissions, in the United States this share was 7 percentage points greater (31 %), yet 4 percentage points less in Japan (21 %). In comparison, based on Eurostat (Environment) data, the share of transport in total EU-27 CO_2 emissions was 17 % in 1990.

Comparing the two indicators highlights the fact that, in the EU-27, the USA and Japan, transport emitted proportionally less CO_2 than the energy it consumed, implying higher CO_2 intensity in the energy consumption of other sectors.

http://www.oecd.org/infigures

*** Based on Eurostat data, this share was 30.9 %. Statistical differences are explained by the use of different data sets and calculation methods.

[2] "OECD in Figures 2007", OECD 2007, pp. 28 & 48

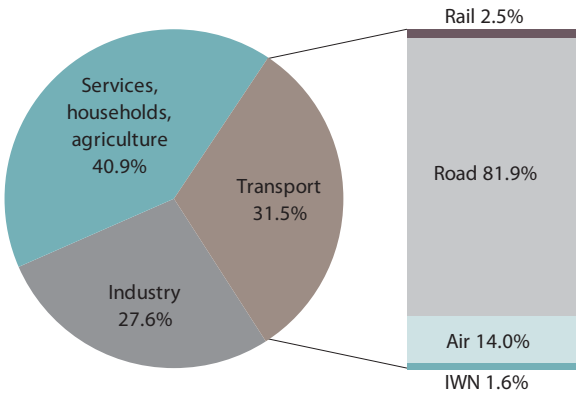
Transport consumes more than Industry

The final energy consumption of the EU-27 transport sector amounted to 370.4 million toe in 2006 (Figure 7.3). It made up somewhat under one third (31.5 %) of total final energy consumption (Figure 7.2), a share which rose from 26.3 % in 1990. This is due to transport's energy consumption growing at an average annual rate of 1.8 % from 1990 to 2006, while energy consumption in industry was reduced.

Transport accounted for 82.9 % of the 108.6 million toe increase in total final energy consumption from 1990 to 2006. This compares to 59.9 million toe increase in consumption by households and services and a 41.4 million toe decrease in consumption by industry. The latter's energy consumption was especially reduced in the early 1990s as a result of energy efficiency gains in production, with the notable closure of inefficient plants in the eastern Länder of Germany and in some of the NMS-12, as well as due to the migration of activities to non-EU countries with lower cost bases. The own-transport of goods by companies in Industry may also be expected to have been outsourced in part to specialised transport companies.

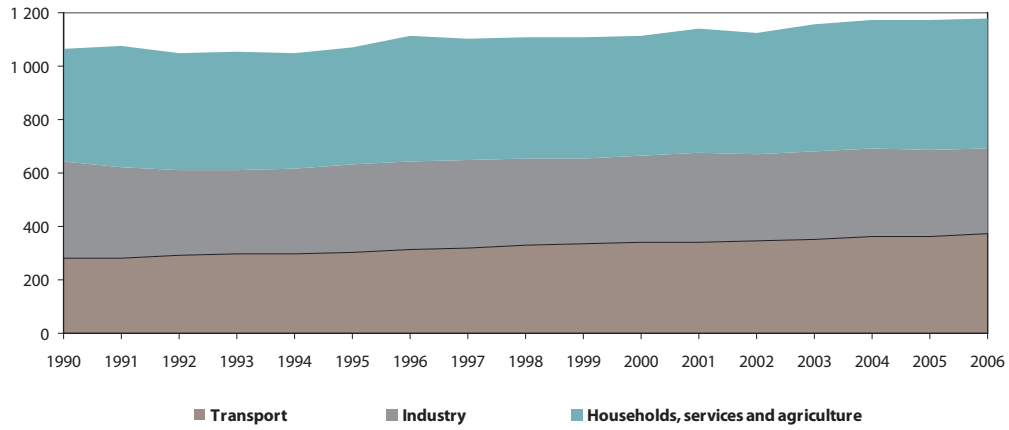
Growing fleets of passenger and goods road vehicles with higher performances, and a strong increase in the provision of Air transport services were the main contributors to the higher energy consumption of the transport sector, three quarters (76 %) of which were accounted for by Road and one quarter (25 %) by Air transport. The EU-27's final energy consumption of transport grew more strongly in the 1990s than after 2 000. While a major share (86.3 %) of the increase in consumption over the entire period was attributable to the EU-15 Member States, the NMS-12 displayed an acceleration in transport consumption after 2000.

Figure 7.2: Share of transport in final energy consumption, EU-27, 2006 (% TOE)



Source: Eurostat (Energy)

Figure 7.3: Final energy consumption of Transport, Industry, and Households, services and agriculture, EU-27, 1990 to 2006 (million TOE)



Source: Eurostat (Energy)

Increases in consumption and efficiency gains

Road transport is the mode consuming most energy in the EU-27 (Figure 7.4). From 1990 to 2006, the final energy consumption of Road transport grew at an annual rate of 1.6 %, to reach 303.3 million toe in 2006, which amounted to 25.8 % of total final energy consumption, and to 81.9 % of consumption in transport, compared to a share of 83.7 % in 1990. Over the shorter 1995-to-2006 period, final energy consumption in Road transport grew by 1.8 % yearly which, over that period, compares to an annual increase in the performance of road passenger transport (passenger cars, powered two-wheelers, buses and coaches) of 1.5 % and an increase in road freight transport of 3.5 % (see Chapter 4).

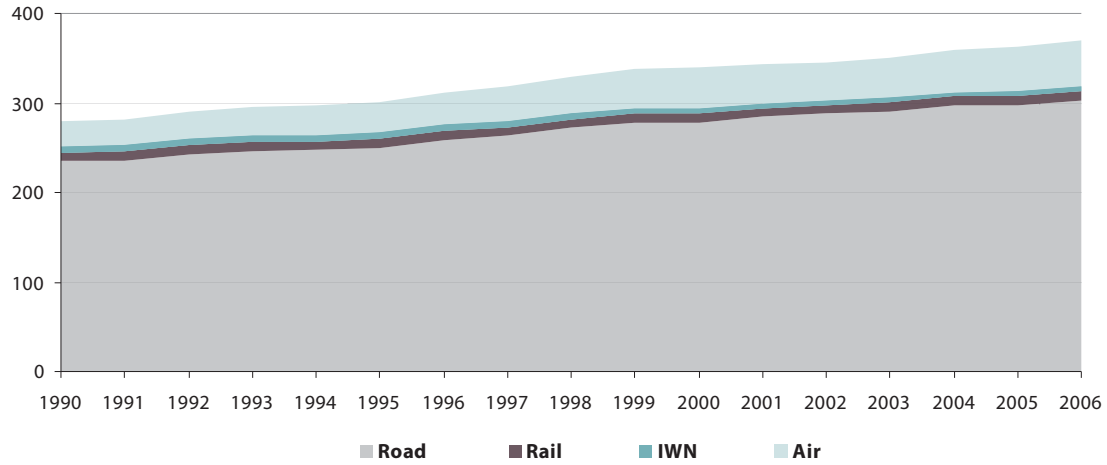
According to data from a recent DG TREN publication[3], private cars accounted for 55.9 % and lorries for 39.4 % of total energy consumption in Road transport in 2005. As 34.3 toe were required to perform one million pkm in 2005, compared to 38.2 toe in 1990, road passenger transport (private cars, public road transport and motor cycles) made estimated yearly energy efficiency gains of 0.7 %. Road freight transport also saw progress as it consumed 65.3 toe per million tkm in 2005 compared to 73.5 toe in 1990, making for 0.8 % annual energy efficiency gains.

Rail made up 2.5 % of final energy consumption in transport in 2006 compared to 3.4 % in 1990. While energy consumption by Rail was close to unchanged in 2000 compared to 1990, (both years: 9.6 million toe), it fell thereafter to reach 9.2 million toe in 2006. This is attributable to reductions in rolling stock (see Chapter 3). Given 1 % yearly increases in Rail passenger and freight transport performance over the period, energy efficiency gains may be expected to have been made, with for example electric-power replacing diesel oil.

Inland navigation was the transport mode that consumed least energy in 2006 (5.9 million toe) when it made up 1.6 % of total transport energy consumption. From 1990 to 2006, energy consumption by inland navigation fell at an average yearly rate of 1.0 %. While vessel numbers have decreased (see Table 3.8), their performance has tended to grow (see Chapter 4), also pointing at energy efficiency gains.

The final energy consumption of Air transport increased throughout the period, except between 2000 and 2002. It rose from 29.1 million toe in 1990 to 51.9 million toe in 2006, at an average annual rate of 3.7 %, the highest rate among the four transport modes covered. The share of Air transport in final energy consumption rose from 10.4 % in 1990 to 14.0 % in 2006. From 1995 to 2006, the average annual growth rate of final energy consumption by Air transport was 3.8 %, compared to a yearly increase in performance of air passenger transport of 4.6 % and an increase in air freight performance of 3.8 % over that period. Through the improved design of aircrafts and engines, and through higher passenger and freight loads, Air transport may be expected to have made noticeable energy efficiency gains measured in toe per pkm (see: IMPACT study).

Figure 7.4: Final energy consumption of Road, Rail, IWN & Air, EU-27, 1990 to 2006 (million TOE)



Source: Eurostat (Energy)

[3] "European Energy and Transport – Trends to 2030 – Update 2007" Directorate-General for Energy and Transport, 2008

Transport especially consumes Oil products

Various fuel types are consumed by transport. The quantities of total final consumption of energy in 2006, expressed in thousand toe, are shown in Table 7.5, together with the transport sector's share in the total final energy consumption of each fuel type and the breakdown by transport mode.

Petroleum products made up 96.7 % of energy consumption in transport in 2006 (Figure 7.6). They are highly demanded, in particular by Road and Air transport, due to the energy they release and their transportability for combustion when needed. Transport accounted for 72 % of EU-27 total final consumption of Oil products in 2006 compared to 62 % in 1990. From 1990 to 2006, 93 % of the increase in final energy consumption by the transport sector was accounted for by the increased consumption of Oil products.

Reflecting the expansion in the two modes, the final consumption of Oil derivates by Road transport grew at an average annual rate of 1.5 % from 1990 to 2006, while consumption by Air transport grew at 3.7 % annually. Road transport went from making up 53 % of the EU-27's total final consumption of Oil in 1990 to 60 % in 2006 while Air transport's share grew from 7 % to 10 %.

Table 7.5: Final energy consumption by fuel, by sector and transport mode, EU-27, 2006 (thousand TOE and %)

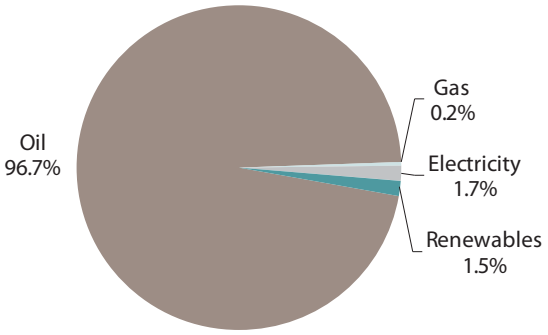
		Total	Oil	Gas	Electricity	Renewables & Other	Solid fuels	Heat
Final energy consumption		1 176 120	496 681	278 701	241 912	62 054	55 479	41 293
Industry (%)		27	10	37	41	29	77	28
Households/Services (%)		41	18	62	57	62	23	72
Transport (%)		31	72	0.2	3	9	0	
of which:	***Road (%)***	*82*	*83*	*100*		*100*		
	Rail (%)	*2*	*1*		*100*			
	IWN (%)	*2*	*2*					
	Air (%)	*14*	*14*					

Source: Eurostat (Energy)

Whereas Air transport only consumes Oil products, Road displayed diversification in its consumption. From 1990 to 2006, a 68.7 million toe rise in the final energy consumption of Road transport was accounted for to 92 % by the increased consumption of Oil fuels while 8 % were accounted for by the increased consumption of Renewable and other fuels and 1 % by Gas (e.g. compressed natural gas).

Rail transport is the only mode consuming Electricity in large quantities as this form of energy can be distributed to vehicles in motion through part of the fixed infrastructure. Reflecting the growing electrification of EU-27 Rail, the transport mode's consumption of Oil products decreased by 1.1 million toe from 1990 to 2006, at an average yearly rate of 2.0 %. Growing simultaneously at an annual average 0.9 %, Rail's consumption of Electricity increased by 0.8 million toe. In 1990, 0.1 million toe of Solid fuels (e.g. coal) were still consumed by Rail transport, however that source of energy was barely used in 2006.

Figure 7.6: Energy consumption in transport, by fuel type, EU-27, 2006 (% TOE)



Source: Eurostat (Energy)

Table 7.7: Final energy consumption, by transport mode, 2006 (thousand TOE)

	Transport	Road	Rail	IWN	Air
EU-27	370 304	303 317	9 199	5 932	51 856
BE	9 626	8 056	180	210	1 179
BG	2 772	2 504	63	0	204
CZ	6 318	5 692	270	6	350
DK	5 339	4 195	106	119	919
DE	63 311	52 444	1 851	274	8 743
EE	797	707	52	6	32
IE	5 373	4 427	50	27	870
EL	8 502	6 439	60	707	1 295
ES	40 822	32 473	1 092	1 678	5 579
FR	50 859	42 212	1 269	304	7 075
IT	44 194	39 022	949	242	3 981
CY	929	618	na	na	308
LV	1 177	1 027	84	0	67
LT	1 503	1 367	76	6	53
LU	2 631	2 217	10	na	405
HU	4 680	4 303	103	1	272
MT	294	217	na	na	77
NL	15 620	11 482	169	267	3 703
AT	7 659	6 637	308	10	705
PL	13 426	12 577	416	3	429
PT	7 142	6 149	68	0	924
RO	4 359	3 996	184	41	139
SI	1 554	1 499	29	na	26
SK	1 832	1 743	45	na	43
FI	4 956	4 018	102	220	615
SE	8 569	7 326	251	123	870
UK	56 060	39 969	1 411	1 687	12 992
IS	479	276	na	16	187
NO	5 120	3 429	144	848	698

Source: Eurostat (Energy)

Table 7.8: Share of transport in domestic final energy consumption, 2006 (% TOE)

	Transport	Road	Rail	IWN	Air
EU-27	31.5	25.8	0.8	0.5	4.4
BE	25.2	21.1	0.5	0.6	3.1
BG	27.6	25.0	0.6	0.0	2.0
CZ	24.1	21.7	1.0	0.0	1.3
DK	34.2	26.8	0.7	0.8	5.9
DE	28.4	23.5	0.8	0.1	3.9
EE	28.7	25.5	1.9	0.2	1.2
IE	41.2	34.0	0.4	0.2	6.7
EL	39.6	30.0	0.3	3.3	6.0
ES	42.2	33.6	1.1	1.7	5.8
FR	32.2	26.8	0.8	0.2	4.5
IT	33.8	29.9	0.7	0.2	3.0
CY	50.5	33.6	na	na	16.7
LV	28.0	24.4	2.0	0.0	1.6
LT	31.8	28.9	1.6	0.1	1.1
LU	59.8	50.4	0.2	na	9.2
HU	26.1	24.0	0.6	0.0	1.5
MT	61.5	45.4	na	na	16.1
NL	30.7	22.6	0.3	0.5	7.3
AT	28.6	24.8	1.2	0.0	2.6
PL	22.3	20.9	0.7	0.0	0.7
PT	38.5	33.2	0.4	0.0	5.0
RO	17.6	16.2	0.7	0.2	0.6
SI	31.4	30.3	0.6	na	0.5
SK	17.2	16.3	0.4	na	0.4
FI	18.6	15.1	0.4	0.8	2.3
SE	25.8	22.1	0.8	0.4	2.6
UK	37.2	26.5	0.9	1.1	8.6
IS*	16.3	9.7	na	0.3	6.4
NO	27.8	18.6	0.8	4.6	3.8

* 2005

Source: Eurostat (Energy)

Seven Member States – Germany, the United Kingdom, France, Italy, Spain, the Netherlands and Poland – accounted for over three quarters (77 %) of final energy consumption in the EU-27 transport sector in 2006 (Table 7.7). This is explained by the fact that they belonged to the EU-27's eight most populated Member States and have extensive transport networks.

In most central and eastern European Member States, Road made up the largest shares of energy consumed in transport, ranging from 96 % in Slovenia to 89 % in Estonia. Rail accounted for the largest shares of energy consumption in transport in the Baltic states Latvia, Estonia (both: 7 %) and Lithuania (5 %) as well as in the Czech Republic, Romania, Austria and Poland.

Inland Water Navigation (IWN) contributed to final energy consumption in transport with above-EU-27-average shares in Greece (8 %), Finland and Spain (both: 4 %) as well as in the United Kingdom, Denmark, Belgium and the Netherlands. Figures reflect consumption by small vessels (including leisure boats) performing coastal shipping and not consuming fuel from international maritime bunkers. This explains why Member States without significant IWN yet with developed coastal activity and/or a large number of islands or lakes displayed high shares.

Aviation's share in total transport energy consumption stood above EU-27 average in Cyprus (33 %), Malta (26 %), the Netherlands (24 %) and the United Kingdom (23 %) as well as in Denmark, Ireland, Luxembourg and Greece. These can be Member States consisting of islands and having developed tourist sectors but also Member States with major international passenger and freight aviation activity.

Transport made up 31.5 % of total EU-27 final energy consumption (Table 7.8). For example reflecting higher motorisation rates, this share was 32.8 % in the EU-15, compared to 23.5 % in the NMS-12. Due to lower heating costs, transport made up larger shares of total final energy consumption in the southern European Member States Malta (62 %), Cyprus (50 %), Spain (42 %) as well as in Greece and Portugal. Road transport made up shares of final energy consumption ranging between 50 % in Luxembourg and 15 % in Finland. Air transport contributed most to total in Cyprus (17 %) and Malta (16 %).

Table 7.9: Final energy consumption, by transport mode, 2006 (kg OE/inhabitant)

	Transport	Road	Rail	IWN	Air
EU-27	754	618	19	12	106
BE	916	766	17	20	112
BG	359	324	8	0	26
CZ	616	555	26	1	34
DK	984	773	20	22	169
DE	768	636	22	3	106
EE	593	526	39	4	24
IE	1 277	1 052	12	6	207
EL	764	579	5	64	116
ES	933	742	25	38	127
FR	831	690	21	5	116
IT	752	664	16	4	68
CY	1 212	806	na	na	402
LV	513	448	37	0	29
LT	442	402	22	2	16
LU	5 609	4 726	21	na	863
HU	464	427	10	0	27
MT	726	536	na	na	190
NL	956	703	10	16	227
AT	927	803	37	1	85
PL	352	330	11	0	11
PT	676	582	6	0	87
RO	202	185	9	2	6
SI	776	748	14	na	13
SK	340	323	8	na	8
FI	943	765	19	42	117
SE	947	810	28	14	96
UK	928	662	23	28	215
IS	1 597	920	na	53	624
NO	1 103	739	31	183	150

Source: Eurostat (Energy)

Table 7.10: Final energy consumption, by transport mode, AAGR 1990 to 2006 (%)

	Transport	Road	Rail	IWN	Air
EU-27	1.8	1.6	-0.3	-1.0	3.7
BE	1.4	1.4	0.1	3.0	1.3
BG	0.6	1.4	-7.4	-100.0	-2.0
CZ	5.2	5.8	-0.0	na	2.9
DK	1.8	2.0	-0.5	-1.4	1.9
DE	0.5	0.2	-0.9	-5.3	3.2
EE	-0.3	-0.2	-1.5	-1.0	-0.7
IE	6.4	6.8	0.3	0.2	5.6
EL	2.4	3.2	-1.4	1.4	0.2
ES	3.8	3.9	4.6	0.1	5.2
FR	1.2	0.9	0.6	-5.3	3.8
IT	1.7	1.6	1.6	-3.0	4.8
CY	2.5	3.0	na	na	1.5
LV	0.4	1.6	-4.9	-100.0	-0.5
LT	-1.8	-1.4	-3.4	1.1	-5.7
LU	6.2	6.1	-1.6	na	7.3
HU	2.8	3.2	-5.9	-12.8	3.2
MT	1.8	2.3	na	na	0.4
NL	2.6	2.2	0.9	-4.5	5.3
AT	3.3	3.3	0.5	2.3	5.3
PL	3.8	4.8	-5.9	-19.6	4.7
PT	4.1	4.5	-1.2	-100.0	3.0
RO	-0.1	0.7	-2.6	-11.9	-3.2
SI	3.3	3.4	0.0	na	-0.2
SK	1.5	1.6	-4.9	na	na
FI	0.9	0.6	0.1	4.1	1.8
SE	1.0	1.1	-0.0	-1.0	0.8
UK	1.3	0.6	1.7	1.8	4.1
IS	3.3	2.6	na	-1.1	5.1
NO	1.3	1.8	2.1	-0.6	2.0

Source: Eurostat (Energy)

Final energy consumption per inhabitant in transport amounted to 754 kg oil equivalent in the EU-27 in 2006, ranging between 5 609 kg oe in Luxembourg and 202 kg oe in Romania (Table 7.9). In the former, high consumption is explained by a high motorisation rate, strong road and air freight activity, and the sale of road fuel at a low price after tax (see: Figure 7.12) to residents of neighbouring countries, a part of which is consumed abroad.

In Ireland (1 277 kg oe per inhabitant), the number of passenger cars and that of road goods vehicles grew at some of the highest rates in the EU-27 between 1990 and 2006. A strong air fleet also contributed to the high consumption per inhabitant in transport. Irish road fuel prices after tax were also lower than in neighbouring countries. In Cyprus (1 277 kg oe per inhabitant), bolstered by strong tourism activity, energy consumption in transport was boosted by aviation.

Final energy consumption in transport grew most in Ireland and in Luxembourg (both: 6 % yearly) due especially to strong growth in consumption by Road and Air transport (Table 7.10). These two modes were also the drivers of substantial increases in transport's energy consumption in the Czech Republic (5 %), Portugal, Poland and Spain (all three: 4 %). The energy consumption of Rail transport grew most in Spain (5 %).

From 1990 to 2006, the transport sector's final energy consumption grew at an average annual rate of 2.4 % in the NMS-12, and more moderately in the EU-15, at a rate of 1.7 %. An average annual growth rate of energy consumption in Road transport of 3.0 % compared to a rate of 1.4 % in the EU-15 reflects rapid passenger and goods motorisation in the NMS-12 during the 1990s and the early 2000s.

Rail transport's energy consumption grew at an average annual rate of 0.8 % in the EU-15. This contrasts with an annual reduction of 4.3 % in the NMS-12 and reflects streamlining of those Member States' rail networks. A similar trend was displayed by Inland Water Navigation, the energy consumption of which fell by 0.6 % annually in the EU-15 yet by 12.0 % in the NMS-12. In Air transport, from 1990 to 2006, energy consumption grew at higher annual rates in the EU-15 (3.8 %) than in the NMS-12 (1.1 %) (data not shown).

Focus on Road transport energy

Table 7.11 (also see: Table 3.1) details the EU-27 stock of passenger cars in 2004 by type of motor energy. Petrol was the most widespread motor fuel type of passenger cars in 20 EU-27 Member States (not available: BG, EL, LT, PT, RO, SI and SK), and in the EFTA members for which data are available. The phasing-out of leaded fuel throughout the EU-27 has made this type of fuel cleaner. Besides diesel, other types of motor energy for passenger cars include LPG and biofuels. Only in Poland, Italy, the Netherlands, the United Kingdom, Belgium and Switzerland did vehicles that were neither petrol- nor diesel-driven make up more than 1 % of total.

A majority of goods transport vehicles already being fuelled by diesel, there however appears to have been a trend of 'dieselification' of passenger cars in the EU (Figure 7.12). From 1994 to 2004, the share of diesel-powered passenger vehicles rose in all 20 Member States. The highest yearly percentage-point (pp) increases in this share were displayed by Austria (2.9 pp), Malta (2.3 pp, 1998 to 2002), Spain (2.2 pp) and Luxembourg (2.2 pp, 1994 to 2001), and the lowest by Denmark (0.3 pp, 1994 to 2002), Cyprus (0.3 pp), Sweden (0.2 pp) and Ireland (0.1 pp). The trend is underlined by diesel fuel's growing share in the final consumption of petroleum products, a share which grew in most Member States, and which, on average in the EU-27, rose from 41.3 % in 1990 to 61.5 % in 2006 (Figure 7.13).

Eurostat (Transport) data of new registrations in France, Finland and the United Kingdom for the years 1998 and 2003 for example reveal the market penetration of smaller diesel motors. On average in the three Member States, 8.3 % of new registrations of diesel-powered cars were made in the under-1 400 cm3 category in 2003, compared to none in 1998 (data not shown).

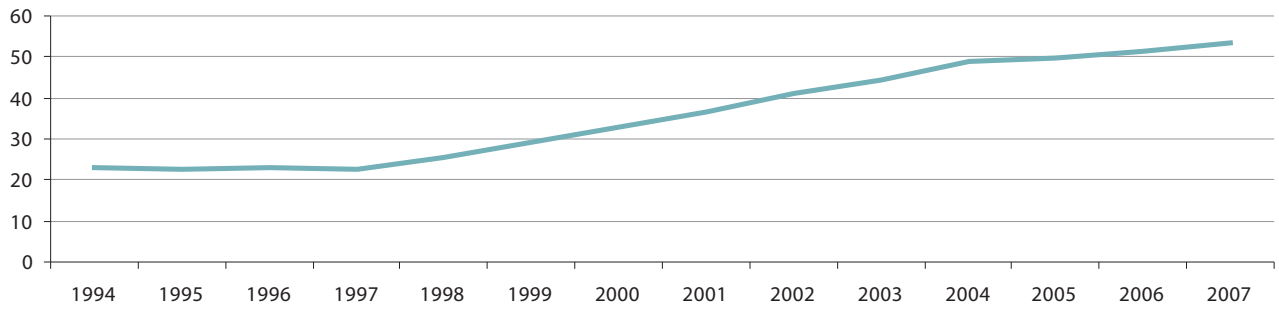
Table 7.11: Passenger car stock, by type of motor energy, EU-27, 2004

	Passenger cars (1 000)	Petrol (%)	Diesel (%)	Other (%)
BE	4 874	51.1	47.2	1.7
CZ	3 816	82.9	16.9	0.2
DK**	1 888	92.6	7.4	0
DE*	45 023	81.5	18.4	0.06
EE	471	85.8	14.2	0
IE	1 582	86.0	14.0	0
EL*	3 840	:	:	:
ES	18 688	64.7	35.3	0
FR*	29 560	56.9	43.1	0
IT**	33 706	76.4	19.0	4.58
CY	335	90.1	10.1	0
LV	686	84.0	15.9	0.01
LT	1 316	:	:	:
LU***	281	67.3	32.7	0
HU	2 828	85.6	13.9	0.46
MT**	202	74.3	25.7	0
NL	6 992	81.4	15.3	3.3
AT	4 109	50.8	49.2	0
PL	11 975	78.4	14.6	7.0
PT**	5 788	:	:	:
SI	911	:	:	:
SK	1 197	:	:	:
FI	2 347	87.6	11.7	0.68
SE	4 113	95.0	5.0	0.05
UK	27 765	79.2	18.0	2.8
IS*	167	88.6	11.4	0
LI	24	87.8	12.1	0.05
CH*	3 800	91.9	6.9	1.2

* 2003 ** 2002 *** 2001

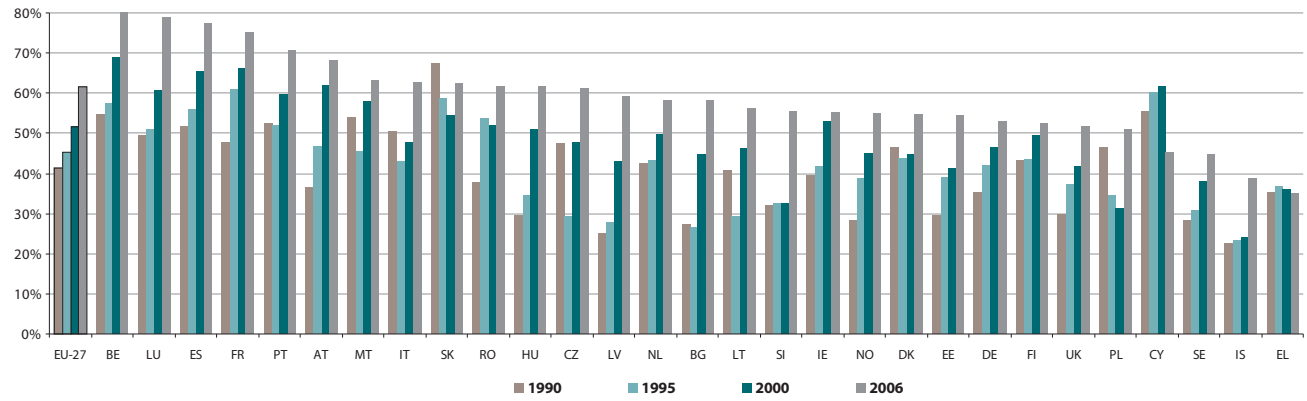
Source: Eurostat (Energy), Member States

Figure 7.12: Share of diesel in new passenger car registrations, EU-15 (%)



Source: ACEA AAA (Association Auxiliaire de l'Automobile)

Figure 7.13: Share of diesel in final consumption of petroleum products



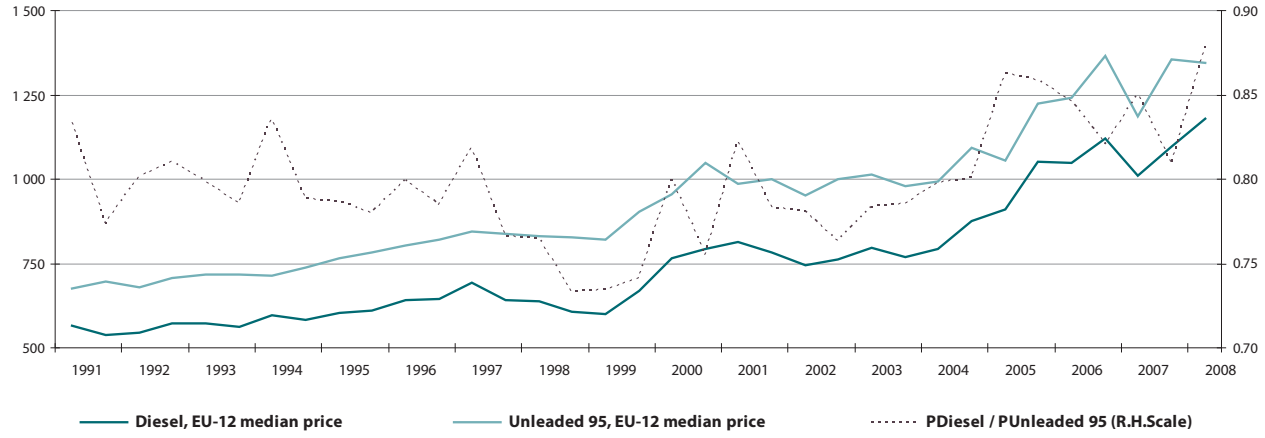
Source: Eurostat (Energy)

Two main factors explain the growing market penetration of diesel-powered passenger vehicles. The first is stronger consumer demand in the context of rising fuel prices. Both the EU-12 median price of petrol and that of diesel have risen since 1999 (Figure 7.14). Whereas the median price of a litre of diesel was 83.4 % of that of a litre of unleaded petrol at the beginning of 1991, the ratio fell to 73.3 % by the end of 1998, then rising to 87.9 % at the beginning of 2008.

Secondly, beyond the fact that, as well as being less flammable and explosive at room temperature, diesel is more energy-efficient, releasing 38.6 MJ per litre compared to the 34.9 MJ per litre released by petrol, the popularity of this type of fuel has been boosted by the supply of cleaner, sulphur-free diesel as well as by that of bio-diesel (see below). These are used to drive vehicles that offer efficiency gains yielded by recent technological progress made in the design of diesel motors. This includes vehicles equipped with electronic control systems for fuel management and with more efficient, direct injection and homogeneous compressed combustion.

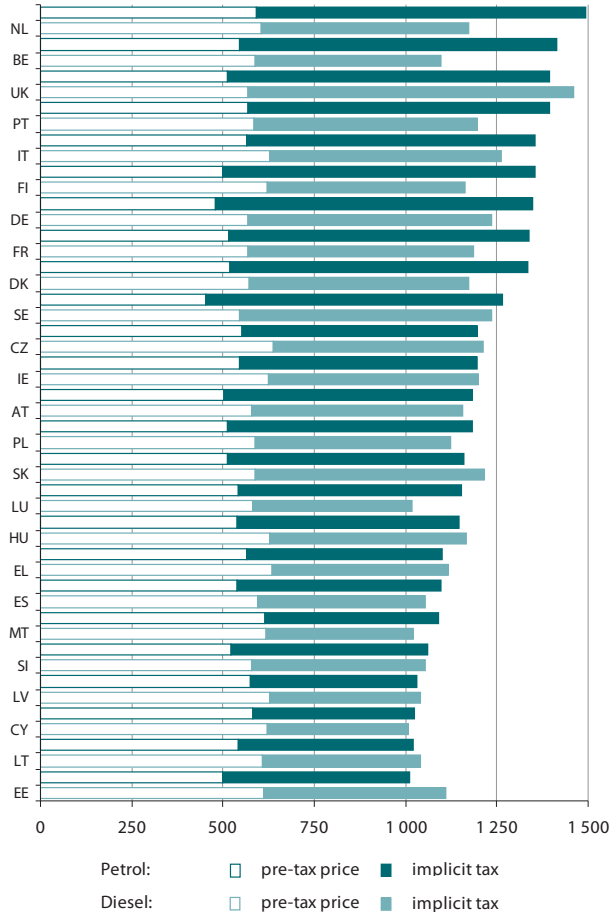
Within the context of rising prices, and despite higher vehicle taxes and insurance premia on diesel vehicles in certain Member States, the lower relative price of diesel together with present-day diesel technology do appear to have made the perspective cost of operating a diesel car relatively lower.

Figure 7.14: Median price of premium unleaded petrol and automotive diesel oil (left-hand scale) and ratio of median price of automotive diesel oil to that of premium unleaded petrol (right-hand scale), EU-12, 1991(S1) to 2008(S1), (EUR/1 000 litre)



Source: Eurostat (Energy)

Figure 7.15: Average sales price of premium unleaded petrol and automotive diesel oil, 2006 (EUR/1 000 litre)



not available: BG and RO

Source: Eurostat (Energy)

Throughout the EU-25, pre-tax vehicle fuel prices displayed more similarity than did final prices and, before tax, diesel was always more expensive (Figure 7.15). This is due to the fact that, although diesel is simpler to refine, it requires more complex filtration to remove sulphur content, thereafter requiring additives to restore lost lubricity. Beside the infrastructural complications in the production of ultra-low sulphur diesel, mass-refining capacity is more readily available for the production of unleaded petrol and, in recent years, infrastructural bottlenecks have exerted upward pressure on diesel prices.

In 2006, the price to the consumer per litre of diesel was lower than that of unleaded petrol in 16 of the EU-25 Member States. The average price of diesel was noticeably lower in Belgium (-23 %), the Netherlands (-21 %), Finland (-14 %), Portugal (-14 %), Denmark (-12 %), Luxembourg (-12 %), France (-11 %) and Germany (-8 %). It was especially higher in Estonia (10 %), in Slovakia and the United Kingdom (both: 5 %). In each of the EU-25 Member States, in 2006, the implicit tax rate on unleaded petrol was higher than that on diesel and it was highest in 11 of the EU-15 Member States.

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 mainly consisted of CNG (compressed natural gas), LPG (liquefied petroleum gas), biodiesel and bio-gas, and fully electric vehicles. Other fuels (ethanol, various diesel/biodiesel mixtures and hydrogen fuel cells) accounted for about 0.5 %.

Looking around the EU-25, buses running on CNG made up almost 20 % of the bus fleets surveyed in Helsinki and Athens, while 100 % of the buses surveyed in Vienna ran on LPG. Biodiesel powered 29 % of Luxembourg's bus fleet, 18 % of Austria's (mainly Graz) and 6 % 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 (a large part of which were diesel-electric) accounted for 0.25 % of the EU's total bus fleet, Luxembourg and Italy emerged as forerunners in their use, with shares of respectively 8 % and 1 %.

http://www.uitp.org/mos/pics/stats/survey_bus_fleet.pdf

Biofuels

Liquid biofuels have accounted for small yet growing proportions of total fuel consumption in transport in the EU-27. Biofuels' share in total fuel consumption by transport increased from 0.1 % in 1995 to 1.5 % in 2006 in the EU-27 reflecting, in particular, the growing importance of biodiesel (Table 7.16 and Figure 7.17).

Three Member States displayed above-EU-27-average biofuels shares in transport energy consumption in 2006: Germany (5.5 %), Slovakia (2.5 %) and Sweden (2.2 %). In France, Austria and Lithuania (all three: 1.3 %) as well as in Portugal (1.0 %), biofuels have also made up growing shares of transport's fuel consumption.

Biofuels include bioethanol and biomethanol (produced from biomass and/or the biodegradable fraction of waste), bioETBE (ethyl-tertio-butyl-ether produced on the basis of bioethanol) and bioMTBE (methyl-tertio-butyl-ether produced on the basis of biomethanol). Biodiesels include biodiesel (a methyl-ester produced from vegetable or animal oil e.g. used fried oils, of diesel quality), biodimethylether (dimethylether produced from biomass), Fischer Tropsch (produced from biomass), cold-pressed bio-oil (a pyrolysis oil fuel produced from oil pressed from oil seed through mechanical processing only) and all other biofuels which are added to, blended with or used directly as diesel.

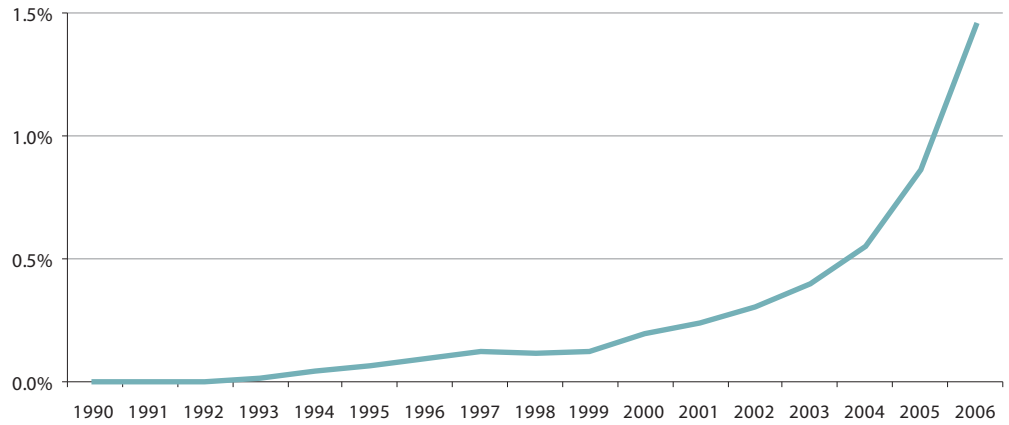
Table 7.16: Share of biofuels in total fuel consumption by transport*, EU-27, 1990 to 2006 (%)

	1990	1995	2000	2004	2005	2006
EU-27	0	0.1	0.2	0.5	0.9	1.5
BE	0	0	0	0	0	0
BG	0	0	0	0	0	0.2
CZ	0	0.4	1.4	0.5	0.0	0.3
DK	0	0	0	0	0	0.1
DE	0	0.05	0.3	1.5	3.1	5.5
IE	0	0	0	0	0.02	0.04
EL	0	0	0	0	0	0.5
ES	0	0	0.2	0.5	0.7	0.4
FR	0	0.3	0.6	0.7	0.8	1.3
IT	0	0	0	0.6	0.4	0.4
LV	0	0	0	0	0.2	0.2
LT	0	0	0	0.1	0.2	1.3
LU	0	0	0	0.04	0.04	0.04
HU	0	0	0	0	0.1	0.2
NL	0	0	0	0	0	0.3
AT	0.04	0.1	0.1	0.2	0.5	1.3
PL	0	0	0	0.1	0.4	0.6
PT	0	0	0	0	0.0	1.0
SI	0	0	0	0	0	0.1
SK	0	0	0	0.1	0.6	2.5
FI	0	0	0	0.1	0.0	0.02
SE	0	0	0	1.7	1.8	2.2
UK	0	0	0	0.03	0.1	0.5
CH	0	0	0	0.03	0.1	na

excluding: EE, CY, MT & RO

Source: Eurostat (Energy)

Figure 7.17: Share of biofuels in total fuel consumption by transport, EU-27, 1990 to 2006 (%)



Source: Eurostat (Energy)

STEER-ing toward sustainability

The transition to a cleaner transport sector will require a significant amount of innovation, not only in technological development, but also in implementation issues and in the policy instruments governing choices between alternative transport modes. STEER, one of four components of the Intelligent Energy for Europe programme launched in October 2005, consists of a number of projects promoting the more sustainable use of energy in transport (i.e. increased energy efficiency, new and renewable fuel sources, and the take-up of alternatively propelled vehicles). The specific focus is on alternative vehicle propulsion, policy measures for the more efficient use of energy in transport, and the strengthening of the knowledge of local management agencies in the transport field.

http://www.managenergy.net/products/R1114.htm

Filling up with greener fingers

Starting in the 1990s, greener energies for transport have been taking root. In 2001, the Commission launched its market-based policy to promote biofuels for transport, which includes targets and financial incentives. The EU Biofuels Directive[4] came into force in 2003, according to which Member States were to ensure a minimum 2 % share for biofuels by 2005 and of 5.75 % by 2010. These targets were indicative and non-binding, and in fact a majority of Member States missed the 2005 target.

The production of biofuels has been growing rapidly in recent years. According to the EEA's TERM 2007 report, 5.1 million tonnes of biofuels were produced in the European Union in 2006, 31 % more than in 2005. Biodiesel accounted for 85 % of total biofuels production. Today's biofuels are principally produced as biodiesel and bioethanol. They mainly consist of first-generation fuels, based on vegetable oils and starch from crops that can also be used for food. The feedstocks used for ethanol production are predominantly cereals and sugar beet, while biodiesel is manufactured mainly from rapeseed, estimated to account for over a quarter of the EU rapeseed crop. In 2006, the two main producers of both biodiesel and bioethanol were Germany and France. There is a threshold above which such crops cannot produce enough biofuel without threatening food supplies and biodiversity. Such effects were highlighted during recent strong concommitant increases in the prices of crude oil and staple commodities on world markets.

In the search for new, economically viable sources of energy that would also reduce competing land-use claims, second-generation biofuel processes aim to extend the amount of biofuels that can be produced sustainably by using the biomass providing from residual non-food parts of current crops such as stems, leaves and husks that are left behind once a food crop has been extracted, from other non-food crops as well as from agro-industrial waste such as wood chips, skins and pulp from fruit pressing, etc. Energy stored in the plants' biomass is released through the help of enzymes and gasification processes.

In February 2006, the European Commission communicated the EU Strategy for Biofuels[5], which is structured along seven policy axes: stimulating demand for biofuels, capturing environmental benefits, developing the production and distribution of biofuels, expanding feedstock supplies, enhancing trade opportunities, supporting developing countries and supporting research and development. A further component of EU biofuel legislation relates to fuel quality. In 2003, the 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, a strict technical requirement which however represented an obstacle to achieving some targets set by the Biofuels Directive.

http://ec.europa.eu/energy/res/legislation/biofuels_sustainability_criteria_en.htm

http://ec.europa.eu/agriculture/biomass/biofuel/index_en.htm

[4] Directive 2003/30/EC of the European Parliament and of the Council on the Promotion of the use of biofuels or other renewable fuels for transport, 8.5.2003

[5] Communication from the Commission – An EU Strategy for Biofuels, COM(2006) 34 final, 8.2.2006

Rail consumes more electricity

A general trend in the increasing use of electricity to power Rail appears to have taken place from 1996 to 2006. Electricity's share in total energy consumption by Rail transport rose from 61.4 % to 67.8 % over that time period in the EU-27.

It can reliably be said that the Member States displaying the largest average yearly percentage-point (pp) increase in Electricity's shares in energy consumption by Rail were Portugal (2.8 pp), Romania (2.0 pp) and Belgium (1.6 pp). In some Member States, railway electrification may also be linked to the growing length of railway lines dedicated to high-speed trains (see Chapter 2).

Whereas the share of electricity in energy consumption by Rail transport was close to unchanged in the Netherlands, the United Kingdom and Lithuania, an average yearly reduction in the share was recorded between 1996 and 2006 in Bulgaria (-0.7 pp), Estonia (-0.6 pp), Spain (-0.3 pp), Austria and Latvia (both: -0.1 pp). Given the high cost of investment in electrical infrastructure, one may expect that the strong economic growth displayed by those Member States over the period resulted in increased demand for Rail transport services, which to a significant extent were provided by diesel trains.

Table 7.18: Share of electricity in total energy consumption by rail transport, 1996 and 2006 (% thousand TOE)

	1996	2006
EU-27	61.4	67.8
BE	59.6	75.6
BG	60.9	54.0
CZ	61.1	68.5
DK	18.5	30.2
DE	65.8	75.7
EE	19.1	13.5
IE	2.5	16.0
EL	23.3	31.7
ES	45.5	42.2
FR	72.9	83.5
IT	79.0	88.0
LV	13.3	11.9
LT	6.7	6.6
LU*	81.8	100.0
HU*	46.6	100.0
NL	81.3	81.7
AT	86.1	85.4
PL	63.3	64.7
PT	36.4	64.7
RO	40.5	60.9
SI	53.8	58.6
SK*	100.0	100.0
FI	42.6	56.9
SE	87.1	98.8
UK	52.0	51.9
NO	86.0	90.3

* LU, HU & SK: energy statistics report the entirety of energy consumption of Rail as consisting of electricity. It may however be assumed that diesel also powered Rail in those Member States.

Source: Eurostat (Energy)

Energy consumption in maritime transport

The attribution of energy consumption to a Member State's maritime transport is more problematic than it is in other modes. A large vessel might for instance bunker fuel in the port of Antwerp, but then travel quickly out of Belgian territorial waters and consume the fuel in large part in international or other national waters.

Unlike in 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.

Readers should note that 2006 data reflect new reporting specifications for international marine bunkers. These cover quantities of oil delivered to ships of all flags engaged in international navigation. The latter may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by domestic navigation, or by fishing and military vessels is excluded. The domestic-international split is determined on the basis of the port of departure and the port of arrival, and not by the ship's flag or control.

Reflecting strong foreign trade activity, in the EU-27, maritime transport's energy consumption from marine bunkers increased from 35.5 million toe in 1990 to 53.7 million toe in 2006, at an average yearly rate of 2.6 %. Over 90 % of the increase in consumption from marine bunkers was accounted for by the Netherlands, Spain, Belgium and Sweden. In 2006, with Rotterdam as the largest port in the EU-27 in terms of total cargo handled, the Netherlands consumed most energy for maritime transport (17.4 million toe). The Netherlands' share in EU-27 energy consumption from marine bunkers amounted to 32 %, double the shares accounted for by Belgium and Spain (both: 15 %).

Computing the energy efficiency of EU-27 maritime transport from these figures, to assess improvements which may have been made from 1990 to 2006, is difficult. Key cost drivers are, for example, listed by the IMPACT handbook as being: engine type, vessel type, fuel quality and operation mode. However, as pointed out by the European Community Shipowners' Associations (ECSA) in its contribution to the Green Paper on a Future Maritime Policy[6]: "in those sectors where it competes directly with other means of transport, shipping remains by far the most energy-efficient form of transport".

Table 7.19: Energy consumption in maritime transport (marine bunkers*), 1990** to 2004 (thousand TOE)

	1990	2006	Share in EU-27 total, 2006	AAGR 1990 to 2006
EU-27	35 523	53 724	100.0%	2.6%
BE	4 094	8 261	15.4%	4.5%
BG	56	108	0.2%	4.2%
DK	954	1 057	2.0%	0.6%
DE	2 475	2 556	4.8%	0.2%
EE	179	210	0.4%	1.0%
IE	18	123	0.2%	12.8%
EL	2 529	3 068	5.7%	1.2%
ES	3 816	8 187	15.2%	4.9%
FR	2 519	2 824	5.3%	0.7%
IT	2 658	3 472	6.5%	1.7%
CY	57	290	0.5%	10.7%
LV	467	195	0.4%	-5.3%
LT	93	137	0.3%	2.5%
MT	30	0	0.0%	-100.0%
NL	10 836	17 373	32.3%	3.0%
PL	423	293	0.5%	-2.3%
PT	605	628	1.2%	0.2%
SI	0	29	0.1%	na
FI	561	548	1.0%	-0.1%
SE	659	2 057	3.8%	7.4%
UK	2 494	2 308	4.3%	-0.5%
IS	32	35	na	0.6%
NO	443	501	na	0.8%

* 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.

** 1990 data may be unreliable for some countries.

Source: Eurostat (Energy)

[6] Green Paper "Towards a future Maritime Policy for the Union" COM(2006) 275 final, Brussels, 7.6.2006

7.2 Emissions

Nearly the entire energy consumption of the EU-27 transport sector consists of hydrocarbon fuels. In yielding their performance, transport vehicles combust fossil fuels and release substantial amounts of carbon dioxide (CO_2) as well as a range of other types of emissions harmful to human health and which can effect anthropogenic changes on the living environment.

Based on the trends observed in a number of Eurostat's Sustainable Development Indicators, some types of air emissions have been falling although total numbers of vehicles have tended to increase. Average CO_2 emissions per km from new passenger cars have decreased at an average yearly rate of 1.4 % in the EU-15 from 1996 to 2007. Transport's emissions of particulate matter (PM10) were reduced by 4.0 % yearly on average in the EU-25 from 1993 to 2004, and the emissions of ozone (O_3) precursors from transport fell by 5.8 % yearly from 1994 to 2005.

Transport emits further polluting chemicals that are not necessarily covered in this section. Although direct ecological effects are also beyond the scope of this analysis, it is interesting to note, for example, that according to the IMPACT handbook the most important negative effects of traffic on soil come from the emission of heavy metals and polycyclic aromatic hydrocarbons by different transport modes, which leads to plant damage, decreased soil fertility together with a threat to animals and humans.

This section predominantly covers the emissions of greenhouse gases[7] (GHG) which can contribute to global warming, and thus form a major external cost of transport. Applying Global Warming Potential weights, six types of emissions are considered as GHGs by Eurostat, corresponding to the Kyoto Protocol's definition. These are also known as the 'Kyoto basket'. Expressed in quantities of CO_2-equivalents, GHG emissions in a large part consist of CO_2, but also include emissions of methane (CH_4), nitrous oxide (N_2O), and fluorocarbons (hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride). As a whole in the EU-27, CO_2 made up 82.6 % of the GHGs emitted in 2005, compared to 78.8 % in 1990. This is mainly due to a reduction of the component shares of both CH_4 and N_2O.

With the aim of fulfilling reduction targets, a number of policy measures including the trading of emission rights have been put in place in the EU-27. Under the Kyoto Protocol, the EU has agreed to an 8 % reduction in its GHG emissions by 2008-2012, compared to the Kyoto base year. The reductions for each of the EU-15 countries have been agreed under the so-called EU Burden-Sharing Agreement[8], which allows some countries to increase emissions, provided these are offset by reductions in other Member States. Eight of the NMS-12 have chosen other reduction targets and base years, as allowed under the Kyoto Protocol.

In 2006, the transport sector contributed 19 % of the GHGs emitted in the EU-27. Road transport was the main source of emissions from transport, of which it made up a share of 93 %. Readers should note that figures do not include emissions from international aviation and maritime transport (bunkers). When international transportation is included, the picture changes quite strongly for some countries[9]. Care should also be taken in comparing the emissions of different transport modes as, for example, the release of CO_2 by Air transport at high altitudes has approximately double the effect of land-based emissions.

The quantities of GHGs and other transport emissions depend on the quantity and quality of the fuels used, on the engine technology implemented for propulsion, and on factors such as speed, loading factor, temperature and engine maintenance. Due especially to a growing stock of road vehicles and aircraft in the EU-27 described in previous chapters, the quantities of fuels consumed by transport have increased. Yet these fuels' quality has been improved, in particular by the widespread removal of lead from petrol as well as by the substantial reduction of sulphur levels in diesel. Resulting in energy efficiency gains, notable improvement has been made in vehicle technology from 1990 to 2006. The numerous improvements ensuring much cleaner emissions from road vehicles include those made in combustion, in exhaust technologies, and in the materials used.

[7] Emissions are calculated based largely of fuel sales/energy use on the national territory, which means that the emissions are assigned to those using the fuels. For example, in the case of electricity production emissions are assigned to the electricity producers and not to the users of electricity such as Rail. Emissions assigned to Rail transport may therefore underestimate emissions as those resulting from increased electricity consumption are imputed to electricity producers and not to Rail transport.

[8] Council Decision concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder (2002/358/CE)

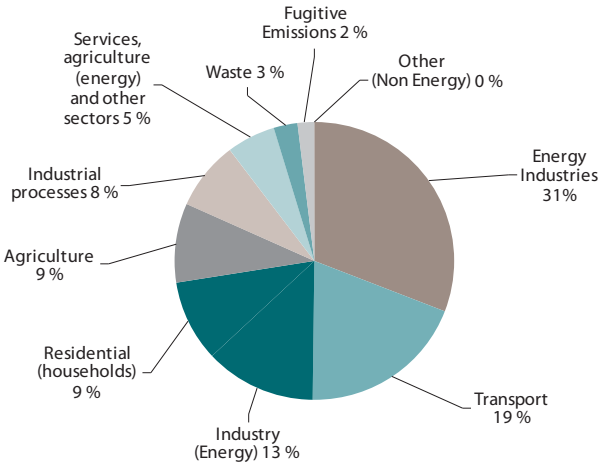
[9] In these cases maritime transport often dominates or at least contributes substantially to the emissions profile in countries with large maritime fleets. This appears to be the case in Denmark and Norway.

Emissions by Transport second-highest

Total GHG emissions of 992.3 million tonnes CO_2 equivalent were attributable to transport in the EU-27 in 2006. Second largest after the energy industries (31 %), transport made up a share of 19 % of total GHG emissions (Figure 7.20). Its proportional contribution has risen from 14 % in 1990 due to own-increases and to reductions in all other sectors. If one were to add the emissions of international maritime shipping and aviation calculated on the basis of emissions from bunkers – of which maritime shipping accounted for 57 % and aviation for 43 % – the total would rise to 1 297.3 million tonnes CO_2 equivalent.

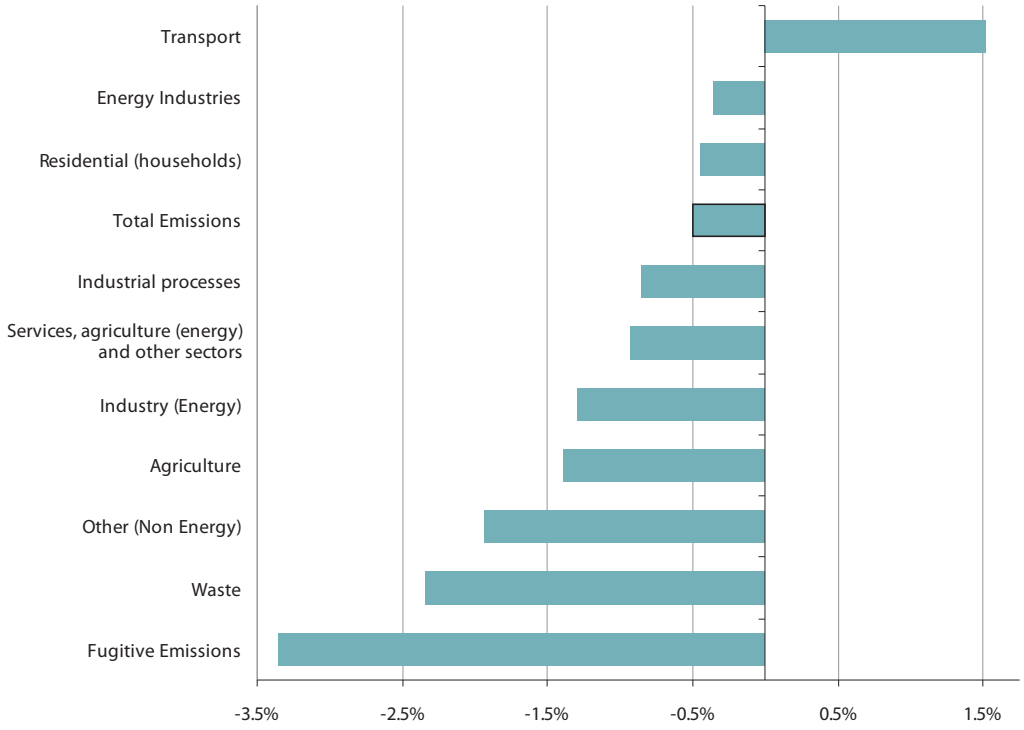
In comparison to an average yearly decrease in total GHG emissions of 0.5 % in the EU-27 from 1990 to 2006, transport was the only sector not to display a reduction in emissions, rather recording growth at an average annual rate of 1.5 % over the period. (Figure 7.21). A major part of the increase was attributable to Road transport. However, pointing at efficiency gains in transport, the rate at which transport emissions grew was below that at which energy consumption grew (1.8 %, see: Table 7.10).

Figure 7.20: Distribution of total greenhouse gas emissions, EU-27, 2006



Source: Eurostat (Environment)

Figure 7.21: Total greenhouse gas emissions, AAGR by source, 1990 to 2006 (%)



Source: Eurostat (Environment)

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 environmental 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 not only cover transport demand and intensity, but also aspects such as 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.

http://reports.eea.europa.eu/

Transport's role in non-CO_2 greenhouse gas emissions

Based on the EEA's recent LRTAP report[10], this section focusses is on transport's non-CO_2 emissions of main pollutants. For NO_x, Road transport was the most important 'key category' as it contributed close to 40 % of those emissions in the EU-27 in 2006. NO_x emissions decreased by 16 % between 2002 and 2006. This reduction in emissions from the Road transport sector has mainly been achieved through the introduction of catalytic converters on petrol fuel cars and stricter EU-27 regulation of emissions from heavy goods vehicles. Diesel vehicles emit more NO_x than petrol vehicles. The increasing number of diesel vehicles leads to a rise in these types of emissions, counteracting some of the emission reductions made in petrol vehicles. In contrast, the trend in NO_x emissions in the next four key categories was almost constant over the period.

The emissions that follow are not those of GHGs yet they represent pollutant compounds at terrestrial level. Road transport was the most important key category for Carbon monoxide (CO) emissions, contributing about 36 % to EU-27 total. Total CO emissions by Road transport decreased by 32 % between 2002 and 2006. Over the longer 1990-to-2006 period, in the four Member States accounting for approximately one half of CO emissions in 2006 – Italy (17 %), Germany (13 %), France (11 %) and the United Kingdom (9 %) – Road's emissions of CO were reduced at an average yearly 9 %.

Road transport does not contribute a large share to total EU-27 emissions of Sulphur oxides (SO_x) emissions. This may be linked to the removal of sulphur from Road transport vehicle fuel. National navigation however contributed 2.4 % of SO_x emissions in 2006.

Road transport emissions contributed just under 18 % to the total emissions of non-methane volatile organic compounds (NMVOC) in 2006, making it a key type of emissions. NMVOC emissions from the sector have decreased by 34 % since 2002, in contrast to emissions from the other four largest key categories in the EU-27, which remained almost unchanged after 2001. From 1990 to 2006 emissions fell by an average yearly 9 %, in the four Member States accounting for approximately half of NMVOC emissions by Road transport in 2006: Italy (19 %), France (13 %), Spain (10 %) and Germany (8 %).

Road transportation contributed 1.7 % of total ammonia (NH_3) emissions in 2006. In the four Member States accounting for 75 % of the EU-27's NH_3 emissions in 2006 – Spain (29 %), Italy (18 %), France (17 %) and Germany (11 %) – NH_3 emissions from Road transport grew on average by 0.1 % yearly from 1990 to 2006.

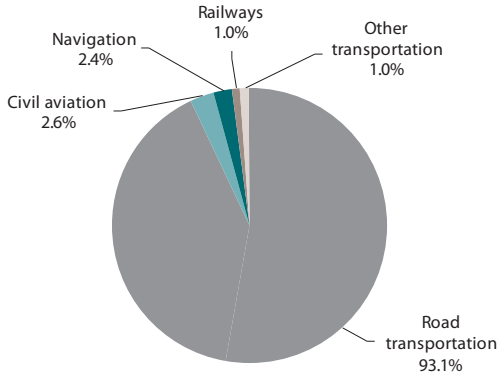
[10] "Annual European Community LRTAP Convention emission inventory report 1990-2006 – Submission to EMEP through the Executive Secretary of the UNECE", EEA Technical report N. 7/2008.

Road transport principal polluter

Road transport contributed 93.1 % to the greenhouse gas emissions of the transport sector in 2006 (Figure 7.22). The figures exclude all international air and maritime transport. Only coastal and inland water transport is included in the emissions estimates and only limited emissions from aviation, such that Road transport forms, by definition, the majority of the transport modes included under the system boundaries of the Kyoto Protocol. Reflecting both the increased use of Road transport and the noticeable reductions in the GHG emissions of most industries and of households, Road transport accounted for 18.0 % of total GHG emissions in the EU-27 in 2006 compared to 12.8 % in 1990.

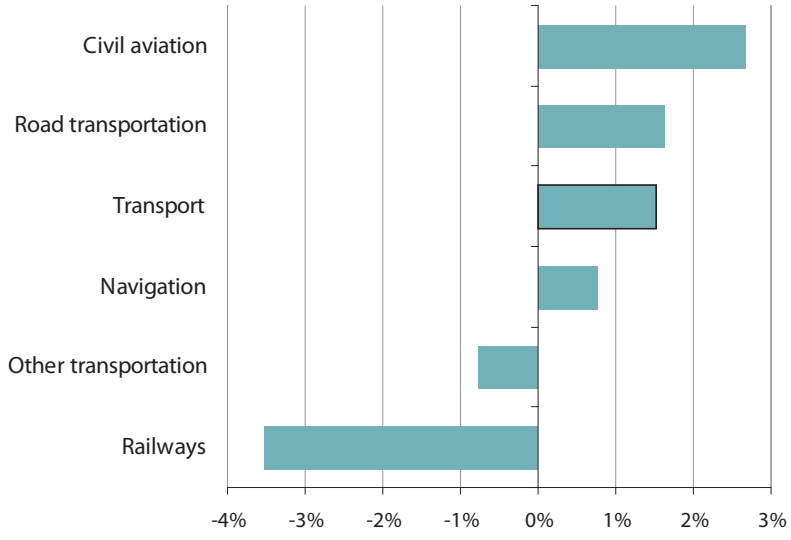
The transport modes' average yearly rates of change in GHG emissions from 1990 to 2006 are depicted in Figure 7.23. One may note the similarity with the rates of growth displayed in the modes' energy consumption, performances and even stocks of vehicles over the period! The 1.5 % average yearly increase in total GHG emissions by transport was driven by annual increases of 1.6 % in Road transport and of 2.7 % in Air transport. In contrast, Rail's GHG emissions fell at a yearly rate of 3.5 % over the period.

Figure 7.22: Transport: Greenhouse gas emissions, by transport mode (% CO_2 equivalent)



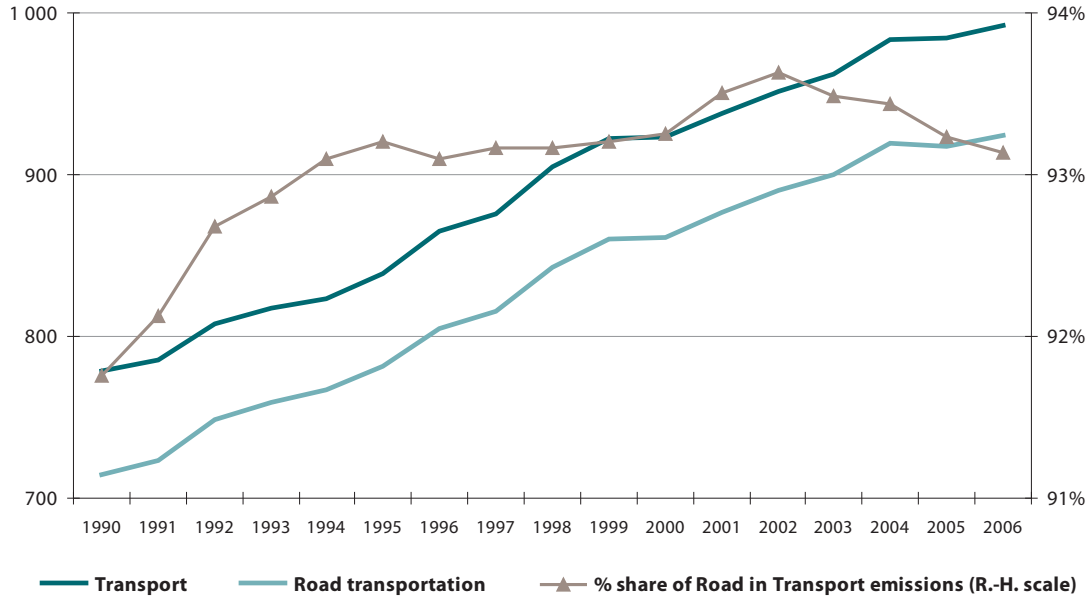
Source: Eurostat (Environment)

Figure 7.23: Greenhouse gas emissions, by transport mode, AAGR 1990 to 2006 (%)



Source: Eurostat (Environment)

Figure 7.24: Total transport and Road transport, EU-27: greenhouse gas emissions and share of Road in Transport emissions, 1990 to 2006 (million tonnes CO_2-equivalent and %)



Source: Eurostat (Environment)

Road transport's share in total transport emissions rose from around 91.8 % at the beginning of the first half, then stabilising at above 93 % in the latter half of the 1990s (Figure 7.24). This may be attributed to the Road sector's growth and to the reduced emissions of other transport modes. After peaking at around 93.5 % in 2002, Road's contribution to the total GHG emissions of transport fell gradually due to the growing share of Air transport. Reflecting rapid motorisation in most of the NMS-12, Road transport's share in transport emissions rose by 12.1 pp, from 84.1 % in 1990 to 96.3 % in 2006 compared to a 0.1 pp increase over the 1990-to-2006 period in the EU-15 Member States.

Marco Polo II 2007-2013

Marco Polo is the European Union's funding programme for projects shifting freight transport from the road to sea, rail and inland waterways. This means fewer lorries on the roads and thus less congestion and less pollution, while offering the reliable and efficient transport of goods. The Marco Polo programme specifically targets enterprises that are active in the freight transport business.

The current, second Marco Polo programme runs from 2007-13 and it features:

- a programme budget of EUR 450 million,
- themes including Motorways of the sea and Traffic avoidance projects,
- the eligibility for funding of countries bordering the EU.

http://ec.europa.eu/transport/marcopolo/index_en.htm

Emissions increase in most countries

The seven Member States – Germany, the United Kingdom, France, Italy, Spain, the Netherlands and Poland – accounting for over three quarters of final energy consumption in the EU-27 transport sector (see Table 7.7) also accounted for three quarters (76 %) of EU-27 GHG emissions in 2006 (Table 7.25).

Transport fleet renewal and modal substitution have contributed positively to reducing GHG emissions in some of the new Member States. Displaying a yearly 2.0 % reduction on average, Estonia was the only Member State whose emissions from all four main modes (Road, Rail, Inland Water Navigation and Air) were reduced (data not shown). Estonia displayed the second highest reduction in emissions from inland navigation in the EU-27 after Germany.

Lithuania followed with average yearly transport emissions reductions of 1.5 %, which are especially attributable to reductions in Road and Rail. The two other Member States displaying reductions in greenhouse gas emissions over the period were Bulgaria (-1.4 %) and Germany (-0.1 %). Germany displayed the largest reductions in emissions by Road, Rail and Inland Water Navigation yet the second highest increase in emissions by Air.

From 1990 to 2006, due especially to increased Road transport activity and the energy consumption thereof (see Table 7.10), the Member States displaying the highest average yearly growth rates in GHG emissions were Ireland (6.3 %) and Luxembourg (6.2 %). In the Czech Republic, reductions in the emissions of Rail and Air transport were outweighed by increases in Road transport. This resulted in total transport emissions growing at the third highest rate in the EU-27 in the Czech Republic (5.7 %). Emissions also grew significantly in Cyprus (4.9 %) and Portugal (4.4 %).

Table 7.25: Transport greenhouse gas emissions, by country, 1990, 2006 and AAGR (Million tonnes CO_2 equivalent and %)

	1990	2006	Share in EU-27 total, 2006	AAGR 1990 to 2006
EU-27	779.1	992.3	100.0%	1.5%
BE	20.6	26.1	2.6%	1.5%
BG	11.0	8.7	0.9%	-1.4%
CZ	7.5	18.2	1.8%	5.7%
DK	10.7	13.6	1.4%	1.5%
DE	164.4	162.0	16.3%	-0.1%
EE	3.4	2.4	0.2%	-2.0%
IE	5.2	13.7	1.4%	6.3%
EL	14.7	24.1	2.4%	3.2%
ES	57.5	108.6	10.9%	4.1%
FR	118.8	138.6	14.0%	1.0%
IT	104.0	133.2	13.4%	1.6%
CY	1.0	2.1	0.2%	4.9%
LV	2.9	3.5	0.3%	1.0%
LT	5.8	4.5	0.5%	-1.5%
LU	2.8	7.3	0.7%	6.2%
HU	8.5	12.7	1.3%	2.6%
MT	0.3	0.5	0.1%	2.6%
NL	26.4	36.1	3.6%	2.0%
AT	12.7	23.1	2.3%	3.8%
PL	25.4	38.6	3.9%	2.7%
PT	10.1	20.1	2.0%	4.4%
RO	7.7	12.4	1.2%	3.0%
SI	2.7	4.8	0.5%	3.6%
SK	5.0	6.0	0.6%	1.1%
FI	12.8	14.4	1.4%	0.7%
SE	18.4	20.2	2.0%	0.6%
UK	118.9	136.7	13.8%	0.9%
IS*	0.6	0.8	na	1.4%
LI*	0.1	0.1	na	0.7%
NO*	11.3	14.6	na	1.7%
CH*	14.6	15.7	na	0.5%

* 2005

Source: Eurostat (Environment)

Five central and eastern European Member States including the three Baltic states displayed the highest proportions of vehicles aged over 10 years in 2004 (Table 7.26). In contrast, the Member States displaying the highest proportions of cars aged under 2 years in 2004 were Luxembourg (2001), Hungary, the United Kingdom, Ireland and Liechtenstein.

The age of the vehicle fleet has a notable influence on emissions. Since 1992, progressively stringent emission standards have been applied to new cars in the EU (see box). For example, a car aged over 15 years in 2007 would have been manufactured before these standards came into force, and it would therefore have been more likely to emit more, while a car aged 12 years would have had to comply with Euro I standards, which were less restrictive than Euro IV or Euro V standards.

Table 7.26: Car stock, distribution by age, 2004 (%)

	Stock of passenger cars (1000)	Less than 2 years	2 to 5 years	5 to 10 years	Above 10 years
BE	4 874	14.5	24.5	31.7	29.3
CZ	3 816	7.3	11.6	26.4	54.7
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	2.6	3.9	8.7	84.9
LT	1 316	1.2	1.9	5.0	91.8
LU***	281	26.7	28.8	26.0	18.5
HU	2 828	20.4	15.7	18.2	45.6
MT**	202	6.4	17.1	27.7	48.9
NL	6 992	13.5	22.1	33.3	31.1
AT	4 109	13.9	20.2	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	12.4	15.9	24.3	46.8
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
CH*	3 800	14.0	23.3	32.1	30.9

* 2003 ** 2002 *** 2001
BG and RO not available

Source: Eurostat (Transport), Member States

Euro standards reduce road vehicle emissions

With the aim of improving air quality, cars have to comply with 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 I, Euro II, etc. – have already helped to reduce air pollution from cars, for example by obliging carmakers to equip exhaust pipes with catalytic converters and particle filters.

The Euro standards set limits on vehicles' emissions of carbon monoxide (CO), hydrocarbons (HC), oxides of nitrogen (NO_x) and particulate matter (PM). Separate emissions regulations apply for both diesel and petrol cars, vehicles of succesive motor capacity, heavy-duty lorries and buses (Figures 7.27 to 7.33) as well as motorcycles. New cars' and light commercial vehicles' (vans) emissions are currently regulated by the Euro IV standards which came into force in 2003 and 2005 respectively (Table 7.34).

Following the Clean Air for Europe (CAFE) programme and the resulting Thematic Strategy on Air Pollution adopted by the Commission in 2005 together with a directive on ambient air quality under the 6th Environmental Action Programme, the new Euro V and Euro VI standards have already been agreed by the Council and the Parliament. Euro V will enter into force for smaller vehicles in September 2009. Its main effect will be to reduce the emissions of particulate matter from diesel cars from 25 mg/km to 5 mg/km. Euro VI is scheduled to enter into force in January 2014 and will mainly reduce the emissions of NO_x from diesel cars further, from 180 mg/km to 80 mg/km.

Figure 7.27: Diesel cars & LCV < 1.305 t, g/km

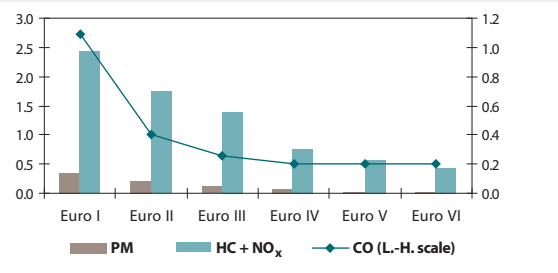


Figure 7.28: Diesel 1.76 t > LCV > 1.305 t, g/km

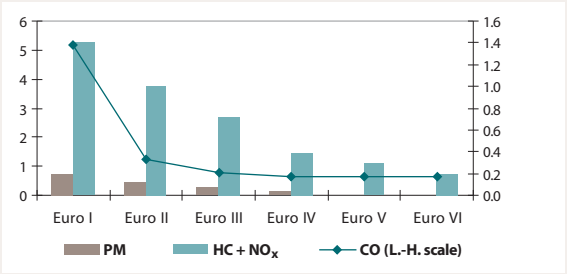


Figure 7.29: Diesel LCV > 1.76 t, max 3.5 t, g/km

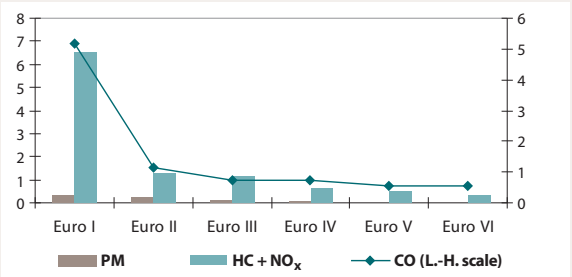


Figure 7.30: Diesel, heavy-duty engines, g/kWh

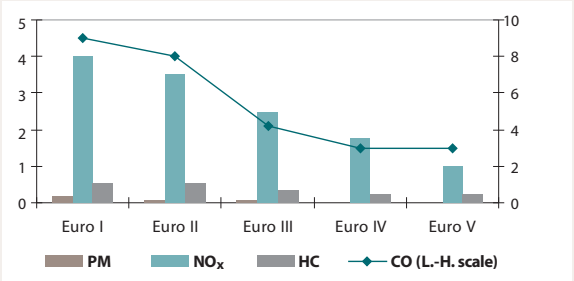


Figure 7.31: Petrol cars & LCV < 1.305 t, g/km

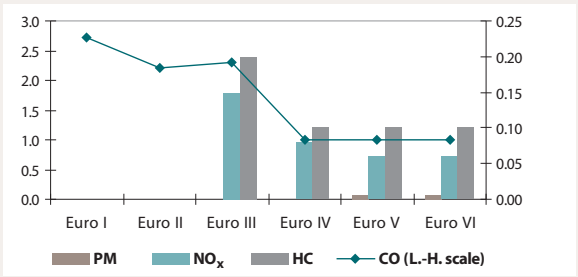


Figure 7.32: Petrol 1.76 t > LCV > 1.305 t, g/km

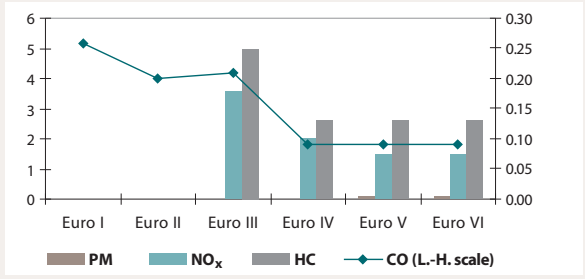


Figure 7.33: Petrol LCV > 1.76 t, max 3.5 t, g/km

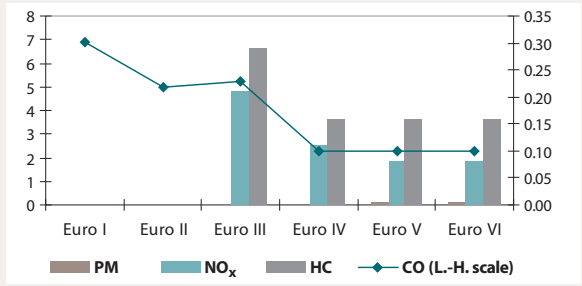


Table 7.34: Euro standards: entry into force

	Cars	LCV < 1.305 t	1.305 t < LCV < 1.76 t	LCV > 1.76 t, max 3.5t	Heavy Duty
			Diesel		
Euro I	Jan-89	Oct-94	Oct-94	Oct-94	1992
Euro II	Jan-93	Jan-98	Jan-98	Jan-98	Oct-96
Euro III	Dec-97	Jan-00	Jan-01	Jan-01	Oct-00
Euro IV	Jan-03	Jan-05	Jan-06	Jan-06	Oct-05
Euro V	Sep-09	Sep-09	Sep-10	Sep-10	Oct-08
Euro VI	Sep-14	Sep-14	Sep-15	Sep-15	
			Petrol		
Euro I	Jan-89	Oct-94	Oct-94	Oct-94	
Euro II	Jan-93	Jan-98	Jan-98	Jan-98	
Euro III	Jan-97	Jan-00	Jan-01	Jan-01	
Euro IV	Jan-03	Jan-05	Jan-06	Jan-06	
Euro V	Sep-09	Sep-09	Sep-10	Sep-10	
Euro VI	Sep-14	Sep-14	Sep-15	Sep-15	

Various European Directives. Please see: http://ec.europa.eu/environment/air/legis.htm

Improved car technology: key to lower emissions

Numerous improvements have been made recently, which ensure much cleaner emissions from road vehicles. Improvements include those made in combustion technologies, in end-of pipe-technologies and in the use of lighter and stronger materials, meaning that less energy is used to yield the same result. Together with the gradual introduction of fuels containing considerably less lead and sulphur, electronic fuel management, direct injection and optimised combustion have contributed to more efficient and cleaner motors.

Improved exhaust technologies include filters and catalytic converters. Technological developments have, for example, enabled the constant reduction in the quantities of NO_x, CO and other volatile organic compounds emitted by vehicles. Diesel motors are a source of soot, fine particles and nano-particles and, to help reduce these emissions, they are being fitted with particulate filters. Since 2000, new models of petrol-engined cars have also, for example, been fitted with on-board diagnostic (OBD) systems ensuring the proper functioning of catalytic converters. The systems alert the driver in the case of a deterioration of the vehicle's emission performance, ensuring emissions are minimised throughout the vehicle's operating life. OBDs became compulsory for diesel-powered cars from 2003, and for heavy commercial vehicles from 2005. Catalytic diesel particulate filters and NO_x adsorbers are under further development.

Reducing emissions from Road vehicles has come a long way, and the proportion of cars complying with the latest and most stringent emission standards is increasing. The IMPACT handbook[11] includes interesting estimates – calculated within a cost-benefit analytical framework – of transport's three main emissions external costs: air pollution, climate change and the costs of up- and down-stream processes; for petrol and diesel passenger cars, and for lorries; in a number of traffic scenarii – metropolitan, urban, interurban and motorway – according to motor size, as well as according to the consecutive Euro-standards. In most cases, the higher a vehicle's Euro-standard is, the lower are the external costs of Road transport.

[11] "Handbook on estimation of external costs in the transport sector – Produced within the study Internalisation Measures and Policies for All external Cost of Transport IMPACT)", Delft, 2008, Annex: Tables 15, 29 and 39

Getting CO_2 off the road

According to the Commission's annual report on CO_2 emissions from new cars[12], 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. Until recently, to help the EU reach its Kyoto Protocol target of reducing greenhouse gas emissions to 8 % below 1990 levels by 2012, a major component of the EU's strategy to reduce CO_2 emissions from cars have been voluntary commitments by the car manufacturers' associations to reduce CO_2 emissions from the cars they produce to an average of 140 g/km by 2008 (for European manufacturers) and 2009 (for Japanese and Korean producers). This is roughly equivalent to consumption of 5 l of petrol or 4.5 l of diesel per 100 km.

In February 2007, the Commission made two parallel Communications[13 & 14]outlining a comprehensive new strategy to reduce CO_2 emissions from new cars and vans sold in the EU, which together with a revision of EU fuel quality standards proposed in early 2007, further underline the Commission's determination to ensure the EU meets the GHG emission targets under the Kyoto Protocol and beyond. In December 2007, the European Commission adopted a proposal for legislation to reduce the average CO_2 emissions of new passenger cars, which account for about 12 % of the European Union's CO_2 emissions.

The proposed legislation is the cornerstone of the EU's strategy to improve the fuel economy of cars and ensure that average emissions from the new passenger car fleet in the Community do not exceed 120 g CO_2/km through an integrated approach. The Commission's proposal aims to reduce average CO_2 emissions from new passenger cars in the EU from around 160 g/km to 130 g/km in 2012. This aims at a 19 % reduction of CO_2 emissions and it will place the EU among the world leaders in fuel-efficient cars. The proposal will benefit consumers through important fuel savings as well as further improving energy security, promoting eco-innovations and high-quality jobs in the EU-27. A similar proposal for light-duty vehicles is planned to be adopted by the Commission in November 2008. 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.

[12] "Implementing the Community Strategy to Reduce CO_2 Emissions from Cars: Sixth annual Communication on the effectiveness of the strategy", COM(2006) 463 final

[13] Communication from the Commission to the Council and the European Parliament 'Results of the review of the Community Strategy to reduce CO_2 emissions from passenger cars and light-commercial vehicles', COM (2007) 19 final, 7.2.2007

[14] Communication from the Commission to the European Parliament and Council, 'A Competitive Automotive Regulatory Framework for the 21st Century – Commission's position on the CARS 21 High Level Group Final Report – A contribution to the EU's Growth and Jobs Strategy', COM (2007) 22 final, 7.2.2007

Inland navigation: a small polluter

With a share of 2.4 % of transport greenhouse gas emissions, and displaying an average annual growth rate of 0.8 % from 1990 to 2006, inland navigation is of considerable interest from the perspective of greenhouse gases and it still has potential for further development at EU level.

Although transport by inland waterways is of minor importance compared to other modes, one should mention that the vessel fleet has undergone substantial changes from 1990 to 2006. Renewal schemes in various countries have replaced smaller, dirtier and less efficient vessels.

Maritime transport: single-largest source of Sulphur

According to Eurostat external trade data, maritime transport is used for about 70 % of the EU's freight exchanges with the rest of the world (see chapter 4). In 2006, 60 % of EU-27 seaborne goods transport involved an extra-EU partner, 28 % an inter-national intra-EU partner, and 11 % was national transport. According to the EEA[15], international navigation accounted for 12.7 % of EU-27 transport sector GHG emissions in 2005 (including international aviation and navigation). Since emissions reporting for most maritime transport is not foreseen by the Kyoto Protocol and the energy use statistics for international maritime transport are not systematically reported, estimates of the emissions from maritime transport are uncertain.

Because of the heavier and more sulphur-rich fuels it uses, waterborne transport is by far the largest emitter of sulphur oxides in the transport sector. Maritime transport and fishing vessels have lagged behind land transport in cleaning up their emissions and ships are becoming a substantial source of air pollution in the EU. According to the Commission[16], unless action is taken, maritime transport is set to emit more SO_2 and NO_x than all land sources combined by 2020.

[15] EEA TERM Report 2007 (2008)

[16] Commission Staff Working Paper, Annex to the "Communication on Thematic Strategy on Air Pollution" and the Directive on "Ambient Air Quality and Cleaner Air for Europe", Impact Assessment; COM(2005)446 final and COM(2005)447 final, p31

Sea change for maritime emissions

In November 2002, the European Commission adopted a European Union strategy to reduce atmospheric emissions from seagoing ships. The strategy reports on the magnitude and impact of ship emissions in the EU and sets out a number of actions to reduce the contribution of shipping to acidification, ground-level ozone, eutrophication, health, climate change and ozone depletion. Air pollutant emissions from ships are also covered by Annex VI of the Marine Pollution Convention (MARPOL) 73/78, of the International Maritime Organization. This contains provisions on SO_x Emission Control Areas (SECA) for the Baltic Sea, the North Sea and the Channel, as well as NO_x emissions standards for ship engines. The general sulphur limit for marine fuel is 4.5 % (45 000 ppm, compared to 50 ppm for petrol cars) but, within the SECAs, the sulphur content of fuel cannot exceed 1.5 % by mass (15 000 ppm). The EU has also applied the same 1.5 % limit on fuel sulphur content for passenger vessels on regular services to or from EU ports.

While ships spend most of their time at sea, their berthing in ports also adds to pollution. This is why, together with the implementation of the SECAs, the EU strategy aims to limit emissions from both inland vessels and seagoing vessels at berth in EU ports. Directive 2005/33/EC addressed the sulphur content of marine fuels and introduced a 0.1 % (1 000 ppm) maximum sulphur content requirement for ships at berth in EU ports from January 2010. Building on this, in May 2006, the Commission adopted the Recommendation on the promotion of shore-side electricity for use by ships at berth in EU ports, which encourages ships not to produce electricity by using their own engines when in port. This abates local air and noise emissions from ships' engines.

http://ec.europa.eu/environment/air/transport/ships.htm

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 which may outperform the impact of technological improvements that reduce engine emissions. At a local level, in the immediate vicinity of airports, concerns focus on the potential health and environmental effects of noise and air pollution, especially from NO_x, volatile organic compounds and particulates.

Not only was Air transport the fastest growing energy consumer in EU-27 transport from 1990 to 2006, but it was also the fastest climbing contributor of GHG as its emissions grew at an average annual rate of 2.7 %. And this is only considering emissions from national fuel deliveries, as international aviation is not covered under the reporting requirements in the Kyoto Protocol.

The main difference, compared to 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 much more quickly. These gaseous and particulate emissions increase the concentration of GHGs found naturally in the atmosphere, lead to the formation of condensation trails, and may increase cirrus-cloud formation, all of which can contribute to climate change. According to the IMPACT handbook, the CO_2 emitted at high altitudes by Air transport has around double the damaging effect it has at sea level. Unless new, less-polluting engines and significantly more fuel-efficient aircraft technologies are introduced, aviation's relative contribution to environmental changes may become more significant.

Watch this airspace

To counter the impact of air transport emissions, EU policy is spreading its wings. The Commission adopted a Communication[17] in September 2005 setting a strategy for reducing the climate-change impact of aviation. The Communication concluded that a comprehensive approach was necessary and that, while most endeavours were already on-going, they needed to be strengthened. They include:

- giving research into 'greener' technology highest priority within the 7th Framework Programme for Research & Technical Development,
- improving the efficiency of European Air Traffic Management (ATM) through the Single European Sky SESAR initiative,
- removing legal obstacles to the taxation of aviation fuel to facilitate more consistent transport energy taxation policy,
- working in the International Civil Aviation Organisation (ICAO) on developing more stringent technical design standards to reduce aircraft emissions at source.

But the main conclusion was that the EU Emission Trading Scheme (ETS) should be extended to include aviation.

In December 2006, the Commission adopted a proposal for legislation to gradually include aviation in the EU Emissions Trading Scheme (ETS). The proposal provides for aviation to be brought into the EU ETS in two steps. From the start of 2011, emissions from all domestic and international flights between EU airports will be covered. At the beginning of 2012, the scope will then be expanded to cover emissions from all international flights – from or to anywhere in the world – that arrive at or depart from an EU airport.

http://ec.europa.eu/transport/air_portal/environment/climate_change_en.htm

http://ec.europa.eu/environment/climat/aviation_en.htm

[17] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions – Reducing the Climate Change Impact of Aviation, COM (2005)459 final, 27.9.2005

Transport noise

Noise created by transport has been attracting increasing attention in recent years, and has lead to various measures at EU level concerning 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[18].

Measures taken in Road transport include the more widespread use of 'quieter' car tyres with low rolling resistance (for increased fuel efficiency) and the use of noise-absorbing road surfacing as well as mitigation measures such as the construction of noise barriers along roads through or near residential areas.

Railway industry measures cover infrastructure operators (e.g. the acoustic grinding of rails, noise barriers, speed limits at night) and train operators (e.g. 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 and they 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. Changing approach/take-off flight paths can also lead to reduction in noise around airports.

Current legislation provides for the reduction of aeroplane 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 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 offering potential for reducing aviation's environmental impact is the improvement of air traffic management. There is a broad consensus between 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 routing increase aircraft noise, fuel consumption and air emissions, as well as flight times. More could also be done to abate noise caused at take-off and landing.

[18] 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, 10.3.2004

More energy efficiency, fewer emissions

Apart from the choice of vehicle and transport mode, a key to further reducing energy consumption and pollutant emissions is efficient use. The more efficiently vehicles are used – through their higher occupancy rate, optimum volumes of goods transported, style of driving, etc. – the less energy is consumed and the less pollution is caused per person or per tonne of goods 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. In contrast in Air transport, 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. In 2007, based on airline traffic data by reporting country, the occupancy rate (ratio of the number of passengers on board to the number of seats available) on all EU-27 (national and international) flights was 75 % for EU-licensed airlines and 86 % for non-EU-licensed airlines.

Regarding freight transport, efficiency appears to have increased in Road transport – also due to a further liberalisation of this sector such as cross-trade or cabotage (see Chapter 4). Over the last two decades, the efficiency of Rail and Air transport were also improved. The efficiency of the latter may, for example, be expected to further improve through innovations in aircraft technology and through the major efficiency gains offered by SESAR and better airspace management.

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 markets and policies – strongly affect the time taken for fleet renewal and modern logistics concepts to take root. Significant efficiency gains 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 the backdrop of rising 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 competitive and efficient 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), Greece (EL), Spain (ES), France (FR), Ireland (IE), 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), the Former Yugoslav Republic of Macedonia (MK) and Turkey (TR);
- the EFTA (European Free Trade Association) countries: Iceland (IS), Liechtenstein (LI), Norway (NO) and Switzerland (CH);
- China (CN), Japan (JP), Russia (RU) and the United States (US).

EU aggregates

Aggregates have been compiled for the EU-27. These aggregates include estimates for missing components, where necessary. In the absence of data for some EU-27 Member States, aggregates are compiled and 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.

Non-availability

The colon (:) denotes unavailable data (either because they are not available in the source used or because they are confidential). In specific cases, confidential data have been marked with the symbol 'c:'. The hyphen (-) denotes inapplicability.

Billion

One billion equals one thousand million.

Trillion

One trillion equals one million million.

Data sources

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. These have been complemented by Structural Business Statistics (SBS), Energy statistics, Environment statistics, Sustainable Development Indicators (SDI), statistics from the Urban Audit and the Labour Force Survey (LFS).

Other main sources include Eurobarometer (European Commission), the OECD and the International Energy Agency (OECD/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 they are 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, transshipment 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, transshipments 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 onto another mode of transport and again loaded onto another railway vehicle, this is considered as unloading from the first railway vehicle followed by loading onto 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 signposted 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.

'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.

Road cabotage transport

National road transport performed by a motor vehicle registered in another country.

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 (OFOD) data rather than Flight Stage (FS) 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 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 are 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.

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. This corresponds to market sales of goods or services supplied to third parties.

Apparent labour productivity

A simple indicator of productivity calculated as value added divided by persons employed.

Wage adjusted labour productivity

An indicator of productivity 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. It can be calculated from the value-added at factor cost less the personnel costs.

Gross operating rate

An indicator of profitability calculated as the ratio of gross operating surplus to 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 calculated as the ratio of gross investment in tangible goods 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/europeanbusiness

Labour Force Survey (LFS)

Data are based on persons employed who are 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 full-time if the usual hours are 35 hours or more, and in Sweden where this criterion is applied to the self-employed).

Abbreviations

Countries

EU-27	European Union of 27 Member States
EU-15	European Union of 15 Member States
NMS-12	The new Member States of the 2004 and 2007 enlargements
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
CN	China
JP	Japan
RU	Russia
US	United States (of America)

International organisations and EU agencies

EEA	European Environment Agency
IEA	International Energy Agency
OECD	Organisation for Economic Cooperation and Development

Weights and measures

AAGR	average annual growth rate
DWT	deadweight tonnes
EUR	euro
GRT	gross tonnage
J	Joules
km	kilometre
km^2	square kilometre
PKM	passenger-kilometre
TKM	tonne-kilometre
TOE	tonnes of oil equivalent
t	tonne (one thousand kilograms)
VKM	vehicle-kilometre
%	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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