

## Indicator Fact Sheet

### TERM 2006 13b – Modal split in freight transport

Indicator code / ID

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⊗ **Road transport is gaining an every increasing share of the freight market. This development constitutes a move further away from the EU objective of stabilising the share at its 1998 level. At present, there are policy initiatives aimed at a modal shift for long-distance and large-scale transport.**

**Figure 1: a) Modal shares in freight transport demand in EEA-30 and b) Share of road freight transport in 1995 and 2004 in different regions**

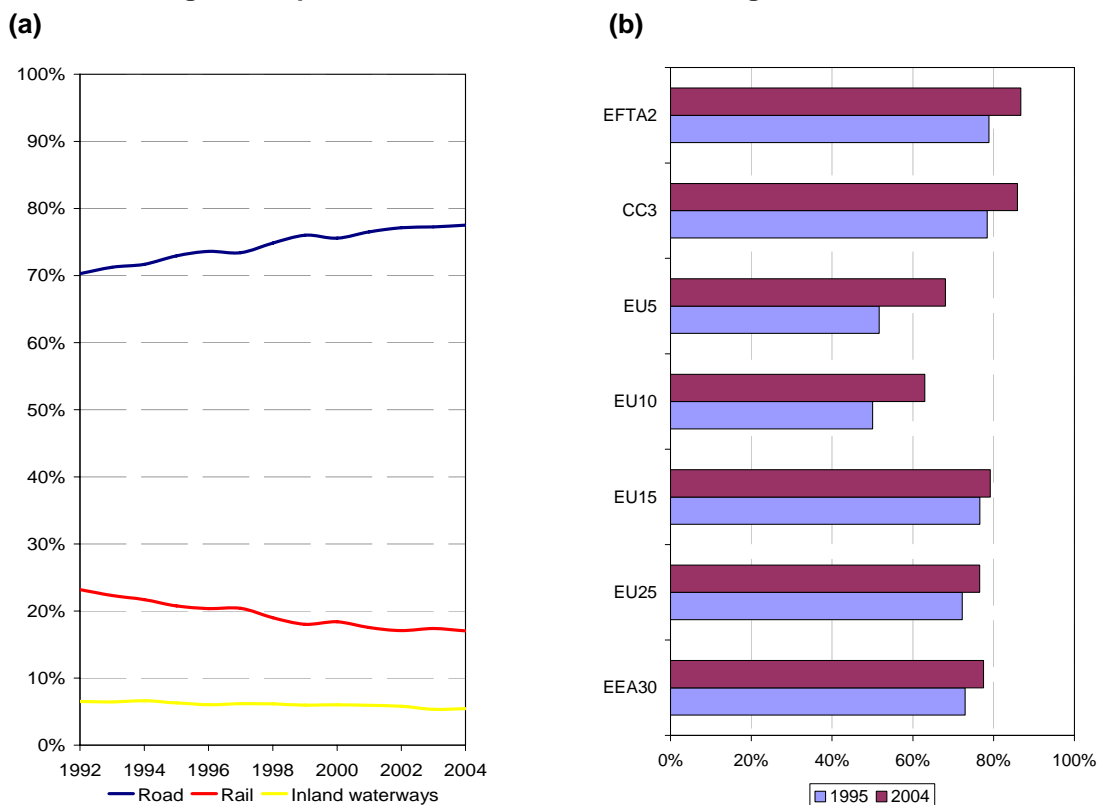
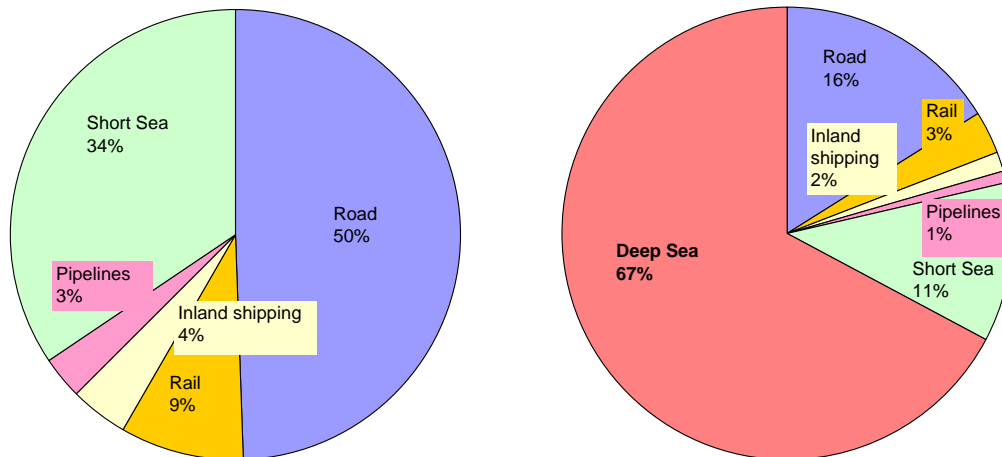


Figure covers the EEA-30 (Liechtenstein and Switzerland are excluded, since no data is available for these countries) Shares of the sum of freight transport tonne-km's by road, rail and inland waterways. Other modes, notably maritime transport and pipelines are not included as there is insufficient data available. The lack of data on maritime transport has a significant impact on the shares; for more information, see figure 2. For region codes, see the 'Meta data' section 2.

Source: Eurostat, 2006.

**Figure 2: indicative 2003 modal shares for the EU-15; including pipelines and a) short sea, and b) short sea and deep sea shipping**



Due to substantial data gaps for sea shipping, the figures are not accurate, but indicative. 'Short sea' here includes national and intra-EU shipping. 'Deep sea' includes all transport between EU-15 and outside countries with half of this transport volume allocated to EU-15. The EU-15 presently account for some 76 % of total transport energy consumption in the EEA-30 (excluding Switzerland and Liechtenstein) and the distribution above is therefore roughly indicative of the modal shares in the EEA-30.

Source: Eurostat, 2005 (sea data) and European Commission, 2006 (all other data). For more information, see Box 1 TERM 13a.

## Results and assessment

### Policy relevance

The European Commission has set itself the following objectives to achieve sustainable transport:

To bring *back* the shares of alternative modes to road (rail, inland waterways, short sea shipping and oil pipelines) to their 1998 levels by 2010, and to make for a shift of balance onwards.

### Policy context:

Shifting freight from road to water and rail is an important strategic element in the EU transport policy. The objective was first formulated in the Sustainable Development Strategy ("SDS", European Commission, 2001a). In the review of the T&E integration strategy in 2001 and 2002 (European Council 2001; European Council, 2002), the Council states that the modal split should remain stable for at least the next ten years, even with further traffic growth.

In the White Paper on the Common Transport Policy (CTP) "European Transport Policy for 2010: Time to Decide" (European Commission, 2001b), the Commission proposes a number of measures aimed at the modal shift.

In the Mid-term review of the European Commission's 2001 Transport White Paper, the Commission states that shifts to more environmentally friendly modes must be achieved where appropriate, especially on long distance, in urban areas and on congested corridors (European Commission, 2006). However, all modes must become more environmentally friendly, safe and energy efficient.

Important concrete policies and initiatives bearing on the modal split policy are listed in the following paragraphs. Many have origins in the CTP paper.

### *Revitalizing non-road modes*

In 2003, the EU adopted the Marco Polo programme (European Commission, 2003) which supports actions contributing to maintaining the distribution of freight between the various modes of transport at 1998 levels by helping to shift the expected increase in international road freight traffic to short sea shipping, rail and inland waterways or to a combination of modes of transport (multimodal) in which road journeys are as short or as sustainable as possible. The programme ends in 2006, but the proposed Marco Polo II (COM(2004) 478) aims to continue

and strengthen the efforts until 2013 by shifting 20.5 billion tonne-km annually off the road to other modes.

The second railway package (European Commission, 2002) aims to achieve full integration of European railway services by greater and faster opening of the rail freight market. It proposes to open up the entire rail freight market to competition by 2006. This opening up not only refers to international services but also to national services, thus facilitating cabotage.

In the field of maritime shipping, the CTP seeks to develop "motorways of the sea", particularly by incorporating shipping links into the trans-European network. Furthermore, document procedures for ships that call at EU ports have been simplified (European Commission, 2001c). The Mid-Term review of the European Commission's 2001 Transport White paper proposes that openings in international laws should be used to opening up the internal shipping market (European Commission, 2006).

The market for inland navigation has been completely opened as of 1<sup>st</sup> January 2000 with the entering into force of Council Directive 96/752.

#### *Infrastructure investments*

The revised Trans-European Network 'TEN-T' guidelines (884/2004/EC) focus on a limited number of priority projects on the major corridors, which will carry the heavy flows of freight traffic between the Member States in the enlarged Union. The priority projects are generally large infrastructure projects, which offer the greatest added value for Europe and for which active collaboration with national and other financing organisations is guaranteed. The TEN-T programme include projects for rail-, water- and road modes.

#### *Fair and efficient pricing mechanisms*

Fair and efficient pricing should encourage use of the best performing modes of transport (see also TERM 26 – Internalisation of external costs). The Commission proposes in the CTP to allocate the additional revenues raised, which are generally higher than the costs of infrastructure, to new rail infrastructure, thereby stimulating a modal shift. However, in the directive which establish distance based charging for heavy goods vehicles on main arteries in Europe cross-financing of infrastructure investments is as good as left outside. (European Commission, 2003; European Commission, 2006). Only the revenues of charging in exceptional cases concerning infrastructure in mountainous regions could be invested in projects aimed at non-road infrastructure. These projects have to contribute directly to the alleviation of congestion or environmental problems and are located in the same region as the road sector on which the charge is applied. Also the internalisation of external costs other than accident costs (climate, air, etc.) are not included in this charging system. However, it is possible to differentiate the charges according to the EURO emission classes of the vehicles.

#### Environmental context:

The relevance of the modal split policy for the environmental impact of freight transport arises from differences in environmental performance (resource consumption, greenhouse gas emissions, pollutant and noise emissions, land consumption, accidents etc.) of transport modes. For the giving vehicle fleet transport on rail and waterways is – on average – less environmental harmful than on road. These differences are becoming smaller, which makes it increasingly difficult to determine the overall environmental effects of modal shifting. Additionally the differences in performance within specific modes can be substantial as for example old trains versus new trains. The total environmental effect of modal shifting can in detail only be determined on a case-by-case basis, where local circumstances and specific local environmental effects can be taken into account (e.g. transport in urban areas or through sensitive areas). Modal shift can apply only for certain market segments and type of goods – e.g. bulk, low value-weight relation, high lot size, long distance etc. – and the specific transport requirements for these goods (CE, 2002). However, there is a significant potential to shift this kind of goods and transports back to rail and barges, and to increase the economic relevance of these rail affine goods.

#### Assessment:

The share of alternative modes (rail and inland waterways) in freight transport has declined during the last decade. As a result, the objective of stabilising the shares of rail, inland waterways, short sea shipping and oil pipelines, and to make for a shift of balance from 2010 onwards, outlined in the Common Transport Policy (CTP) will not be achieved unless a strong reversal of the current trend (see figure 1) is achieved.

The reasons of the steadily growing modal share of and the preference for road are among others:

- Road transport was able to take more advantage of the dismantling of trade barriers (due to the opening up of borders and the enlargement of the European Union) than rail transport was. Consequently, road transport becomes more competitive compared to rail transport with regard to international transport.
- The road sector is liberalised to a great extent (resulting in decreasing transport prices), while the inland waterway and rail sectors have only relatively recently been opened up for broad competition. In addition, the privatisation of railway companies has resulted in a cutback of tracks and higher transport prices, since transport revenues should fully compensate for costs now.
- Changing production structures (e.g. outsourcing) demand more and more for 'just-in-time' delivery of goods. Transport speed and flexibility are therefore of great importance. Despite congestion, road transport is often faster and more flexible than rail or water transport.
- The type of the goods transported plays an important role in mode choice. Perishable and high value goods require fast and reliable transportation – road transport is often the fastest and most reliable form of transport available, providing much flexibility with pickup and delivery points. On the other hand, the transport of bulk goods is less time dependent, and so for this type of goods the cheaper transport forms – rail and inland waterways – are preferred. Since the share of perishable and high value goods is rising in total tonne-kilometres (see TERM 13a – Freight transport volume, sub-indicator on types of goods), this can partly explain the strong position and increasing share of road transport.
- Due to changing spatial planning and infrastructure development, many destinations can only be reached by road and combined transport is only practised to a limited extent.
- The average tonne of goods carried by road travels about 110 km (European Commission, 2001f), a distance over which rail or inland waterways can hardly compete, in particular if road transport is needed to and from the points of loading. Moreover, there is a lack of standardisation of loading units and convenient and fast connections between inland waterways and rail. For short sea shipping the average tonne of goods is carried over 1430 km (European Commission, 2001f). Here, time is less an issue. The low price of shipping is probably of overriding importance (see TERM 20– Transport prices).

The policies mentioned in the policy context has obviously not (yet) been able to alter the modal shares visibly. Implementation of the trans-European network will likely have impact on the shares, but it is not clear to what extent. While most of the priority projects focus on rail, road infrastructure is by far dominating. Road infrastructure projects reduces the potential modal shift to non-road modes. The Marco Polo II programme could, if it succeeds to shift the entire future increase in international freight transport offer a significant contribution to stabilizing freight modal shares; the Commission expects 40 % of the increase in road transport to be in international road freight, leaving much to be done with *national* road transport to keep the shares constant. Even so, the objective seems ambitious to deliver its objectives at a cost of 1 Euro for every 176 tonne-km shifted.

The modal shares greatly depend on the inclusion of sea shipping. As Figure 2 illustrates, the modal shares of road, rail, and inland navigation is dwarfed by that of sea shipping when international transport is included. However, the lack of complete data for sea shipping and (to lesser extent) oil pipelines on country level hinders an assessment of trends in modal shares of all modes in the EEA-30.

The pattern of modal shares of freight transport seen in present day Europe is not universal for industrialised societies. The share of rail in the United States (see Box 1) is much larger, whereas the share of road is about half as big compared with Europe. It shows that low shares of rail and inland shipping are not inevitable and indicate that the targets of the CTP are within the limits of the possible. A comparison of Europe and the US shows many differences in geography, spatial planning, infrastructure use, and 'border trouble'. For example, the rail

networks in United States is almost exclusively used for freight transport, thereby avoiding the problems that occur with a mix of slow freight services and fast passenger trains.

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## Data

**Table 1: Trends in freight transport modal shares in the EEA-30 (excluding short sea shipping and oil pipelines)**

Unit: share of total tonne-km

	1992	1994	1996	1998	2000	2002	2004
<b>Road</b>	70%	72%	74%	75%	76%	77%	78%
<b>Rail</b>	23%	22%	20%	19%	18%	17%	17%
<b>Inland Waterways</b>	6,5%	6,6%	6,0%	6,2%	6,0%	5,8%	5,4%

Note: Data for Switzerland and Liechtenstein are not available

Source: Eurostat, 2006

**Table 2: Modals shares in freight transport in 2004 by country or region (excluding short sea shipping and oil pipelines)**

	Road	Rail	Inland waterways
Austria	66%	31%	3%
Belgium	75%	12%	13%
Bulgaria	67%	29%	4%
Cyprus	100%	0%	0%
Czech Republic	75%	25%	0%
Denmark	91%	9%	0%
Estonia	33%	67%	0%
Finland	76%	24%	0%
France	80%	17%	3%
Germany	67%	19%	14%
Greece	97%	3%	0%
Hungary	66%	28%	6%
Iceland	100%	0%	0%
Ireland	98%	2%	0%
Italy	90%	10%	0%
Latvia	28%	72%	0%
Liechtenstein	-	-	-
Lithuania	51%	49%	0%
Luxembourg	91%	6%	4%
Malta	100%	0%	0%
Netherlands	65%	4%	31%
Norway	86%	14%	0%
Poland	66%	34%	1%
Portugal	95%	5%	0%
Romania	67%	26%	8%
Slovenia	72%	28%	0%
Slovakia	65%	34%	0%
Spain	95%	5%	0%
Sweden	64%	36%	0%
Switzerland	-	-	-
Turkey	94%	6%	0%
United Kingdom	88%	12%	0%
EEA30	78%	17%	5%
EU25	77%	18%	6%
EU15	79%	14%	7%
EU10	63%	36%	1%
EU 5	68%	31%	1%
CC3	86%	12%	2%
EFTA2	87%	13%	0%

Note: For region codes, see the 'Meta data' section 2

Source: Eurostat, 2006

**Table 3: Share of road by country or region (excluding sea shipping and oil pipelines)**

*Unit: share of total tonne-km excl sea shipping and pipelines*

	1992	1994	1996	1998	2000	2002	2004
Austria	51,3%	50,8%	64,3%	64,0%	64,8%	65,8%	65,6%
Belgium	73,1%	76,7%	76,4%	75,1%	77,4%	77,5%	74,9%
Bulgaria	75,5%	80,1%	77,2%	77,0%	52,3%	62,9%	66,9%
Cyprus	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Czech Republic	46,9%	50,3%	57,1%	64,3%	68,0%	73,3%	75,2%
Denmark	91,2%	91,5%	92,3%	91,2%	92,1%	92,1%	91,4%
Estonia	30,2%	28,3%	31,1%	32,7%	37,3%	30,3%	32,7%
Finland	75,8%	71,9%	73,7%	73,8%	75,8%	76,6%	76,0%
France	73,9%	75,3%	76,4%	75,3%	76,0%	77,8%	79,9%
Germany	60,6%	61,6%	64,3%	65,0%	66,1%	67,0%	66,9%
Greece	96,0%	98,1%	97,8%	98,5%	98,1%	98,5%	97,4%
Hungary	54,1%	60,0%	61,3%	65,8%	68,1%	65,5%	65,9%
Iceland	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Ireland	89,1%	90,2%	91,7%	94,6%	96,2%	97,1%	97,7%
Italy	88,0%	87,1%	89,2%	89,1%	89,0%	90,4%	89,5%
Latvia	19,8%	12,8%	15,1%	24,0%	26,5%	29,2%	28,4%
Liechtenstein	-	-	-	-	-	-	-
Lithuania	30,5%	36,3%	34,1%	40,4%	46,6%	52,3%	51,3%
Luxembourg	80,0%	79,7%	79,7%	83,3%	87,8%	91,5%	90,9%
Malta	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Netherlands	62,7%	62,2%	64,2%	63,8%	63,4%	63,3%	65,0%
Norway	90,0%	91,1%	81,7%	83,6%	83,5%	85,1%	86,2%
Poland	41,8%	40,9%	45,3%	52,9%	56,9%	62,2%	65,8%
Portugal	90,7%	91,9%	92,6%	92,5%	92,5%	93,1%	94,7%
Romania	37,4%	44,0%	41,4%	43,1%	42,9%	57,3%	66,7%
Slovenia	64,4%	67,6%	70,0%	68,9%	70,0%	68,2%	72,2%
Slovakia	31,3%	47,7%	53,8%	57,8%	53,0%	58,7%	65,4%
Spain	90,7%	91,5%	90,2%	91,7%	92,8%	94,1%	94,9%
Sweden	55,8%	58,6%	63,9%	63,5%	63,9%	65,6%	63,9%
Switzerland	-	-	-	-	-	-	-
Turkey	92,6%	92,1%	93,8%	94,8%	94,3%	95,5%	94,4%
Unit Kingdom	89,6%	92,2%	91,6%	90,8%	90,0%	89,7%	88,1%
EEA30	70,3%	71,7%	73,6%	74,8%	75,6%	77,1%	77,5%
EU25	69,3%	70,7%	72,6%	73,6%	74,6%	76,2%	76,5%
EU15	74,3%	75,4%	77,1%	77,1%	77,6%	78,9%	79,2%
EU10	42,7%	45,2%	49,0%	55,0%	57,5%	60,8%	63,0%
EU5	44,2%	46,7%	51,4%	57,9%	60,7%	65,1%	68,1%
CC3	77,0%	78,6%	80,3%	84,1%	84,0%	85,6%	85,9%
EFTA2	90,3%	91,4%	82,2%	84,1%	84,0%	85,6%	86,7%

Note: total tonne-km includes freight by road, rail, and inland waterways. Insufficient data is available for maritime and pipeline transport. For region codes, see the 'Meta data' section 2. Some gap filling has taken place to calculate the aggregate totals – for more information see the Meta data section.

Source: Eurostat, 2006

## Meta data

### Web presentation information

1. Abstract / description / teaser:  
Instead of shifting freight transport to alternative modes (rail and inland waterways), the share of road transport is steadily growing.
2. Policy issue / question:  
Is freight transport shifted from road to other modes?
3. EEA dissemination themes:  
Transport
4. DPSIR: D

### Technical information

- Main data source: TERM 13 2006 data (sec draft).xls  
Eurostat, 2006, Free data available on the web site: <http://www.europa.eu.int.comm/eurostat/>.  
Assessment based on unpublished electronic update from the Structural Indicators data set. Supplied by Boryana Milusheva (Eurostat), May 2006  
Source for international sea shipping data: Eurostat Sea transport working group.  
Preliminary, unpublished data.
5. Description of data: Data contains the number of tonne-km by road, rail, and inland waterways.  
GDP: Gross Domestic Product in constant 1995 prices (billion euro). Dataset: a\_gdp\_k downloaded from Eurostat website (publicly available) May 2006.  
*Original measure units:* Tonne-km (a 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). 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). GDP in constant 1995 prices (billion. Euro).  
International sea transport data contains estimates of weight of goods carried and tonne-km for EU-15 countries from 2000 to 2003 split by national, intra-EU and extra-EU.
  6. Geographical coverage:  
**EU-15** (Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal, Finland, Sweden and the United Kingdom),  
**EU-10** (Cyprus, Malta, Czech Republic, Slovak Republic, Poland, Estonia, Lithuania, Latvia, Slovenia and Hungary),  
**EFTA-2** (Iceland and Norway), and finally  
**CC-3** (Turkey, Romania and Bulgaria)  
**EEA-30** is all these countries combined.  
International sea transport: EU-15 incl. individual countries.
  7. Temporal coverage: Tonne-km: 1990-2004 (with gaps)  
International sea transport: 2000-2003
  8. Methodology and frequency of data collection: Tonne-km, EU-15: annually collected by a Common Questionnaire developed jointly by Eurostat, UNECE and ECMT. Tonne-km, EU-10: Also collected by Eurostat; data previously very incomplete, but now improving.  
International sea shipping: First estimates produced in 2005, methodology not available but involves reconstructing trip information based on total goods volumes and a default distance matrix applied to the port of departure and the receiving marine coastal area (MCA). Estimates are very uncertain due to large data gaps.
  9. 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 lead to a 2 % error in the 1992 estimates for EEA-30, and 7 % in the 1992 estimates for EU-10. Moreover, the basedata themselves are occasionally based on estimates from Eurostat or national authorities.

#### Quality information

10. Strength and weakness (at data level): Data for maritime transport is insufficient for a full assessment.
11. Reliability, accuracy, robustness, uncertainty (at data level): Data is quite reliable, except data for sea transport which are very rough estimates.
12. Overall scoring (give 1 to 3 points: 1=no major problems, 3=major reservations): 2 (data gaps for maritime transport).  
 Relevancy: 2 (Vehicle-km would be 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, except for sea shipping)  
 Comparability over time: 2 (1 for EU-15, but new Member States and candidate countries occasionally have breaks in time series)  
 Comparability over space: 2 (differences exist in methodology of what data is included)

#### **Further work required**

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

Filling the data gaps for sea shipping data would facilitate full inclusion of sea shipping in the indicator. This will require substantial improvements in data registration, however, and is not feasible in the short term.

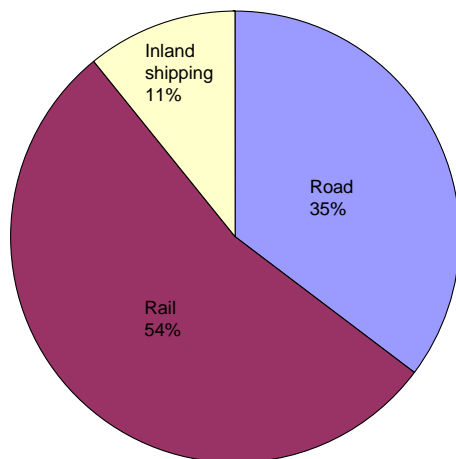
More comprehensive and reliable statistics for the ten new member countries is desired. Comprehensive data on intermodal services could provide a clearer picture of trends in this sub-sector of transport, which would facilitate research and policy in this field

### Box 1: Modal shares in Europe and the US

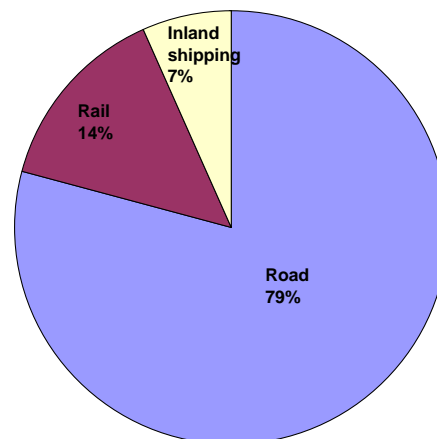
Figure 3 shows the modal shares of rail, road and inland waterways in the United States (left) and the EU-15 (right). As can be observed in the figures, on the one hand, the share of rail transport in the US is much larger than in the EU-15. On the other hand, road transport is dominant in Europe, whereas it represents a minor share in the US. In both parts of the world, inland navigation represents the smallest fraction of all transport modes shown.

**Figure 3:** a) Modal shares in freight transport in the United States and b) Modal shares in freight transport in EU-15.

a)



b)



Note: Based on 2003 data  
Source: Eurostat, 2006

Note that the shares of short sea shipping were not included in either figure, due to insufficient data. It can be expected that this mode plays a much larger role in Europe than in the US, due to the relatively long coastline of the EU-15 and the presence of large islands and peninsulas. Short sea shipping in Europe might constitute much of the large rail fraction in the US. When included, the share of road transport in both figures could be more in line with each other.