Indicator Fact Sheet

TERM 2005 13a – Freight transport demand by mode and group of goods

Indicator code / ID	
Analysis made on (Assessment date)	23 April 2004
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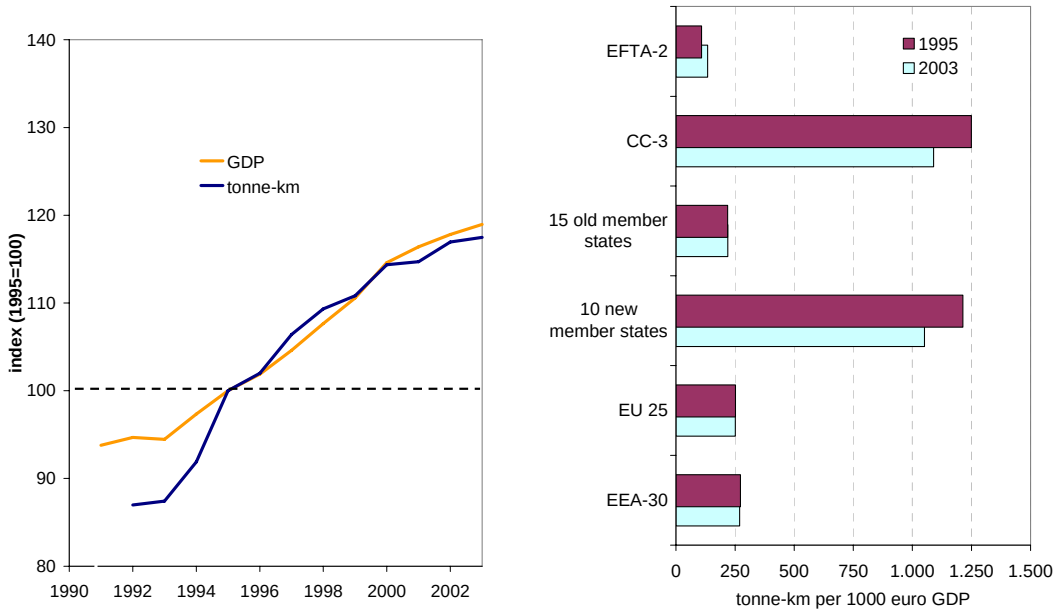
😐 **Freight transport volume has grown quickly, and has generally been coupled to the growth in GDP. Consequently the objective of decoupling GDP and transport growth is no closer to being achieved. However, the apparently close link is not evident when looking at individual regions (e.g. old 15). The difference in transport intensity between the old and the new member states is great but decreasing.**

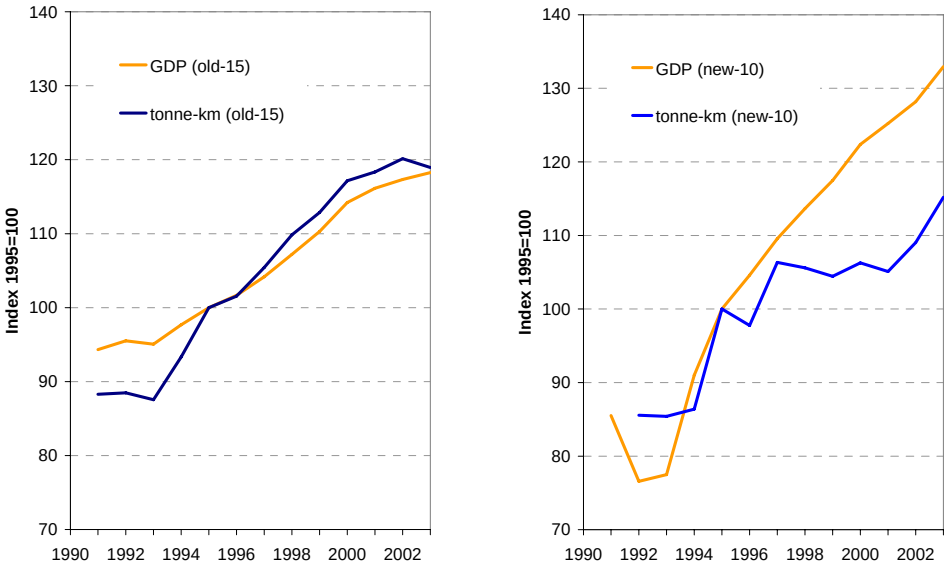
Figure 1: a) Freight transport volume and GDP and b) freight transport per unit of GDP by region



Note: GDP in Euro at constant 1995 prices. Freight transport (tonne-km) includes transport by road, rail, and inland waterways. Short-sea shipping and oil pipelines are excluded due to lack of data. For more detailed data, see tables 1-3.

Source: Eurostat, 2004

Figure 2: Freight transport volume and GDP in old versus new EU member states
a) old member states **b) new member states**



Note: GDP in euro at constant 1995 prices. Freight transport (tonne-km) includes transport by road, rail, and inland waterways. Short-sea shipping and oil pipelines are excluded due to lack of data. For detailed data, see tables 1-3.

Source: Eurostat, 2004

Results and assessment

Policy relevance:

The EU has set itself the objective to reduce the coupling between economic growth and freight transport demand ('decoupling') in order to achieve more sustainable transport (European Commission, 2001a; European Commission, 2001b).

Policy context:

Reducing the coupling between transport growth and GDP is a central theme in EU transport policy for reducing the negative impacts from transport:

- The objective of decoupling freight transport demand from GDP was first mentioned in the Transport & Environment (T&E) integration strategy (European Council, 1999) that was adopted by the Council of ministers in Helsinki. Here, the expected growth in transport demand was named as an area where urgent action was needed. In the sustainable development strategy (European Commission, 2001a) that was adopted by the European Council in Gothenburg, the objective of decoupling is set in order to reduce congestion and other negative side-effects of transport.
- In the review of the T&E integration strategy in 2001 and 2002, the Council reaffirmed the objective of reducing the link between the growth of transport and GDP (European Council, 2001; European Council, 2002a).
- In the Sixth Community Environmental Action Programme (European Council, 2002b), decoupling of economic growth and transport demand is named as one of the key objectives in order to deal with climate change and to alleviate health impacts from transport in urban areas.

Transport of goods and passengers is part of most economic activities, wherefore policies aimed at increasing economic activity are mostly associated with increasing transport demand. The objective of decoupling is therefore seldom directly linked to concrete actions. In general, policies that influence the price of transport will also bear on the coupling, as prices regulate demand while having a limited impact on GDP insofar as transport is not the only driver of the economy. Fair pricing instruments are frequently considered options to achieve decoupling. Well developed charge structures will also improve the environmental performance of the transport modes, improving the overall eco-efficiency of transport.

Infrastructure investments

The trans-European Network (TEN-T) guidelines were revised in 2004 (884/2004/EC). Currently, the focus is on a limited number of priority projects – generally large infrastructure projects - and includes projects for rail-, water- and road modes. The major focus is on removing bottlenecks and avoiding congestion.

Environmental context:

Transport is one of the main sources of greenhouse gases and also gives rise to significant air pollution, which can seriously damage human health and ecosystems. Reducing demand would consequently reduce freight transport's environmental burden. Decoupling the need for freight transport from GDP growth is only indirectly linked to environmental impact.

For a complete picture of transport demand and the environmental problems that arise from it, it would be valuable to complement the data on the number tonne-kilometres by mode with vehicle-kilometres by mode. However, only very limited and low-quality data is available on the number of vehicle-kilometres.

Assessment:

Rapidly growing demand

Freight transport demand has grown significantly since 1992, thereby making it increasingly difficult to reduce the environmental consequences of transport. Interestingly, for the first time freight transport volume fell in the 15 old member states in 2003. However, this is probably temporary, as partial 2004 data suggest an 8 % increase from the previous year (preliminary Eurostat data).

The main underlying factors that stimulate the growth in freight transport are globalisation and intra-EU liberalisation of the internal market, combined with a price of freight transport that remains relatively low (see TERM 2002 20 EU – Transport prices). This situation enabled and facilitated:

- Complex trading networks, exploiting differentials in labour cost. Especially within the EU, constraints on cross-border movements have been removed and related 'barrier costs' are reduced (TNO, 1999). Increased distances between material extraction, the manufacture (and recycling) of goods and the final consumer are a logical consequence.
- Preferences of customers have become more specialised, causing additional and longer freight movements. In Germany, for example, the amount of food consumed has not grown much in the last three decades, but food transport (in tonne-km per capita) almost doubled. Reasons include customer preferences for food from other countries, the location and production patterns of the food industry and the policies and location of retailers, such as 'just-in-time' deliveries to supermarkets (FAW, 2000).

Development of the transeuropean networks under the TEN-T programme may facilitate further growth in freight volume due to the focus on relieving bottlenecks and expansion of infrastructure capacity. The revised guidelines have some provisions for environmental issues, namely a call on member states to perform Strategic Environmental Assessment of national transport programmes and a requirement that funding for TEN-T projects be conditional on compliance with EU environmental legislation. However, environmental concerns are secondary for the selection of projects and the overall environmental impacts have not been assessed

The growth in freight transport has been far from uniform. In many countries of the ten new members states, freight demand declined in the early nineties following the economic problems experienced in the new market economies and the collapse of the industrial base on which much freight transport depended. Also important has been the shift from an economy based on production and manufacturing to a less transport-intensive one based on services. For some countries, the freight demand is still below the level in 1991, but is now increasing. Particularly rail freight transport demand has declined in the new member states, but the decline appears to be halted. Railways, especially in Central and Eastern Europe have suffered from a number of serious structural problems: a decline in heavy industry, growing competition from the road sector, low productivity, and a spiral of financial decline where lost markets and revenues have lead to underinvestment and lack of maintenance (ECMT, 2001).

The most extensive growth was in road transport with an average annual growth rate of 4 % in the EEA-30, and in air freight transport, which has likely grown faster (57 % growth during the

nineties for EU-15, Norway and Iceland, or about 4.6 % p.a.). However, the market share of air freight transport remains very low, about 1.8 % of the volume of road, rail, and inland modes in Old-15 in 2000 (Eurostat, 2004).

In terms of transport volumes sea shipping dominates when international sea transport is also included (see Box 1). Information about sea transport is due to methodological and data reliability problems frequently omitted from transport statistics, but volumes should not be underestimated. The demand for intra-European short-sea transport (Table 3) is roughly on the level of road transport in the old-15, for which data is available.

The link between economic growth and freight transport

Since 1992 transport volumes have grown at roughly the same rates as GDP in the EEA-30. In the years 1993-1995 the growth in tonne-km was higher but has nevertheless since then followed GDP (see also Table 4). It is more a general tendency than fixed relationship between the two, as large differences between countries exist (see figure 2). In the 15 old member states, the growth in transport demand has exceeded growth in GDP, while in the ten new member states a significant decoupling has occurred, combining high economic growth and decoupling. However transport volumes have kept growing.

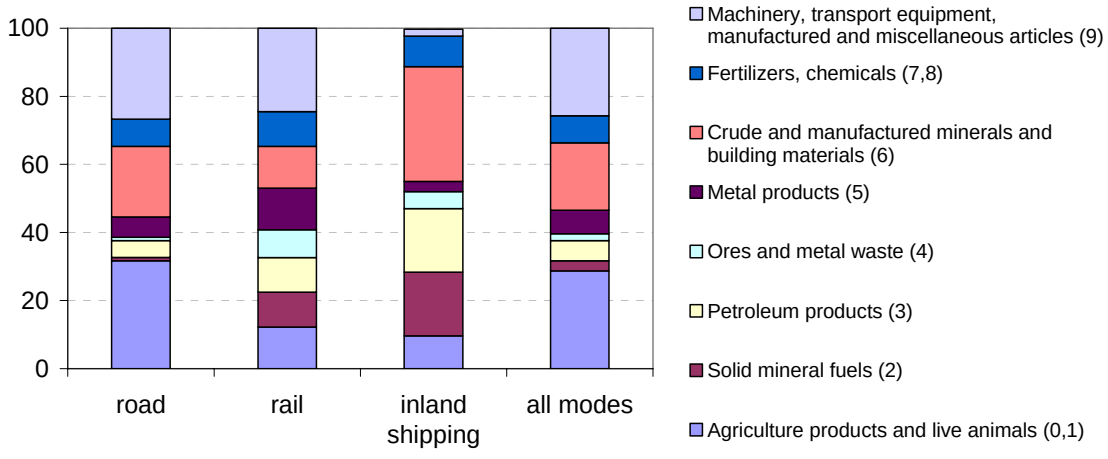
Freight transport volume and intensity (tonne-km/GDP) are generally closely linked to changes in the volume and structure of economic activity. However, economic growth does not necessarily have to be of a kind that increases freight transport volume, and even within the EU there are countries with similar levels of freight transport volume but very different GDP (see Table 2 and Figure 1b). The economies of the ten new member states show much higher transport intensities. The economies of the old members are dominated by the service sector to a much larger extent than in the new member states and offers a good explanation why these economies are much less reliant on transport than the economies of the new member states.

Transport generates a lot of benefits for the society as a whole. Therefore, it may be a useful policy to decouple the environmental impacts from GDP (promoting eco-efficiency), rather than transport volumes itself. This respects the benefits of transport, while it tackles the environmental problems arising from it.

Sub-indicator (information): Type of goods transported by mode

i For the 15 old member states for which data is available, agricultural products and live animals, are goods frequently transported. These goods generally require fast delivery due to their limited storage life. As road is one of the fastest modes of transport, these types of goods are unlikely to be shifted to alternative forms of transport.

Figure 3: Types of goods transported in the 15 old member states



Note: data refer mainly to the years 1994 – 96 depending on country and mode. For these three modes, the 15 old member states in 1995 accounted for 74 % of the tonne-kilometres in the EEA-30. Percentages mentioned are shares in tonne-km.

Source: European Commission, 2002

Assessment for the sub-indicator

Manufactured goods (chapter 9 – see Figure 3) represent a substantial share of goods transported by road. This corresponds with high value goods being transported over long distances throughout the EU. Agricultural products, animals and fodder (chapter 1 and 2) are also important categories of goods transported mainly by road, which is due to the limited storage life (road transport is by far the fastest means of transport) and the regional character of the transport of agricultural products and manufactured goods (road being sometimes the only available mode for pick-up and delivery). Inland shipping and rail transport play a relatively more important role in the transport of bulk goods, like minerals (chapter 6), solid mineral fuels (chapter 2) and petroleum products (chapter 3).

For most categories of goods, the share in *road* transport (in tonnes) in 2000 was very similar to that of 1990 (Eurostat, 2003). The most significant changes that occurred are the *decrease* of crude and manufactured minerals and building materials and the *increase* of agriculture products and live animals, foodstuffs and animal fodder and manufactured goods. This points out that there has been a gradual shift in road transport towards more high value, perishable goods.

The average value of the goods that are transported varies greatly between the modes. An average road cargo is valued at 1674 €/tonne, compared with 924 €/tonne for rail transport and 86 €/tonne for inland waterway transport (ECMT, 2003). The prices reflect the differences in bulk versus more processed and manufactured materials and goods. As road and rail transport cater to somewhat different markets, modal shift may be limited to small market segments.

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Data

Table 1: Trends in freight transport demand (EEA-30) by mode

Unit: *1000 million tonne-km*

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Road	1 179	1 208	1 278	1 415	1 456	1 516	1 588	1 634	1 678	1 704	1 750	1 765
Rail	397	379	388	403	404	422	404	388	409	391	388	399
Inland waterways	113	110	119	123	121	129	132	129	134	133	133	118

Source: Eurostat, 2004

Table 2 Trends in transport intensities

Unit: Tonne-km per 1000 euro GDP (1995 prices)

	1992	**1995**	**2003**
Austria	153	228	270
Belgium	240	278	265
Bulgaria	3 614	4 009	1 404
Cyprus	-	154	153
Czech Republic	-	1 306	1 281
Denmark	168	177	154
Estonia	-	1 876	3 565
Finland	349	341	312
France	190	196	184
Germany	181	198	207
Greece	148	151	-
Hungary	-	694	605
Iceland	-	87	91
Ireland	136	120	170
Italy	201	220	206
Latvia	3 030	3 098	4 122
Lithuania	2 617	2 537	3 067
Luxembourg	400	462	504
Malta	-	-	-
Netherlands	327	333	297
Norway	-	109	136
Poland	-	1 157	907
Portugal	234	252	297
Romania	1 751	1 737	1 656
Slovak Republic	-	2 810	1 365
Slovenia	395	416	389
Spain	230	252	351
Sweden	244	269	244
Turkey	-	934	968
United Kingdom	192	202	172
EU 25	234	252	251
EEA-30	251	273	270
10 new member states	-	1 213	1 051
15 old member states	202	218	220
CC-3	1 079	1 249	1 090
EFTA-2	104	108	134

Source: Eurostat, 2004

Table 3 Trends in sea and oil pipeline transport compared to other modes in the 15 old EU member states

Unit: 1000 million tonne-km

	Short sea	Oil pipelines	Road	Rail	Inland Water-ways	Total
1990	923	70	976	255	107	2 332
1991	955	79	1 010	234	107	2 386
1995	1 070	82	1 124	222	115	2 613
1997	1 124	82	1 180	239	119	2 744
1998	1 142	85	1 249	239	122	2 837
1999	1 197	85	1 287	236	122	2 927
2000	1 270	85	1 319	250	128	3 052
2001	1 254	87	1 344	241	126	3 051
2002	1 255	85	1 376	236	125	3 077

Note: In 2002, the old-15 accounted for 76 % of the total combined transport demand of road, rail, and inland navigation in the EEA-30, so the figures here can give a rough indication of the whole EEA-30. Short sea transport excludes transport between EU and other countries – see Box 1 for more information.

Source*:* European Commission, 2004

Table 4 Trends in decoupling in the EEA-30

Unit: % change in transport intensity since the preceding year. Negative values indicate decoupling.

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
change	0,7%	2,0%	5,9%	0,1%	1,6%	-0,2%	-1,3%	-0,4%	-1,2%	0,7%	-0,5%

Source Eurostat, 2005.

Meta data

Web presentation information

1. Abstract / description / teaser:

   Freight transport demand keeps growing and has not been uncoupled from GDP growth, but a closer look at the regions reveals large differences.
2. Policy issue / question:

   Are we achieving an uncoupling of transport growth and economic growth?
3. EEA dissemination themes:

   Transport
4. DPSIR: D

Technical information

1. Data source: Freight transport demand and GDP data: Eurostat structural indicator data (Eurostat, 2004)

   Data on short sea shipping is from the DG Tren Pocketbook (European Commission, 2004)
2. Description of data: Data contains the number of tonne-km by road, rail, and inland waterways for the EEA-30 countries since 1990 (some gaps exist). Data for short sea shipping and oil pipelines is incomplete. Tonne-km: unit of measure of goods transport which represents the transport of one tonne by road over one kilometre (the distance to be taken into consideration is the distance actually run).

   GDP: Gross Domestic Product in constant 1995 prices (billion euro). December 2004 dataset: a_gdp_k downloaded from Eurostat website (publicly available).

   Original measure units: Tonne-km. Road: domestic and international travels by vehicles registered in that country. Rail and inland waterways: domestic and international travels on national territory (in some cases different definitions are applied).
3. Geographical coverage: EEA-30, consisting of old-15 (Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal,

Finland, Sweden and the United Kingdom), new-10 (Czech Republic, Cyprus, Malta, Estonia, Latvia, Lithuania, Hungary, Poland, Slovak Republic, Slovenia), Norway, Iceland, Turkey, Romania, Bulgaria

4. Temporal coverage: Tonne-km: 1990-2003 (but with gaps)
5. Methodology and frequency of data collection: Tonne-km, old-15: annually collected by a Common Questionnaire developed jointly by Eurostat, UNECE and ECMT. Tonne-km, new-10: Also collected by Eurostat; data previously very incomplete, but now improving.
6. Methodology of data manipulation, including making 'early estimates':
   Road, 1992-1994, Norway, Iceland, Cyprus, Malta: linear extrapolation based on adjoining years.
   Road, 1992, Slovak Republic: extrapolated from adjoining years assuming same trend as in neighbouring Poland.
   Road, 1992, Turkey: linear extrapolation based on adjoining years.
   Rail, 1992, Czech Republic, Slovak Republic: linear extrapolation based on adjoining years.
   Rail, 1992-94, Norway: Assumed equal to 1995 level.
   Inland navigation, Slovak Republic, Hungary, Czech Republic, 1992: linear extrapolation based on adjoining years.
   Inland waterways, 1992, Hungary, Slovak Republic, Czech Republic: linear extrapolation.
   GDP, 1990-1994, Czech Republic and Poland: Old time series (TERM 2003 data) used.
   GDP, 1992, Estonia: linear extrapolation based on adjoining years.
   GDP, Malta 1991-1998: Old time series (TERM 2003 data) used.
   A systematic error of 20 % (arbitrarily chosen) would only lead to a 2 % error in the 1992 estimates for EEA-30, and 7 % in the 1992 estimates for new-10. Moreover, the base data themselves are occasionally based on estimates from Eurostat or national authorities which reduces reliability. f

Quality information

7. Strength and weakness (at data level): data for short sea shipping, air freight transport, and oil pipeline transport is too incomplete to be included in calculation of totals. Availability of reliable data for these modes (particularly sea) would strengthen the analyses.
8. Reliability, accuracy, robustness, uncertainty (at data level): Data is quite reliable for the old-15, though sometimes the data is based on rough estimations. For the new-10, there are, particularly for road data, frequent estimations, gaps, or breaks in time series.
9. Overall scoring (give 1 to 3 points: 1=no major problems, 3=major reservations): 2 (unreliable statistics for new-10)

   Relevancy: 2 (Vehicle-km provides a better unit of measurement, since it is more directly linked to environmental impact of transport movements)

   Accuracy: 2 (Tonne-km figures are estimated rather than measured, but are rather consistent between sources)

   Comparability over time: 2 (New member states have many data gaps and historically less reliable data)

   Comparability over space: 2 (New member states have many data gaps and historically less reliable data)

Further work required

Consistent and reliable data from the new member states and candidate countries would strengthen the conclusions.

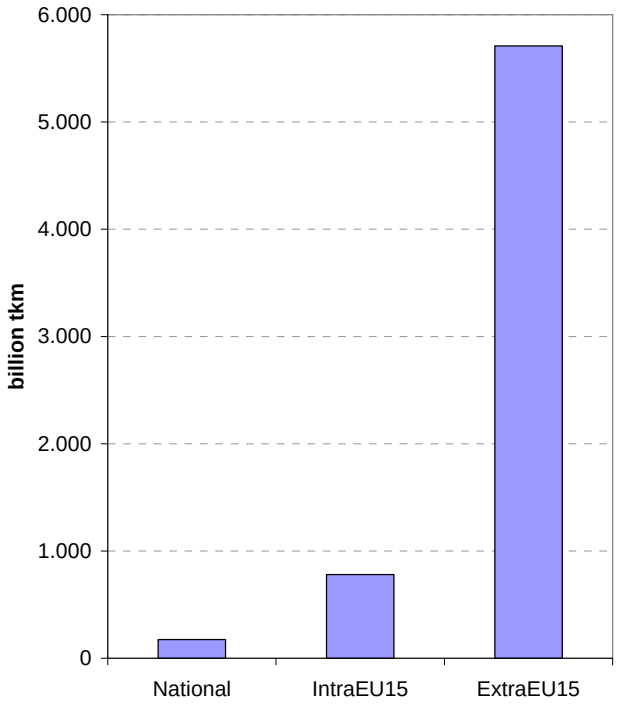
Data is needed on deep-sea shipping in general and short-sea shipping for the new member states in particular.

Further work is needed to develop reliable and comparable statistics on vehicle-km of freight transport, since such data are closer connected to the environmental consequences of transport and might reveal changes in load factors.

Box 1 International sea freight transport dwarfs intra-EU transport

In road transport, most of the transport volume comes from transports within that country, and the most of the rest comes from transports to or from other EU countries. Sea shipping, on the other hand, is dominated by long distance international transport, and ignoring the contribution of transport between EU and non-EU countries seriously underestimates the scale of sea transport (Figure 4).

Figure 4 The scale of international sea transport in 2003



'ExtraEU15' includes transport between EU-15 and countries outside EU-15. Half of the kilometres are here allocated to EU-15, the other half being allocated to the trading partners. 'IntraEU15' includes transport between EU-15 countries. 'National' includes transport with origin and destination in the same country. Figures should be considered very rough estimates.

Source: Eurostat, 2005.

When international sea transport is included, sea transport volumes dwarf those of all other modes. This is not necessarily reflected in the environmental impacts, as these are also determined by the efficiency of transport and location of emissions. For some information on emissions, see *TERM 2003 02 - transport emissions of greenhouse gases* and *TERM 2004 03 - Transport emissions of air pollutants*. Due to the crude nature of the estimates and lack of data, it is not possible to produce a reliable time series, but the volume is likely increasing steadily as is total energy consumption by maritime vessels (see *TERM 2004 01 –energy consumption*).