Soft Mobility Paper

Measures for a climate-friendly transport policy in Europe

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in the framework of the
Climate Change Campaign

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Preface

Climate change is in full swing. In order to limit its disastrous regional and seasonal consequences, [1] some of which have already manifested themselves, and to curb the effects of gradual warming of the earth's atmosphere, the emission of greenhouse gases resulting from human activity must be systematically reduced. As one of the main polluters, Europe must lead the way towards this objective, in accordance with its commitments made in the Kyoto Protocol and beyond. In particular, CO_2 emissions from road and air traffic have continued to increase in recent years and are responsible for at least one third of the total volume of greenhouse gases. It is therefore high time to reduce the use of fossil fuels for transport operations too as part of a coordinated Europe-wide efficiency and substitution strategy.

Transport accounts for about 70% of annual oil consumption in the EU. Ninety-six per cent of the fuel burned in internal-combustion engines comes from mineral oil. No other area of economic activity is so dependent on oil. In view of the foreseeable shortage of oil resources and the further price rises this will entail, all-out efforts must be made to develop oil substitutes for use in transport and, at the same time, to make transport operations far more energy-efficient. This means shifting some of the burden to the relatively climate-friendly systems of rail, local public transport and bicycles as well as ensuring that road and air transport become more efficient in terms of environmental protection.

From an environmental perspective, there is no alternative to a strategy of weaning the economy off oil, and such a strategy cannot succeed unless it focuses on transport too. In all of this, however, protecting the climate must remain the overarching aim. The adverse impact of some oil substitutes, such as liquidised coal or mined shale, is so drastic that they cannot be contemplated as sustainable alternatives. .

In their Vienna Declaration of 7 March 2006 on a Sustainable Energy Policy for Europe,[2] the Green/EFA Group in the European Parliament defined key objectives and areas of activity of an environment-friendly and climate-friendly energy policy, stressing the crucial importance of appropriate steps in the transport sector. In the present 'Soft Mobility Paper', we intend to outline specific measures forming part of a European strategy for the reduction of oil consumption, and hence of pressure on the environment, deriving from transport activity.

Mobility in the sense of free movement of persons and goods is one of the conditions for a free, converging Europe. This makes it all the more urgent to develop a sustainable transport system that guarantees the freedom of movement of people and goods while also ensuring that the adverse effects of transport on the environment and the climate can be brought under control.

The proposals we present here are actually a continuation of the fairly progressive aims set forth in the Green Papers and White Papers issued by the European Com-

[1] Developing countries have been hit hardest by the global increase in extreme weather consitions (storms, flooding and drought). Climate-related deaths and growing economic damage, however, have also occurred in industrialised countries.

[2] http://www.greens-efa.org/cms/topics/dokbin/109/109638.vienna_declaration@en.pdf

mission[3] in the years from 1995 to 2001, the main postulates of which were the application of the polluter-pays principle and fair competition between modes of transport. Unfortunately, in the wake of the Lisbon Strategy, the new Commission is increasingly departing from its original aims, such as that of an honest transport-pricing policy, and is falling short of its own targets, as the mid-term report on the Transport White Paper has recently shown.

What makes this all the more regrettable is the fact that the development and reorganisation of our present transport set-up into a modern, energy-efficient and customer-friendly transport system is not only an environmental necessity but also an economic opportunity, for if Europe concentrates its political and technological efforts on the areas in which it has a competitive edge, especially energy-efficient vehicle technology, integrated multimodal urban-transport networks and the development of alternative fuels and propulsion technology, this will not only lead to greater protection of the climate but will also yield economic benefits in the Member States and enhance their prospects in the world's sunrise markets. Greater protection of the climate also fosters competitiveness and hence the pursuit of the aims set forth in the Lisbon Agenda, as was recently reaffirmed in the Green Paper on energy-efficiency (COM(2005) 265 of 22 June 2005). As energy prices continue to rise, motorists will benefit from each litre of fuel they save as a result of improvements such as significantly more efficient propulsion systems in their cars.

[3] Particularly the Green Paper entitled *Towards fair and efficient pricing in transport. Policy options for internalising the external costs of transport in the European Union* (COM(95) 691), the White Paper entitled *Fair payment for infrastructure use: a phased approach to a common transport infrastructure charging framework in the EU* (COM(1998) 466 of 22 July 1988) and the White Paper entitled *European transport policy for 2010: time to decide* (COM(2001) 370 of 12 September 2001).

1 Present situation: transport versus protection of the climate

THESIS 1: **Emissions of greenhouse gases from transport in Europe are increasing in both absolute and relative terms. Without additional and strategically coordinated measures in the realm of transport, the EU will fall far short of the climate-protection targets it has set itself.**

Under the Kyoto Protocol, the European Union has pledged itself to cut the greenhouse-gas emissions of the 15 older Member States by 8% in relation to the 1990 level during the period from 2008 to 2012. In 2003, the 1990 emission level had only been reduced by 1.3%. The enlarged 25-member EU, which does not have a common Kyoto target, has nevertheless managed a 5.5% reduction.[4] According to the latest Eurostat report, however, the year 2003 actually saw the volume of greenhouse-gas emissions exceed the 1990 level in absolute terms for the first time since 1991 (see Table 1 on pages 7 and 8 below). The brunt of responsibility for this renewed increase in emissions is borne by transport.[5]

According to Eurostat, land transport was a major source of greenhouse gases in Europe in 2003, producing 19% of the total volume of emissions. It was also the only sector in which emissions had been rising sharply since 1990, the total increase in CO_2 emissions in this sector having amounted to some 20%. In the 15 older EU Member States, emissions rose by an annual average of 1.7% between 1990 and 2005. In the ten new Member States, the average increase was initially only 0.2%. Since 2000, the picture has changed: greenhouse-gas emissions in the new Member States are now increasing at an average annual rate of 5.6%, whereas emission growth in the older Member States has slowed down to one per cent a year. Three quarters of the volume of CO_2 emissions from land transport operations are produced by road traffic.[6]

The greenhouse-gas emissions from air transport and international sea transport must also be taken into account. According to Eurostat, they are 'only' responsible for about 5% of greenhouse gases in the EU, but there is a sharp upward trend.[7]

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[4] The sharper fall in the new Member States is due primarily to the rapid transformation in the domains of industrial manufacturing and energy production following the demise of Communism in the countries of Central and Eastern Europe.

[5] Emissions from transport, with the exception of air and sea transport, are covered by the Kyoto Protocol. There are no targets for the reduction of greenhouse-gas emissions in specific industries but only global targets for CO_2 emissions from the following sectors: energy industries, manufacturing industries and construction, services, households and land transport.

[6] See Eurostat, *Annual European Community greenhouse gas inventory 1990–2003* and *inventory report,* 2005, at:
http://reports.eea.europa.eu/technical_report_2005_4/en/EC_GHG_Inventory_report_2005.pdf

[7] Because air transport emits greenhouse gases into higher atmospheric strata, its impact on the greenhouse effect is far greater than that of land transport. One reason for this is the formation of ozone resulting from emissions of nitrogen oxide, while vapour trails from aircraft produce cirrus clouds, which are also suspected of magnifying the greenhouse effect. This is why the Intergovernmental Panel on Climate Change (IPCC) came to the conclusion in 1999 that the climatic effect of air transport is two to four times greater than the impact of CO_2 emissions alone (see COM(2005) 459 final: Communication of 27 September 2005 on reducing the climate-change impact of aviation, p. 4).

Whereas emissions from shipping rose by an annual average of 2.3% from 1990 to 2000, a figure that has even increased to 2.9% for the period since 2000,[8] the growth in the volume of air traffic over the same period has actually amounted to 5.6%.[9]

TABLE 1: CO_2 emissions in the 25-member EU by sector

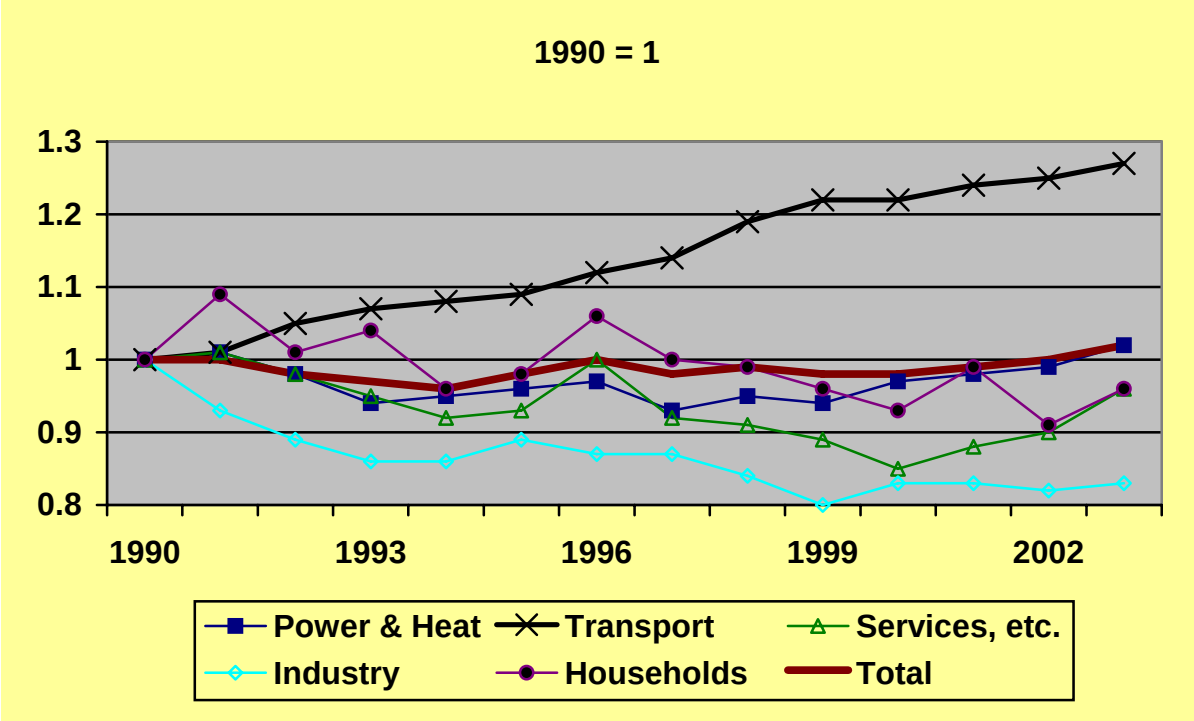
CO_2 emissions by sector

EU 25, in millions of tonnes of carbon dioxide

	Total	Power and heat generation	Industry	Transport	of which:				Households	Services, etc.
					Road	Air	Inland waterway	Rail		
1990	**3 775**	1 487	723	793	675	85	20	12	500	273
1991	**3 796**	1 497	674	802	684	86	21	11	547	276
1992	**3 699**	1 456	644	826	705	88	22	11	506	267
1993	**3 639**	1 401	623	840	716	92	22	11	515	260
1994	**3 609**	1 407	623	846	718	96	22	10	481	252
1995	**3 655**	1 417	640	857	726	100	21	10	486	255
1996	**3 759**	1 441	628	887	750	105	22	10	528	274
1997	**3 673**	1 387	628	905	765	110	20	10	500	252
1998	**3 695**	1 408	605	941	790	120	20	10	490	252
1999	**3 668**	1 397	580	968	812	128	19	9	480	243
2000	**3 692**	1 426	598	971	811	134	16	9	464	233
2001	**3 749**	1 440	598	979	825	130	15	9	492	241
2002	**3 750**	1 472	593	986	835	129	15	8	454	246
2003	**3 853**	1 514	597	1 001	843	132	17	8	479	262

[8] CO_2 emissions from global shipping were assessed at 813 million tonnes for 2001 (cf. V. Eyring *et al.*, 'Emissions from International Shipping: 1. The last 50 years', in *Journal of Geophysical Research*, No 110/2005 - http://www.agu.org/pubs/crossref/2005/2004JD005619.shtml). That is equivalent to the total of CO_2 emissions from road traffic in the 25 Member States of the EU.

[9] *Op. cit.,* pp. 101-102.



Source: Eurostat

Note: The figures for power and heat generation include output for producers' own final use.

This makes air and sea travel, which are not covered by the Kyoto Protocol, the fastest-growing sources of greenhouse-gas emissions.

If the current growth rate for air traffic is maintained, emissions from international flights from airports in the EU will have increased by 150% in the period from 1990 to 2012. This increase in emissions from international air transport would cost the Community more than a quarter of the reduction quota that forms part of its Kyoto target. Emissions from aviation, which currently account for 3% of the total volume of emissions, will develop in the longer term into a major contributor to the greenhouse effect.[10]

The graph from the Statistical Handbook for 2005 published by the Directorate-General for Energy and Transport of the European Commission (see Table 1 above) shows very clearly that transport is the only sector in the EU in which CO_2 emissions have not fallen since 1990; indeed, they have risen by almost 30%.

All forecasts for the coming years in Europe are based on the expectation of growth in the volume of traffic, which will inevitably lead to increasing CO_2 emissions too, because no coordinated European strategy is being developed to curb these emissions.

Mobility is a prerequisite and a consequence of European and global convergence. Anyone who favours European integration is also bound to support freedom to travel

[10] See COM(2005) 459 final, p. 2.

and the free exchange of goods – within environmentally acceptable limits, of course. It is only a few years since the peoples of Central and Eastern Europe fought to secure these rights. The challenge is to ensure, in spite of these forces generating growth in the volume of traffic, that measures are taken to reduce CO_2 emissions from transport operations to a tolerable level in the medium term. This cannot and will not be achieved unless we have an EU-wide strategy which guides and coordinates the transport policies of the old and new Member States on the basis of the binding climate-protection targets.

THESIS 2: **A change of course in European transport policy and mobility management is required if Europe is to compete successfully in the world's sunrise markets.**

Forms of mobility that do not impair the global climate are also the best protection against the greatest economic threat to our societies, namely the end of availability of mineral-oil resources. Should the oil shortage arrive suddenly, for example if deliveries from Saudi Arabia, the world's foremost oil-extracting country, which accounts for 13% of global production, were to be stopped, within a short time scarcely a wheel would still be turning in Europe. The consequence would be a worldwide economic crisis – which, incidentally, would hit the world's poorest countries especially hard. In many cases, these countries' oil bills already exceed the amount of international development aid they receive.

Even without such an oil shock,[11] the sands of time are running out on the age of fossil fuels. Almost all experts believe that it will only be a matter of years before oil extraction peaks then goes into decline. At the same time, the world's appetite for energy is growing ever more voracious. The 20% of the global population who live in the rich West are still responsible for 80% of global energy consumption, the United States being the main consumer in both absolute and *per capita* terms. But a rapidly increasing fraction of the 80% of the world's population whom poverty has hitherto condemned to low energy consumption are experiencing the sort of economic growth, especially in China and India, that is enabling more and more of them to emulate the energy-hungry lifestyle of the West. This is why China is already producing more cars than Germany, and almost all of them have been manufactured for the home market.

This development is changing the conditions in which the European car industry operates in two respects. Firstly, China will grow in the medium term into a powerful competitor in the production of low-priced cars. There is no reason why the automotive success stories of Japan and Korea cannot be replicated in China. Secondly, the pressure for low-energy propulsion technology will be dramatically increased by the growing shortage of oil. This presents the European car industry with opportunities, but also exposes it to risks. Its advantage in terms of brand image, which enables it to charge higher prices, can only be maintained if the most innovative vehicles – and that means first and foremost the most energy-efficient – come from Europe. If the

[11] The sensitivity of the oil market to the interruption of supplies from a given region was demonstrated by the record oil prices that were registered in the wake of Hurricane Katrina in the Gulf of Mexico in the autumn of 2005.

European car industry hesitates, others will overtake it. Those others might even be China and India.

'Transport policy is energy policy.' That statement, made by the Greens/European Free Alliance Group in the European Parliament in its Vienna Declaration on a sustainable energy policy in Europe, needs to be re-emphasised. Unless the volume of CO_2 emissions from transport is significantly reduced, the EU will not achieve its climate-protection targets.

However, a strategy of ending dependence on oil, a 'farewell to oil' in favour of forms of mobility that protect the climate and the environment, is not only a necessity for the sake of the global climate; it is also crucial to the competitiveness of Europe. And no sector of the economy is more dependent on oil than transport. In the aftermath of the oil crisis of 1973/74 there was a great scramble to switch to other energy sources for power generation and heating, but transport has remained dependent on oil for more than 97% of its energy requirements. Strenuous efforts are needed to reduce this dependence both significantly and quickly.

Without a medium- and long-term conversion of the energy basis of transport from fossil fuels to renewable energy sources, people's mobility would sooner or later regress to pre-industrialisation standards. For this reason, we must use solar power, in the broadest sense of the term, in future to fuel our motorised transport, as otherwise vehicles will no longer run. The fact that this is not impossible is shown by the Swedish Government's plan to make the national economy, including the transport sector, entirely independent of oil imports by the year 2020.

THESIS 3: **The volume of road, sea and air traffic is increasing in Europe. The volume of traffic carried by rail, which is greener and more environmentally and climate-friendly, is stagnating or declining.**

Europe is ill-prepared for the end of the oil era. The share of the transport market accruing to rail transport, which is relatively environment-friendly and energy-efficient, is dwindling everywhere, most drastically in the new Member States, where it was by far the leading form of transport before the fall of the Iron Curtain.[12]

Traffic, especially freight traffic, continues to shift almost unabated from rail to road. The railways' share of the freight market in the current 25 Member States of the EU, for instance, dwindled from 19.8% in 1995 to 16.4% in 2002. During the same period, the share accruing to road hauliers rose from 67.8% to 72%.

[12] In the ten new Member States, some 59% of freight was still carried by rail in 1990; this figure had fallen to 43% by 2000 and 39% by 2003. During the same period, the railways' share of the freight market in the 15 older Member States declined from 20% in 1990 to 13% in 2000. By 2003, it had settled around the 14% mark; see McKinsey & Co., *The Future of Rail Freight in Europe. A perspective on the sustainability of rail freight in Europe*. Presentation to the European Parliament, Brussels, on 9 November 2005, p. 6 (http://www.cer.be/files/McKinseyFINAL-164934A.pdf).

TABLE 2: **Modal split for freight transport (EU 25) in percentages**[13]

	1995	1996	1997	1998	1999	2000	2001	2002
Road	67.8	68.3	68.2	69.3	70.5	70.4	71.3	72.0
Rail	19.8	19.4	19.6	18.5	17.5	17.7	16.8	16.4
Waterways	6.6	6.3	6.4	6.4	6.2	6.2	6.1	6.0
Pipelines	5.8	6.0	5.7	5.9	5.7	5.6	5.8	5.6

In the realm of passenger transport, the market shares of the various modes of transport have remained fairly stable. There is, however, a continuing slight shift towards road transport in this category too.

TABLE **3: Modal split for passenger transport (EU 25) in percentages**[14]

	1995	1996	1997	1998	1999	2000	2001	2002
Private cars	81.7	81.7	81.9	82.1	82.2	82.2	82.3	82.5
Buses and coaches	10.2	10.1	10	9.9	9.8	9.7	9.6	9.5
Rail	7.0	7.0	7.0	6.9	6.9	7.0	7.0	6.8
Trams and underground railways	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

The absolute and relative *growth in the volume of road and air transport* has a powerful impact on the increase in transport-induced CO_2 emissions, since the specific CO_2 emissions from road and air traffic are considerably higher than those from rail traffic. According to a study conducted by the German pro-rail group *Allianz pro Schiene*, an alliance of environmental and transport associations, the specific CO_2 emissions from private cars are 2.3 times higher than those of a passenger train. Road-haulage vehicles have no less than five times the climatic impact of a goods train. The study, like others before it, shows the impact of air transport to be considerably more harmful than that of either road or rail transport.

[13] Figures from: Working Group Under the Joint Expert Group on Transport and Environment (JEGTE), Reduction *of Energy Use in Transport. Final Report*, 2006, p. 3. Accessible on the Internet at http://www.umweltbundesamt.de/verkehr/downloads/reduction-energy-use-transport.pdf (in German).

[14] *Op. cit.*, p. 4.

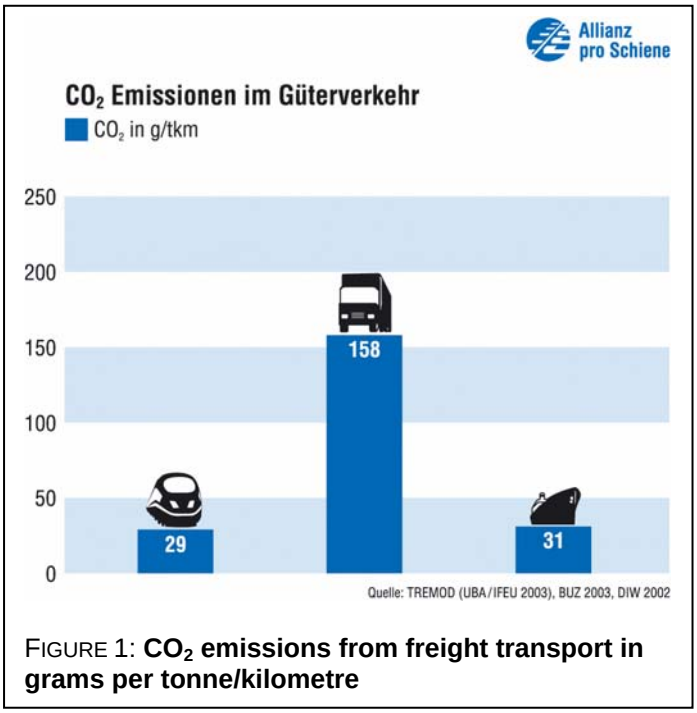


FIGURE 1: **CO_2 emissions from freight transport in grams per tonne/kilometre**

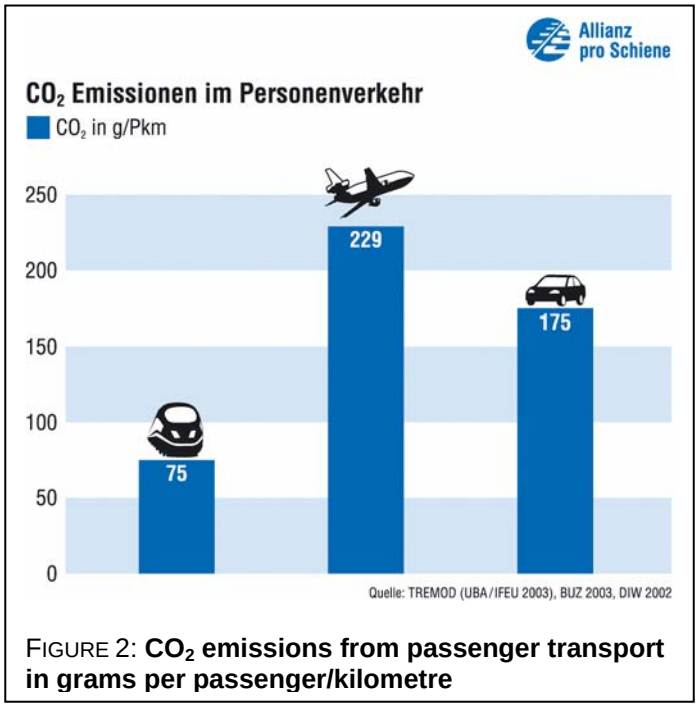


FIGURE 2: **CO_2 emissions from passenger transport in grams per passenger/kilometre**

The growth of personal *passenger transport* has now slowed down in Western Europe, whereas the process is still in full swing in Central and Eastern Europe as the new Member States try to bring their economies up to Western standards. The greatest degree of convergence has been achieved in eastern Germany. In some of the eastern *Länder* the car-ownership ratio even exceeds the average for the old Federal Republic.

In the realm of *freight transport* the signs point to continuing growth, particularly because of a steady increase in the distances covered by haulage operations. The following are among the reasons for this growth:

- a sharp increase in the flow of goods because of the single European market,
- strong export orientation of Member States' economies, while the EU is also a major market for imports from other parts of the world,
- reduction in manufacturing industry of vertical ranges of manufacture, necessitating the delivery of more and more primary products from all parts of the world ('global sourcing'),
- 'just-in-time' logistical strategies involving the minimisation of storage capacity in sales outlets and production plants in favour of last-minute haulage operations, and
- transformation of the retailing structure from a host of small shops to large chains, leading both to an increase in the movement of goods and to the establishment of large shopping centres on greenfield sites, which are almost inaccessible without a car and therefore increase the volume of shopping traffic.

The flexibility that is needed to cope with these new requirements, particularly with regard to consumer goods, can best be provided by road haulage. The inherent advantage of road transport lies in the unrivalled development of the road network, which means that a lorryload of citrus and tropical fruits from Spain, for example, can be taken direct to the wholesale market in Poland without the need for trans-

shipment.[15] Its other great competitive advantages lie in low wage levels, particularly in the new Member States, and in inadequate social protection and supervision of drivers. In particular, the road-haulage industry is not yet required to pay its own social costs, most notably in cases where the damage it causes to health and the environment is not factored into HGV tolls.

Cross-border rail freight in Europe, by contrast, is hampered by the fact that there are still five different track gauges, six different electrical power systems, eight pantograph systems, seven signalling systems, more than 20 train-control systems, four loading gauges, five railway communication systems and a host of non-harmonised rules and regulations, which almost invariably necessitate a change of engine and driver when trains cross national borders. Because of the lengthy waiting times this entails, the average speed of cross-border goods trains is only 10 mph. The market in transport of bulk goods, an area in which road haulage cannot compete, is shrinking. Besides, on many major routes this market is shared with inland-waterway and coastal-shipping operators.

Air transport quickly recovered from the events of 11 September 2001 and the SARS crisis in Asia, and is now setting new records for total passenger and freight miles every year, with current year-on-year growth rates at about 5%. Additional highly attractive offers from the major airlines are a contributory factor, as are the those of the low-cost carriers that have been creating a furore in the sphere of passenger air transport for several years. They frequently offer internal European flights for a few euros, for example, and, astonishingly, even make money from this in some cases, because they focus on the highly profitable main routes and magnanimously 'grant' their competitors a free hand on the less profitable feeder routes. They are sometimes aided and abetted by unfair competitive advantages deriving from low handling charges, which are generally state-subsidised, at regional airports. In addition, these airports pay direct subsidies in the form of so-called marketing grants for the opening of new air routes. Moreover, even today public treasuries still meet the cost of building and maintaining transport access to airports. In its study on the expansion of regional airports in Germany, Deutsche Bank Research refers to public subsidisation in the form of investment grants and operating subsidies amounting to €9.20 for each air traveller, whereas the major airports are only subsidised to the tune of €0.50 per passenger.[16]

Air freight traffic is growing even faster than passenger traffic. In Germany alone, it increased by 9% in 2005. Although air freight accounts for only 1.1% of the volume of all international transport, it earns an estimated 40% of the total value of international freight transport.

International shipping, and particularly container services, have been enjoying a boom over a number of years as a result of the division of labour within the global economy. Even if shipping vastly outperforms road haulage in terms of low CO_2 emissions per unit of weight, the exponential growth in intercontinental trade in goods, especially between Asia and Europe, is contributing more and more to the

[15] The cost of road haulage is so low that it is worth sending North Sea shrimps by refrigerated lorry to Morocco for peeling, then bringing them back to be sold at the fish market in Hamburg.

[16] Deutsche Bank Research: 'Expansion of regional airports: misallocation of resources', in *Current Issues,* 18 November 2005, p. 1 (http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000193311.pdf).

total volume of CO_2 emissions. An estimated 40% of all tonne/kilometres of freight transport in the 15 older Member States are ascribable to sea shipping. Wage and carriage costs are so low that it is cheaper, for example, to ship Australian coal halfway round the globe to Europe than to extract coal from the seams in the Ruhr coalfield or in Lorraine.

Inland waterway transport accounts for 6% of freight transport in the 25-member EU. The main artery, carrying 80% of all inland waterborne freight in Europe, is the Rhine, the primary role of which is to serve as a link with the hinterland for Rotterdam, Europe's largest port. Inland waterway transport is heavily weather-dependent. When the river is too high, too low or iced over – which is the case for about four months of the year – vessels are immobilised. Where timely delivery is crucial, as in the case of container goods, this means that, alongside the road next to a river, there must also always be a parallel rail infrastructure with the capacity to carry extra freight in such cases.

The recurring calls for rivers and canals to be developed to take vessels the size of Rhine barges are misguided, especially in view of the increase in extreme weather conditions associated with climate change. Instead of investing in widening, straightening and deepening rivers, it would be better to renew the fleet, which is 15 years old on average, and adapt it for use on the existing river system. At the same time, the environmental standards of inland vessels must be considerably enhanced, which must also involve the retrofitting of serviceable vessels. This is one of the main aims of the Commission's action programme *Naiades* (Navigation and Inland Waterway Action and Development in Europe).[17]

THESIS 4: **Transport pricing does not tell the environmental truth, because social costs are not factored in. This, along with selected tax subsidies, especially for air transport, distorts competition between modes of transport to the detriment of the railways.**

The social cost of transport operations chiefly encompasses costs arising from accidents, atmospheric pollution, damage to the climate and to public health, noise, impairment of natural resources and the landscape and damage to buildings. A study covering the 15 older EU Member States plus Norway and Switzerland[18] provides hard and fast numerical evidence. It puts the social cost of the use of private cars at €76 per 1 000 passenger kilometres, which is more than three times the social cost of rail travel (€22.90 per 1 000 p/km). Travel by bus and plane, at €37.70 and €52.50 per 1 000 p/km respectively, both generate lower social costs than the use of a private car.

[17] See COM(2006) 6 final dated 17 January 2006: Communication from the Commission on the promotion of inland waterway transport: Naiades – an integrated European action programme for inland waterway transport. http://ec.europa.eu/transport/iw/doc/2006_01_17_naiades_communication_en.pdf

[18] Infras/IWW: External Costs of Transport - Update Study, commissioned by the International Union of Railways (UIC), Final Report, Zürich and Karlsruhe, 2004

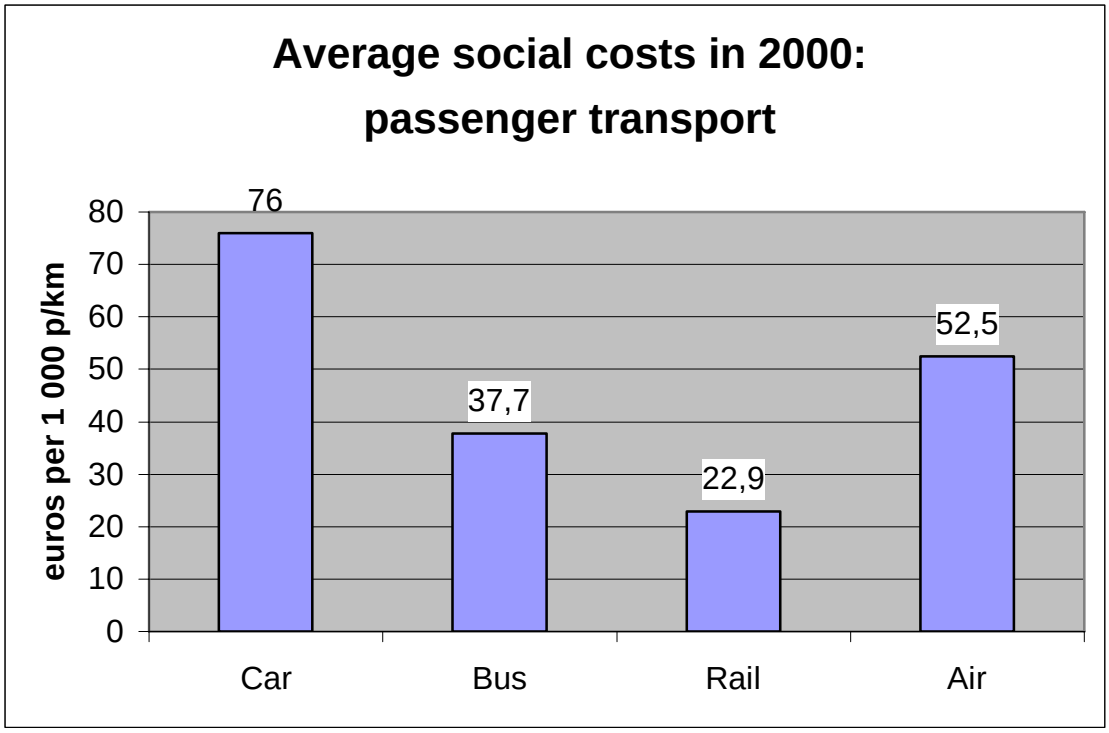


FIGURE 1: **Social costs arising from passenger transport**

The differences are even greater for freight transport. The transport of freight by rail generates social costs of €17.90 per 1 000 tonne/kilometres, which is less than a quarter of the social costs generated by HGV traffic. Compared with deliveries made by light utility vehicles (€250.20 per 1 000 t/km) and air transport (€271.30 per 1 000 t/km), the social cost of rail transport is 14 or 15 times lower. At €22.50 per 1 000 t/km, transport by inland waterway generates social costs that are 11 or 12 times lower.

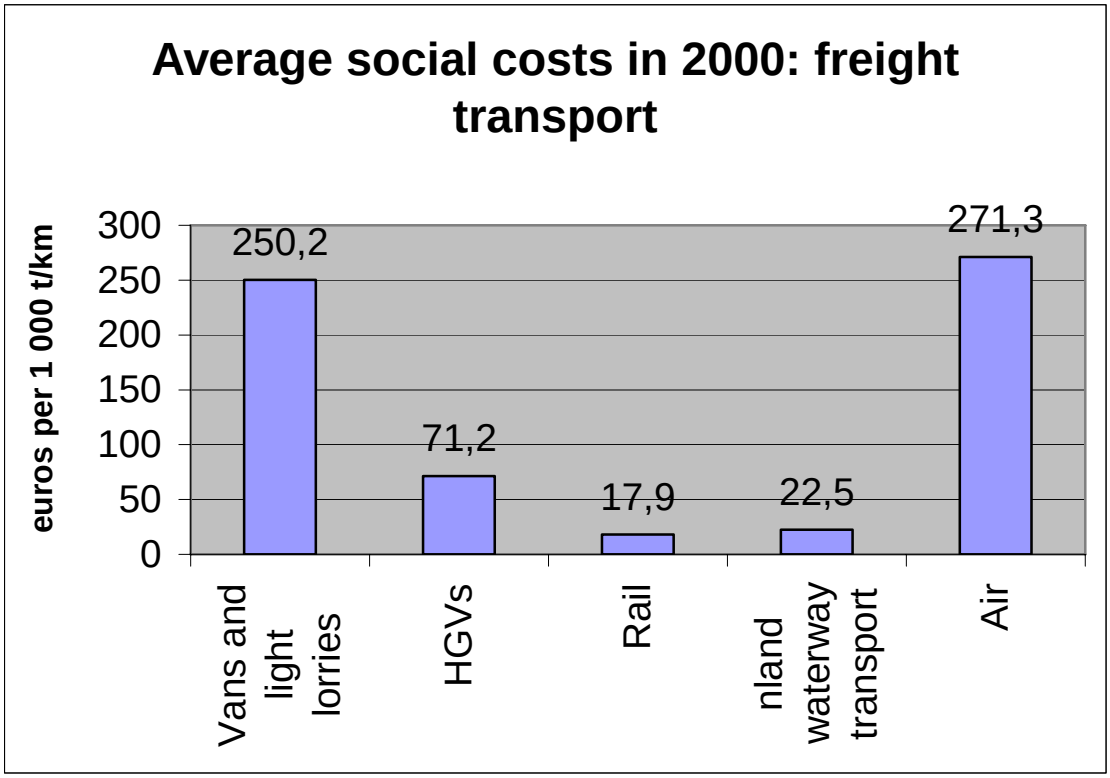


FIGURE 2: **Social costs arising from freight transport**

In accordance with the principles that users should pay the cost of transport, that prices should be a true reflection of cost and that modes of transport should compete on a level playing field, the social costs arising from each mode of transport should gradually be shifted onto its users. Such a gradual redistribution of social costs by means of appropriate levies or excise duties will not only lead to fairer pricing, since those who generate these costs will finally have to meet them, but will also enhance the competitiveness of the more environment-friendly rail system in the European transport market.

Competition between rail and air continues to be grotesquely distorted by exorbitant tax subsidies for air transport, which is neither subject to an energy tax (kerosene duty) like rail and road transport nor subject to VAT in respect of cross-border flights. The decision of the SPD-Green Federal Government in Germany, which was in office until 2005, to abolish the latter tax privilege, was thwarted by the Christian Democratic majority in the Bundesrat, the representative chamber of the federal *Länder*. There is no logical economic or regulatory reason for the historically rooted and long-outdated fiscal privilege enjoyed by one particular mode of transport. Its abolition throughout Europe is long overdue.

THESIS 5: **The planning of transport infrastructure by the Member States, and more especially by the EU itself in the form of trans-European network (TEN) projects, is hopelessly underfunded and is still based in some cases on the pursuit of the wrong priorities, with expensive showcase projects being put before efficient transport systems, hardware before software and the construction of new railways before the upgrading of existing lines.**

If Europe intends to make progress in protecting the climate from the impact of transport operations, there must be a renaissance of Europe's railways. The example of the United States demonstrates convincingly that it is possible for a highly industrialised country to move a large percentage of its freight by rail. More than 40% of goods are now carried by rail in the United States, as against a diminishing average of some 14% in the 25 EU Member States. The secret of the United States' success lies less in the existence of a perfectly developed infrastructure than in the fact that long-distance trains are not hampered by national borders, different track gauges or incompatible train-control and signalling systems.

Accordingly, the EU has recognised the urgent need to remove all of these obstacles. In a number of legislative 'railway packages', measures designed to harmonise European rail transport with a view to achieving 'interoperability' have been adopted and are being implemented in stages.

Besides this very important 'soft' infrastructure, however, there is also a lack of 'hard' infrastructure in the form of well-developed railway lines. This applies especially to lines linking the new Member States with the older ones. On some routes, trains cannot even match the speeds at which steam trains used to operate before the Second World War. The train journey from Berlin to the Estonian capital, Tallinn, for example – a distance of 1 700 kilometres – takes 60 hours; passengers have to change nine times and cross the border between Latvia and Estonia on foot. In 1935, the same journey could be made by steam train in 27 hours – less than half the time it takes today.

The European Union is certainly aware of the problem. Its trans-European transport networks (TEN-T) are intended to improve the situation. The budget for the development of the entire network of trans-European railways, which is to have a total length of some 94 000 kilometres by 2020, including 20 000 kilometres of high-speed lines, and of the network of trans-European roads, with a total target length of 89 500 kilometres, amounts to more than €600 billion. The bulk of the construction and development measures planned and prioritised by the EU relates to the rail network, with 12 500 kilometres of new lines and 12 300 kilometres of upgraded lines. The TEN plans also provide for improvements to the road network, comprising the construction of 4 500 kilometres of new roads and the upgrading of a further 4 800 kilometres. The budget also covers the development of inland waterways, of short sea shipping and of the European satellite-based navigation system Galileo.[19] Since most inter-

[19] European Commission, *Trans-European transport networks. TEN-T – priority axes and projects 2005*, Brussels, 2005, pp. 7 *et seq.* See http://europa.eu.int/comm/ten/transport/projects/doc/2005_ten_t_en.pdf

continental freight is transported by ship, great importance attaches to the ship/rail interface, where Europe is still far from adequately equipped.

For the first 14 TEN-T projects adopted at the Essen summit of the European Council in 1994, 90% of the cost of each project was to be paid from the relevant national budgets, and the remaining 10% was to be funded by the EU. This distribution of the financial burden is probably one of the main reasons why a grand total of three TEN projects have been completed to date. For this reason, the grant element for priority projects was increased to 20% as part of a revision of the TEN guidelines, and 50% part-funding from the EU budget will even be provided in future for cross-border sections. The snag in all of this is that the EU budget is far from able to meet these commitments.

The list of priority TEN projects contains a total of 30 construction projects, including the 14 'Essen projects', and the latter alone, according to figures communicated by the Member States in 2005, will cost €252 billion. Coordinators have been appointed for six core projects – five rail axes plus the development of the standardised European Rail Traffic Management System (ERTMS) for installation on a defined core trans-European network with a total length of some 20 000 kilometres. Under the hard-won agreement on the Financial Perspective for the EU budgets from 2007 to 2013, however, even these six projects are underfunded, let alone the others, foremost among which are the east-west links between the old and new Member States. Instead of the €20.35 billion proposed by Parliament and the Commission, the budget for the TEN-T projects was cut by two thirds to €7.2 billion. The implementation of most of these projects has thus become an impossible dream.

If the TEN list is not to remain a Utopian wish list as a result of this drastic pruning, two things are needed. The first is another critical review of the transport projects in terms of their cost-benefit ratio and serious reflection for the purpose of identifying additional ways of funding the development of a viable and environmentally compatible European transport infrastructure. In particular, major showcase projects should be subjected to very critical scrutiny. The six core projects alone, for example, include the Brenner base tunnel, the tunnel on the proposed rail link between Lyon and Turin, the bridge over the Strait of Messina[20] and the Fehmarn Belt bridge between Germany and Denmark – four highly controversial and disproportionately costly projects whose benefit to the transport system is far outweighed by their prohibitive environmental and economic cost (for further details, see subsection 3 D on pages 47 *et seq.* below).

Subsection 3 C, on pages 38 *et seq.* below, deals in detail with new funding methods that would be desirable in terms of both transport economics and environmental protection.

2 Aims: breaking the link between economic and transport growth, defining the target for the switch to rail and reducing

[20] Since the new Italian Prime Minister, Romano Prodi, has announced that his government no longer wishes to pursue this project, it is likely to drop out of the EU priority list for the foreseeable future.

the volume of CO_2 emissions generated by transport operations

It is a declared aim of the EU to break the link between economic growth and growth in the volume of transport operations. In real terms, however, the 25-member EU has made little progress over the past few years. In the domain of freight transport, the situation has remained static since 1995, while passenger traffic has fallen slightly, by about 3.5%. In the new Member States, where economic growth is comparatively high, more tangible success has been achieved in breaking this link, success that is due in part to the rapid growth of a previously underdeveloped service sector, which is less transport-intensive than agriculture or industry.

The defined objective of breaking the link between economic growth and transport growth, however, centres on a relative value and as such has limited use as a means of achieving the goals of EU environmental and climate policy. The fact is that an expanding economy and a transport sector which is growing slightly more slowly would still combine to keep driving up energy consumption and the associated emissions.

The Joint Expert Group on Reduction of Energy Use in Transport, a working group under the Joint Expert Group on Transport and Environment (JEGTE), compiled a report[21] for the European Commission which contains a comprehensive catalogue of objectives and measures.

The first measure it proposes is the setting of national targets for the reduction of energy use in transport by the target year of 2020. These should be accompanied by national action plans. The report refers to the aim set out in the German Federal Government's national sustainability strategy of a 20% reduction in transport intensity in the realm of passenger transport (ratio of passenger/kilometres to GDP) and a 5% reduction in freight transport intensity (ratio of tonne/kilometres to GDP) in relation to 1999 levels.

This aim of breaking the link between economic growth and transport growth, however, is only a relative objective, and its achievement will not necessarily mean a fall in emissions of climate gases, because it merely measures the relationship between two trends.

It is therefore more appropriate to apply reduction targets to the volume of CO_2 emissions from transport operations.

A CO_2 reduction target of 10% for road traffic was introduced in the Netherlands in 1990 for the period from 1986 to 2010. In the year 2000, however, the Government distanced itself from this target since it was in danger of being missed and because specific measures in pursuit of this target had been avoided for political reasons.

As a target value for the reduction of the volume of CO_2 emissions in transport, we suggest that the EU should set itself the aim of reducing these emissions too by 8% in the medium term, i.e. by 2012, regardless of the state of play in other sectors. The EU Member States should then set aims for 2020 and conclude a binding agreement

[21] This report is available on the Web at:
http://www.umweltbundesamt.de/verkehr/downloads/reduction-energy-use-transport.pdf

whereby the volume of climate gases from transport operations in the EU as a whole is reduced by 30% in relation to the base year 1990.

In our view, a necessary enabling objective for the achievement of a reduction in CO_2 emissions is a shift in the modal balance from the modes of transport with the highest climate-gas emissions, namely cars, utility vehicles, HGVs and aircraft, to the modes that are least harmful to the climate, i.e. rail, inland waterways, coastal shipping and inner-city cycling. As an environmental benchmark, the EU should therefore set itself the target of an annual 1% shift in the modal split in favour of the more climate-friendly modes of transport and should structure all of its transport-related action accordingly. Such a targeted shift would also help to ensure that the annual 1% increase in energy-efficiency agreed by the Council in March 2006[22] is applied in the transport sector.

3 Action: stepping stones on the way to climate-friendly transport

What action can be taken to achieve these aims?

Borrowing from and supplementing the catalogue of measures recommended by the aforementioned Joint Expert Group, we propose the following steps as mandatory action for the reduction of energy consumption in transport operations:

1. From the Greens' perspective, *traffic reduction* is the foremost priority. Limitation and reduction of the volume of traffic on the roads can be achieved by improving haulage logistics with a view to avoiding unladen journeys – as has been achieved in Switzerland, for instance, following the introduction of the mileage-based heavy-vehicle levy (LSVA) there – and by pursuing an appropriate infrastructure policy. Such a policy includes, for example, supplying conurbations with locally sourced regional products, as in the Food Campaign launched in London by Ken Livingstone and Jenny Jones, and urban planning based on the aim of minimising the distances people have to travel, combined with clear priority for public transport.
2. *Increasing the energy-efficiency of vehicles:* technical measures should be taken to reduce the specific energy consumption of each individual means of transport.
3. *Optimised choice of mode:* each kind of transport operation should be carried out using the mode of transport with the highest level of energy-efficiency (modal shift).
4. *Increasing the vehicle utilisation rate* per vehicle/kilometre: each operator should make the most logistically efficient use of available carrying capacity.

[22] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services

5. *A reduction in journey distances and transport requirements* can be achieved by strengthening regional economic processes and ending support for misguided location policies that result in wide dispersal of the production chain.
6. *More energy-efficient behaviour* at the wheel: systematic training should be given in ecodriving, i.e. driving in such a way as to minimise fuel consumption and emission levels.
7. *Improved logistics:* the organisation of the freight transport chain and passenger transport connections should be optimised to permit the most efficient modal mix (intermodality).
8. *Mobility card* for public transport: a European standard should be developed for a customer-friendly, easy-to-use system of public passenger transport with additional mobility-enhancing features for individuals.

These measures can be influenced by various political management instruments, which can be categorised as follows:

A. regulatory measures, such as the setting of maximum values;
B. political action to provide support and encourage research in the field of transport infrastructure (e.g. promotion of urban mobility);
C. political measures relating to pricing (excise duties, levies and withdrawal of subsidies);
D. infrastructure measures, such as Trans-European Network projects.

Changes in people's mobility patterns and in freight transport can also result from factors that are not open to political influence or are the intended or unintended consequences of political management measures. A sharp increase in the price of oil, for instance, is very likely to affect people's transport choices. Demographic and economic trends in the Member States will also have a decisive influence on the general development of the transport situation. Regardless of these factors, our strategy paper identifies measures that will, in any event, contribute significantly to a lowering of traffic climate-gas emissions.

In the following subsections, we focus primarily on measures that can be made compulsory through political action on the part of the EU and can therefore radically change the conditions in which passenger and freight transport operate within the Union.

At the same time, we are aware that, because of the complex decision-making processes involving the Commission, Parliament and the Council and the fact that voting on many of the proposals made below is subject to the unanimity requirement in such important bodies as the Economic and Financial Affairs Council (Ecofin), a great deal of persuasion is still needed.

3 A Regulatory measures

If the European transport system is regarded as a market, it follows that a level playing field must be created for all participants in the market by means of regulatory provisions. The introduction and gradual tightening of the European pollutant standards

for passenger cars have proved to be an extremely effective means of drastically lowering the volume of pollutant emissions from road traffic. Emissions of climate gases from passenger cars, unlike those from haulage vehicles, are not covered by European standards.

The greatest contribution at the lowest cost, which would also be the quickest to implement, would be made by measures focused on vehicle efficiency, targeting both the technological efficiency and the efficient use of present means of transport. Since passenger cars and commercial vehicles account for such a high percentage of the total volume of traffic in the EU, the reduction of fuel consumption by road traffic is the most important of these measures.

(A 1) **If the car industry does not meet its own voluntary commitments, maximum permissible values should be imposed for CO_2 emissions from road traffic and fuel consumption. Binding quantified CO_2 reduction targets for road traffic should be set nationally, and progress towards their achievement should be overseen by means of a monitoring system.**

The European Automobile Manufacturers' Association (ACEA) promised the European Commission that it would reduce the average CO_2 emissions of new passenger cars sold by its member companies to 140 grams per kilometre by the year 2008. This is equivalent to a fuel-consumption rate of 5.8 litres per 100 km (48.7 mpg) for petrol engines and 5.3 litres per 100 km (53.3 mpg) for diesel engines. The association of Japanese manufacturers, JAMA, and the Korean association, KAMA, intend to achieve that target one year later. An increased voluntary commitment of 120 g of CO_2 per km by 2010/2012 has hitherto been the Commission's aim as part of its effort to meet the Kyoto targets.

Although the car industry is still on task and has been stating that it will be able to meet the 140 g/km target by 2008, there are legitimate grounds for doubting whether it can do so. According to a study commissioned by the European Federation for Transport and Environment (T&E),[23] in 2005 average CO_2 emissions fell by only 1.3% from 162.2 to 160.0 grams per kilometre. According to a study conducted by the German environmental organisation *Deutsche Umwelthilfe*,[24] the latest 2006 models produced by German car manufacturers actually exceed the fuel-consumption targets set by the EU for 2008 by 45% to almost 70%. The CO_2 emission levels for Volkswagen cars, for example, are about 202 g per km, BMW is manufacturing cars with emission levels of 219 g per km, and DaimlerChrysler cars even emit 237 g per km. This is partly due to growing sales of German-made sports utility vehicles (SUVs) in the wake of aggressive advertising, while fuel-efficient cars like the three-litre VW Lupo have been taken out of production.

It is up to the car industry to make every effort to live up to its pronouncements in the face of this evidence to the contrary. Increased efforts to use biofuels as 10% additives without the need for engine conversion are to be welcomed. It would be wrong, however, to offset the CO_2 reduction resulting from the use of biofuels against the

[23] See http://www.transportenvironment.org/Article185.html

[24] See http://www.duh.de/pressemitteilung.html?&tx_ttnews[tt_news]=539&tx_ttnews[backPid]=170 (in German).

ACEA target, since that would lift the pressure on manufacturers to develop more efficient vehicles.

What alternative instruments are available for the period after 2008? Let us examine some of the regulatory regimes around the world:

More extensive voluntary commitment in Canada

In April 2005, Canadian automotive manufacturers and importers signed a memorandum of understanding in which they committed themselves to reducing the total volume of greenhouse-gas emissions from all cars, including those already on the road, by a specific amount, namely 5.3 megatonnes.

Top-runner approach in Japan

The most efficient vehicle in each class serves as the benchmark for all other vehicles in that class. Its consumption rate is prescribed as the ceiling for all future vehicles in that class.

CO_2 ceilings in China and California

In China and California, CO_2 ceilings have been introduced for each class of vehicle and are made increasingly stringent at intervals of several years. This principle has been applied very successfully in Europe over a number of years in the context of the European standards for atmospheric pollution.

Assessment of these models

The advantage of the *extended voluntary commitment* in Canada is that it encompasses the entire vehicle fleet. It effectively caps the volume of CO_2 emissions from road traffic. It means that vehicle manufacturers must endeavour to reduce emissions from all vehicles, not just new ones. This can be achieved, for example, by conversions designed to enable vehicles to run on more climate-friendly biofuels. But it can also be achieved through sponsorship of driver training (see page 26) and even vigorous advertising campaigns to encourage people to walk or cycle instead of making short journeys by car. In addition, such a commitment could surely help to ensure that the car industry, with the aid of attractive premiums, would speed up the replacement of the old vehicle fleet with new greener vehicles.

One of the good things about the *top-runner approach* is that it prescribes ceilings which have already been proved attainable by a reference vehicle. Moreover, experience from Japan has shown that no company wants to suffer the ignominy of permanently failing to meet the standards set by a competitor. There is therefore creative competition among engineers to come up with the most energy-efficient products. This has no doubt played a significant part in Japan's global leadership in the field of low-CO_2 hybrid technology.

CO_2 ceilings are an extremely efficient means of lowering emissions, as experience with the European pollutant standards has shown. The higher cost of energy-efficient technology does not distort competition, since the ceilings apply to all vehicles from the date when they enter into force. How the ceilings are adhered to is a matter for each manufacturer.

All three instruments are useful and can be used in combination. *We therefore propose, on the basis of the Canadian arrangement, a binding overall ceiling for CO_2 emissions from road traffic. The need for a binding obligation derives from the fact*

that the voluntary pledges made in Europe are plainly not being honoured. At the same time, there should be binding CO_2 ceilings for new vehicles in the framework of the European pollutant standards, and these ceilings should be based on the best vehicle in each class (the top-runner approach); in the case of the cumulative ceiling, certain subceilings must not be exceeded either.

The targets to which the European automotive industry has committed itself are relatively demanding and are more stringent than those in Japan, China and California, especially if the target of 120 grams of CO_2 emissions per kilometre for new vehicles by 2010/2012 is taken into account. On the other hand, they are not binding obligations but a voluntary commitment, which evidently cannot be honoured and which has no consequences for manufacturers. We therefore make the following proposal:

- The CO_2 ceilings for vehicles should be lowered at intervals not exceeding two years, so as to discourage manufacturers from adopting a 'wait-and-see' attitude based either on the hope that the rules will be relaxed in the event of collective failure to comply with them or on the hope of a quantum leap in vehicle technology, such as fuel cells reaching the marketable stage.

- The ceilings should, on the one hand, be set for each class of vehicle.

- On the other hand, by analogy with the current voluntary commitment, there should be a cumulative ceiling, weighted on the basis of the number of vehicles registered in each class, which is collectively observed by all manufacturers. A loading factor would be added to the CO_2 rating of vehicles equipped with air-conditioning.

- As an enforcement mechanism, provision must be made for the payment of monetary penalties in the event of non-compliance with the ceilings.

The disputes about the setting of new pollutant ceilings have demonstrated time and again that the relevant industry will try to exert influence with a view to avoiding stringent limits. This is currently illustrated by the discussion on the fifth generation of European emission standards for cars (Euro 5), particularly with regard to the ceiling for nitrogen oxide.

By 2012, a cumulative CO_2 ceiling of 120 grams per kilometre must be achieved. We propose a two-yearly reduction of this ceiling by at least 10 g per km from then until 2020, which would result in a figure of 80 g per km being achieved across the entire fleet by the year 2020.[25] This would be roughly equivalent to the fuel-consumption rate achieved by the three-litre VW Lupo back in 1999! In relation to today's new cars, however, it would mean halving the average rate of fuel consumption. The reduction requirements for heavy vehicles and those with large engine capacities should also be greater than those for small vehicles with low-capacity engines, since efficiency technology such as hybrid engines should become standard in higher vehicle classes first.

The automotive industry often argues that the stringent limits for atmospheric pollutants, particularly particulates and nitrogen oxide, run counter to the aim of reducing consumption. Even if there is such an adverse trade-off effect, that is no reason to

[25] If even more stringent ceilings are achievable under the top-runner principle, these should apply.

relax the anti-pollutant regime. On the contrary, targeted efforts are needed to reduce vehicle weights, which are normally increased each time a new model comes on the market, by systematic downsizing (see pages 33 *et seq.*).

The CO_2 ceilings should include all motor vehicles, including especially light utility vehicles, which are responsible for 20% of the volume of CO_2 emitted by road traffic. They should also include haulage vehicles and buses. An analogous set of ceilings should also be developed in due course for rail transport and inland-waterway vessels.

Contribution to the reduction of CO_2 emissions from transport operations: high

(A 2) **Improvement of the technical rules governing energy-saving devices in vehicles could create additional energy-efficiency potential.**

In some cases, it would only take small amendments to statutory regulations to achieve quite large reductions in CO_2 emissions. For example, low-resistance tyres and friction-modified lubricants have long been on the market but are not universally used, because there is no obligation to do so.

Friction-modified lubricants are synthetic oils with additives which possess particularly good lubrication qualities (low viscosity). This reduces friction in the engine, which has a direct impact on fuel consumption. The mileage per gallon attainable with conventional lubricants can be increased by two to five per cent by switching to a friction-modified oil.
As a first step, we propose that a standard, such as an eco-label, be established for these low-viscosity engine oils and that the standard then be made mandatory.

Low-resistance tyres have lower rolling resistance than conventional tyres. The saving on fuel consumption is in the order of 2% to 9%. A great deal of energy can also be saved if tyre pressures are correct. Driving with underinflated tyres reduces the life of the tyres, increases the risk of accidents and increases fuel consumption by two to four per cent. For this reason, low-resistance tyres should be prescribed as standard. In addition, after a transitional period, all new vehicles should be fitted with a tyre-pressure indicator. This will bring twofold benefits by cutting fuel consumption *and* increasing road safety.

Contribution to the reduction of CO_2 emissions from transport operations: high

(A 3) **Ecodriving: energy-efficient driving technique can be encouraged by compulsory cost and consumption indicators in new vehicles.**

One of the greatest potential sources of energy-efficiency is the driving technique of each individual motorist. Up to 25% of fuel consumption can be saved through the use of efficient driving methods. On the one hand, such methods have to be learned; on the other, they need continual positive reinforcement.

Driving schools throughout the EU must be required to adjust their curricula so that learners are taught how to drive in an energy-efficient manner. We also propose that every new car sold in the EU should come with a voucher for free training in fuel economy. In addition, after a transitional period, all new vehicles should be equipped with a consumption indicator, which would display their current rate of fuel consumption. In order to make the feedback to drivers even more effective, a permanent

‘online’ display should show the cost implications of the rate at which their driving technique is causing the vehicle to consume fuel. Whenever the driver unlocked the petrol cap, he or she would be prompted to enter the price of the fuel dispensed at the pump into the on-board computer, which would display the price per litre multiplied by the current level of consumption. It is also conceivable that a particularly aggressive driving technique could trigger a warning tone, similar to the tone that is widely used today to signal that a seat belt has not been fastened. Fuel-economy training courses should be compulsory for anyone who drives for a living.

Contribution to the reduction of CO_2 emissions from transport operations: medium

(A 4) **The addition of biofuels and the provision of petrol pumps for biofuels (‘green pumps’) at all service stations should be made compulsory.**

The potential contribution of biofuels to the protection of the climate is not unchallenged. It is clear that alternative fuels are no substitute for all kinds of efficiency measures. It is also certain that, if the energy-guzzling mobility patterns in the industrialised countries are maintained, biofuels alone cannot be a panacea for our environmental problems. Nevertheless, biofuels are a good means of gradually reducing dependence on oil and therefore ensuring continuity of supply, at least in the medium term. Even though the contribution of the first generation of biofuels to protection of the global climate is rather small compared with that of potential efficiency gains in the realm of fossil fuels, it is right to pursue this path as part of a strategy of reducing dependence on oil.

Energy crops grown in monocultures with sizeable inputs of fertilisers and pesticides are not a viable long-term solution. The future therefore lies in regionally produced and marketed biofuels, such as pure vegetable oil, and in a second generation of biofuels, which can be obtained from every form of biomass, such as liquidised biomass or bioethanol distilled from wood or straw. In second-generation biofuels, the entire biomass can be directly converted into fuel if it contains genetically modified enzymes. Research is still needed in this area, which is why the production of these fuels is dealt with in the context of research activity. In first-generation biofuels, by contrast, oil is pressed from the seeds of the biomass and is then converted into fuel.

Biofuels of the first generation, particularly biodiesel and bioethanol, are already in fairly wide use in some Member States. In Germany, biodiesel now accounts for more than 5% of the entire diesel market.

Biodiesel and bioethanol can be added to conventional diesel or petrol without the need for conversion work on the vehicle. A 5% addition is already possible at the present time and poses no problems. The Association of the German Automotive Industry (*Verband der Automobilindustrie - VDA*) has announced that German manufacturers are trying to develop engines that can run on a mixture containing 10% biofuel.

In terms of yield per hectare, in which it outscores biodiesel, biogas is one of the most promising alternatives. Natural gas with an admixture of biogas is also a feasible fuel and should be prescribed in binding form by the EU together with the other organic additives.

Besides their use as additives, however, the market in pure biofuels (biodiesel, E 85, E 100 and vegetable oil) should be expanded. In Sweden, from 2006 onwards, every

service station with eight or more dispenser pumps is required to offer biofuel from at least one pump. This obligation to install a ‘green pump’ should be introduced throughout Europe with a view to increasing the availability of biofuels.

Contribution to the reduction of CO_2 emissions from transport operations: medium

3 B Political action to provide support and encourage research

Besides regulatory, fiscal and infrastructure-related measures, the EU can also do a great deal to contribute to a climate-friendly transport structure by supporting research and demonstration projects and by establishing market-based incentive programmes. In the framework of the Marco Polo programme, for example, very successful action has been taken since 2003 to promote the creation of new intermodal freight-transport chains. For the next funding period, from 2007 to 2013 (Marco Polo II), the Commission has asked for €740 million. How much of that amount will actually be made available on the basis of the agreement on the Financial Perspective remains to be seen, and a certain degree of scepticism seems to be warranted.

Great potential for the reduction of climate gases is also offered by alternative forms of propulsion and fuels and by environment-friendly multimodal urban-transport strategies. The main channel through which the EU can encourage innovation in this field is its support of relevant projects through the Seventh Framework Research Programme (2007-2013).

(B 1) **Urban passenger transport should be as clean and quiet as possible and should include intermodal services with user interfaces that possess uniform elements.**

Some 80% of the population of the EU live in densely populated conurbations. Many cities possess thoroughly attractive systems of local passenger transport, albeit with scope for further improvement. Bicycles are the ideal form of transport for distances up to five kilometres, but their utilisation varies widely. Whereas bicycles account for 27% of total mileage in the Netherlands, where the average distance cycled per inhabitant in a year exceeds 1 000 kilometres, far less use is made of bicycles in most other countries with similar geographical and economic conditions (see FIGURE 3 below).

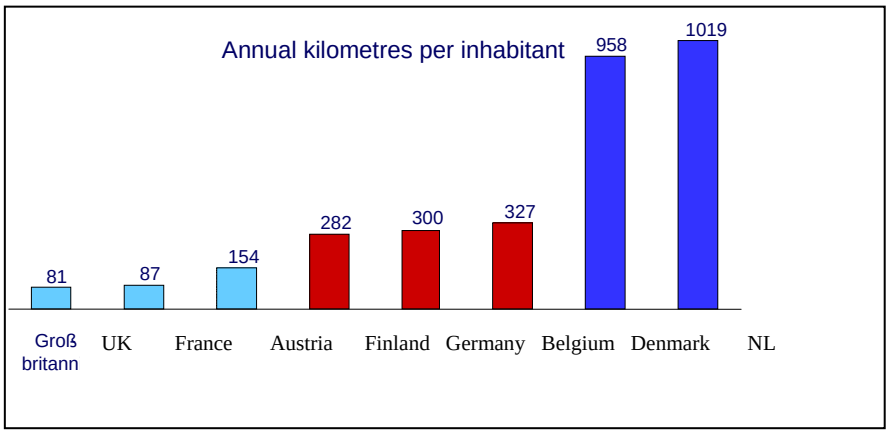


FIGURE 3: Bicycle use in Europe[26]

Far more short car journeys in particular could be made by bicycle or on foot instead. Ten per cent of car journeys are shorter than a kilometre, 30% are shorter than three kilometres, and 50% are shorter than five kilometres. Thus there is enormous potential here for more environment-friendly mobility patterns.

Even in towns and cities, the car often remains the primary means of transport. As Germany's experience with ecotax, for example, has illustrated, cost alone has a relatively low impact in determining a person's transport choices. It is already cheaper in many cases to take the train instead of travelling by car, and in view of rising oil prices this can even apply to families too. Public transport, however, is often considered to be a greatly inferior option in terms of reliability and availability. This is what new intermodal mobility strategies have to address. They must be based on an acceptance that the private car is the benchmark and create an intermodal system that can stand comparison, at least in terms of functional equivalence but ideally in terms of standards of comfort too.

The prerequisite for an intermodal transport system is a very well-developed public-transport network which would serve as the backbone of the system and would be supplemented by other facilities designed to enhance individual mobility, such as car-sharing and bicycle hire. The aim, in other words, is to develop *innovative approaches to public transport* in conurbations, especially the most densely populated areas where traffic-related problems, such as atmospheric pollution, noise and congestion, are greatest. It remains a priority political task to guarantee the funding of a modern and flexible system of public transport. Proactive spatial planning and urban-development policies must restore the appeal of inner cities as places to live.

A cost-effective and very efficient approach is the *promotion of bicycle and pedestrian traffic*. Half of all car journeys in the EU are shorter than five kilometres, and one in ten is shorter than a kilometre. A large percentage of these journeys could be made by bicycle or on foot. This would save a great deal of fuel and hence cut CO_2 emissions, because cold starts mean double fuel consumption in summer and even triple consumption in winter as well as the corresponding emission volumes. Taking Germany as an example, even if only 30% of car journeys below six kilometres were

[26] Source: M. Cramer, *Fahrradnutzung in Europa*, 2006, p. 2 (http://www2.michael-cramer.de/uploads/EU-Radverkehrspolitik.doc) (in German).

replaced by bicycle trips, this would lead to a 4% reduction in CO_2 emissions from road traffic.[27]

All-in-one intermodal travel-pass cards, such as the German *MobilCard*, are an important tangible symbol of a coordinated multimodal approach to transport. A successful example of such a scheme, entitled *HANNOVERMobil*, was launched in the city of Hanover in November 2004. In the medium term, such card systems should be rolled out across Europe, providing people with the widest possible selection of transport options (bus, suburban train, inter-city train, aircraft, taxi, car-sharing, car rental, bicycle hire, etc.). Innovative pricing models are also needed for these systems to ensure that a charge is only incurred if the selected means of transport is actually used. Instead of the system used in local public transport networks in which tickets or travel cards are bought in advance and are valid for a specific period, *MobilCard* holders receive variable invoices based on the best available prices for the services they have used.

The German rail operator Deutsche Bahn AG is preparing to become the first national mobility provider in Germany by offering its passengers the opportunity to buy a rail ticket, known as a *CityTicket*, which entitles them to travel on from the station to their final destination free of charge by urban transport, or to use its own additional mobility services, *DB Carsharing* and *Call a Bike* – an innovative approach to bicycle hire.[28]

Another key element takes the form of *multimodal information systems*. Third-generation mobile telephony (UMTS) opens up new possibilities in this sphere, because it will facilitate the widespread use of portable navigation systems for bus and train passengers, who can obtain reliable and fast information on the best route at all times.

Among the advantages of such technological aids is that they make public transport, for example, a practical option for new user groups to whom it has hitherto been theoretically available but who have tended not to consider using it. Real-time information in mobile terminal equipment in the hands of passengers or on displays at stations and bus or tram stops also provide reliability. Irrespective of what the timetable may say, the display will 'keep its promise' if it indicates, for example, that the tram or bus will arrive in three minutes.

The EU can and must support this development by such means as the establishment of the global navigation-satellite system Galileo. There is also a need, however, for targeted EU support for demonstration and pilot projects relating to the use of these ICT applications in intermodal passenger transport.

Creating links and interfaces between modes of transport is not only a matter of better information but also requires the removal of physical barriers for people with reduced mobility, such as wheelchair users, parents with prams and people with disabilities. In addition, information systems must be available for those who do not

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[27] Figures as published in JEGTE, 2006, p. 46.

[28] *Call a Bike* is available in the inner city in Berlin, Munich, Frankfurt am Main and Cologne. Unlike other bicycle-hire systems, it allows hirers to leave their bikes next to any road junction within a certain area. Hirers open the bicycle lock by entering a code, which is communicated to them by mobile phone (see also www.callabike.de).

have a mobile phone or who cannot use such technology; these systems should include personal service at railway stations, easily readable and comprehensible ticket machines and unambiguous signposting systems. This is especially important in the light of demographic trends in Europe.[29]

The European standardisation of information systems for passengers is an important task for the future. If people have to learn how to use the local transport system in every new city they visit, and if transport systems are not easily understood by strangers, many of them will opt to travel by car and be guided to their destination by the on-board navigation systems that are already in fairly common use. For this reason public transport needs a user interface that is simple and standardised in the same way as traffic signs on our roads. What has already become possible through the definition of passengers' rights should be extended to the important domain of customer information. In the initial stages, however, it can only be a matter of additional information systems designed to prevent the exclusion of user groups with no knowledge of information technology.

Parking regulations in many cities have made people switch to public transport, because daytime parking charges have become too expensive for those who work in city-centre locations. These charges, however, are still far too low in many cases. In American cities such as New York and Chicago, motorists often have to pay eight dollars to park for half an hour and 20 dollars or more to park for the whole day – a nightmare for European motorists which has not only become reality in the United States but is also accepted.

Various cities in the world have experienced great improvements in inner-city traffic management by introducing congestion charging, whereby motorists driving into the central area of the city are required to pay a toll. In London, for example, the number of cars in the central charging zone – which is to be considerably extended – has fallen by 30%, and accidents are down by 20%. Initial reports from Stockholm, where congestion charging was introduced on 1 January 2006, indicate a 25% drop in the volume of traffic, suggesting that the effect will be similar there. There has been a corresponding increase in the percentage of travellers using public transport, which the revenue from congestion charges will be used primarily to develop and modernise. Inner-city congestion charging has proved itself in the face of initial acceptance problems, and the spectre of desolate city centres that some people feared has not materialised. On the contrary, the quality of life has improved conspicuously in these inner cities, which are now more pleasant places to live in and visit – and the business community, incidentally, has benefited too.

It is certainly true that the London and Stockholm models cannot be duplicated exactly in every European city. A major obstacle to their transferability lies in the technology, which is still very expensive, whereby vehicles are captured on video as they enter the city centre. This makes the system costs for the introduction of congestion charging very high. This is why it is more practical to introduce a European toll service in accordance with the original proposal for a Directive on the interoperability of electronic road-toll systems presented by the European Commission (COM(2003)

[29] In Eurostat's baseline scenario for the 25-member EU, it is assumed that the number of elderly people (aged 65-79) will rise by 44.1% between 2005 and 2050, while the number of very elderly people (aged 80 and over) will increase by no less than 180.5%. See COM(2005) 94: Green Paper entitled *Confronting demographic change: a new solidarity between the generations*, 16 March 2005, p. 5.

132 final), which set out technical conditions for the creation of a universally applicable system of toll collection (‘one contract per customer, one box per vehicle’) that would also apply to congestion-charging systems.

(B 2) **On the way to a zero-emission car, pressure and support are needed for technological innovations in order to further improve conventional propulsion technology and to develop and apply new forms of propulsion technology based on renewables.**

Although the environmental efficiency of vehicle technology has been distinctly improved in recent years, there has been far too little progress in relation to what is actually needed to stabilise the volume of CO_2 emissions produced by the entire fleet of vehicles on Europe’s roads and to reduce it in the medium term. At the same time, some European car manufacturers are highly successful global exporters. If we look at the newly industrialised countries, particularly China and India, in which motorisation is still in its infancy, it almost seems as though the age of mass car ownership has only just begun.

This development presents Europe and its highly advanced car industry with opportunities as well as risks. The thorny question about the future of the motor car in the context of a rapidly growing global vehicle market accompanied by dwindling oil reserves, however, has not yet been addressed with sufficient honesty by European car manufacturers. The scale of the challenge is still being played down.

Over the last few years, major manufacturers have repeatedly invoked fuel-cell technology, which, they allege, will soon be marketable and will then help the newly industrialised countries to become motorised. The vision of a technological quantum leap, however, in which one stage of technological development is bypassed, so to speak, is unrealistic. The fact is that the motorisation of the newly industrialised countries is largely taking place on the basis of the conventional combustion engine.

In this age of globalisation, the sunrise markets will be captured by those who can offer innovative developments today to meet the challenges of tomorrow. We firmly believe that the European car industry possesses the engineering know-how and the capital to sustain its technological edge by means of green innovations. If the bulk of the cars and mobility systems of the future are developed and built in Europe, the prospects will be good for the future of the European car industry and for jobs in that industry. Conversely, if technological solutions are not found to drastically reduce dependence on mineral oil, there will be grounds for concern about Europe’s export prospects and hence its future as a centre of car manufacturing.

The main legitimate concern about the European car industry is that it was caught napping by what is perhaps the most important innovation in propulsion technology in the last 40 years, namely the hybrid engine. In this area of the market the Japanese are at least five years ahead of us. This damages the market prospects of European manufacturers as well as denting their image.

For environmental reasons and for the sake of Europe’s role as a car-manufacturing location and the jobs the industry provides, it is therefore imperative to pursue systematically the efforts to increase the environmental efficiency of cars and to harness all our present and future potential for that purpose. The fields in which innovations are possible and the measures that can be taken can only be sketched out here.

They are presented in detail in the *Green Car Paper* produced by the Green Group in the German Bundestag.[30]

- In the short and medium term there is still great scope for the ***improvement of conventional propulsion technology***. For example, *common-rail engines* for diesel vehicles and *direct fuel injection* in petrol engines in conjunction with *twin-clutch gearboxes* prevent power interruption during gear changes and therefore enable drivers to achieve considerably greater fuel economy. *Variable displacement*, i.e. automatic deactivation of some cylinders when less engine power is needed, also saves fuel.

- ***New synthetic fuels***, which can also be obtained from biomass, will make it possible in future to combine the benefits of petrol and diesel engines in a combined combustion engine (homogeneous charge compression ignition (HCCI) technology). This nips pollutant emission in the bud during the combustion process and offers considerably greater fuel economy.

- Huge efficiency gains are possible with ***hybrid vehicles***. These combine an electric motor with an internal-combustion engine. In the *full hybrid*,[31] the electric motor does the basic work, which means that the car can be driven in city traffic, for instance, with zero emissions. This also helps to reduce traffic noise, since electric motors are considerably quieter than combustion engines. For faster acceleration and at higher speeds the combustion engine is activated too, and it also recharges the batteries for the electric motor. Kinetic energy from the regenerative brakes is also recycled to the batteries.

- Hybrid vehicles, the market potential of which is expected to grow in the coming years,[32] also point the way towards a switch to ***fuel cells***. These have the potential to replace the internal-combustion engine altogether, thereby effecting a revolution in vehicle propulsion. This form of propulsion, however, will only maximise its environmental potential if hydrogen can be extracted from renewable sources. Even before that happens, there are numerous other problems to solve. These can be summarised under the following headings: durability, utilisation under extreme temperatures and cost. Moreover, there is no storage technology yet for hydrogen as a reactant in fuel cells that avoids heavy energy losses resulting from cooling to extremely low temperatures or from very high tank-filling pressure. Once these problems are solved – and experts currently agree that they can be solved – fuel cells will prove superior to the internal-combustion engine, because they convert a far higher percentage of primary energy into kinetic energy rather than waste heat.

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[30] A. Schmidt *et al.*, *Green Car Paper. Herausforderungen, Innovationsfelder, Maßnahmen und Potenziale einer grünen Automobilstrategie*, Berlin, 2 February 2005 (http://www.gruene-bundestag.de/cms/verkehr_bau/dok/57/57235.htm) (in German).

[31] As an alternative to the full hybrid, increasing use will be made of *mild-hybrid technology*. This essentially involves a combination of a starter and dynamo in the form of an integrated starter-generator (ISG). An automatic start-stop mechanism ensures that the combustion engine is turned off as soon as the car comes to a halt and automatically starts again when the footbrake is released. A regenerative braking system also converts the kinetic energy used in braking into reusable electrical energy. Consumption reductions of up to 15% can be achieved with this technology, which is an especially interesting option for small cars.

[32] The management consultants Frost & Sullivan assume that all major car manufacturers will be offering hybrid vehicles in the near future. They predict that, of the new cars registered in Europe in 2010, 450 000 will be based on hybrid technology. German automotive expert Ferdinand Dudenhöffer even expects that there will be a million hybrid vehicles a year in Western Europe by 2015.

- A ***visionary potential future innovation*** is the development of *solar car paints*. DaimlerChrysler and Volkswagen are conducting nanotechnology-based research into such paints, which would serve as semiconductors, with the result that the entire exposed bodywork surfaces of vehicles could be used to generate electricity, which could then be stored in batteries in hybrid vehicles, for example. Researchers believe that this could save half a litre of fuel per 100 kilometres.

- Several car manufacturers are working on energy recovery from waste heat in engines, either through the conversion of heat into electrical power (***thermoelectricity***) or through the application of high pressure to steam produced by waste heat in expansion machines linked to the crankshaft. A device known as the *turbosteamer* and based on this technology is being developed by BMW and is said to achieve fuel savings of up to 15%.

The fuel consumption of a vehicle depends to a great extent on its weight. A 100-kilogramme reduction in the weight of a car can save up to half a litre of fuel per 100 kilometres. The constant addition of new electronic components, particularly in connection with safety technology, as well as new features designed to enhance passenger comfort have steadily increased the weight of vehicles in spite of past reductions in bodywork weight. This is also a problem for hybrid vehicles with their 'double' set of technological equipment. The weight of passenger cars in Europe has risen by an average of 30% over the past 30 years. The addition of one weight factor tends to have a knock-on effect. The weight added by the incorporation of safety systems necessitates the installation of stronger, and hence heavier, engines, which leads in turn to an upgrading of the safety technology. Moreover, the trend among wealthy customers is for increasingly big and heavy cars. The conflict of aims between more and more safety technology, with its weight implications, and the general reduction of car weights can be resolved if new lightweight construction materials establish themselves in the market.

New weight-reducing construction methods will be introduced when fuel cells replace internal-combustion engines as propulsion systems – in the form of decentralised wheel-hub motors, for example – and when mechanical components are replaced by electronic components (*drive-by-wire systems*). From prototypes of such vehicles – the AUTOnomy 2004 from General Motors and Toyota's Fine T 2006 – it is also apparent that a reduction of vehicle weight can lead to a further reduction in engine weight through downsizing, thereby reversing the present trend in car manufacture. This can be done without compromising on safety, because materials such as carbon-fibre-reinforced plastic (CFRP) and natural-fibre composites are considerably more rigid than steel but are also considerably lighter.

In the last few years new processes for ***biofuel*** production have been developed in which fuels can be distilled from wood and straw, from entire plants and even from biological residues and waste. Biogenic fuels generally have no net climatic impact, because they only release as much CO_2 in the incineration process as the plants have absorbed from the atmosphere. On the other hand, the energy balance sheet of the production process (input of chemical fertilisers, use of machinery and transport to fuel-production facilities) plays a crucial role in the environmental assessment of new fuels.

The EU has set a reference value for the market quota for biofuels of 2% by 2005, 5.75% by 2010 and 8% by 2020.[33] Since the final figure for 2005 is likely to be 1.4%, which falls short of the first intermediate target, the Commission plans to introduce national targets for biofuel as a percentage of all marketed fuel, obligations relating to the use of biofuels, and a provision whereby only biofuels produced inside or outside the EU in accordance with minimum sustainability standards are reckonable towards the targets.[34]

New processes and economies of scale will tend to lower the cost of producing biofuels, whereas fossil fuels, because of their limited availability, are tending to become increasingly expensive. It is therefore only a matter of time before biofuels become cheaper to produce than mineral oil. Here too, however, the dictates of environmental policy must apply. The scarcity of mineral oil must not be used to justify the mass clearance of Amazonian rain forests, for example. Biofuels have the potential to create hundreds of thousands of new jobs in agriculture and forestry as well as in distillation plants. Billions of euros that have hitherto been spent on oil imports from crisis-torn regions of the world can be invested in Europe instead, where they will serve, among other things, to strengthen rural areas and enhance regional wealth creation.[35]

It is still too early to estimate the future importance of each of the biofuels. For this reason, various parallel routes must be followed during a transitional period. Biodiesel, bioethanol and biogas are biofuels that are already available today. Synthetic biofuels, obtained by means of a biomass-to-liquid process, are at the development stage.

- *Biodiesel* (chiefly rapeseed methyl ester) is the standard biofuel today and is available throughout Germany. It can be used by vehicles with adapted engine technology. The potential production of biodiesel is limited, however, by the restriction that crop rotation imposes on the cultivation of rape, which is mainly grown for use in biodiesel production. In addition, problems arise when rape is grown as a monoculture or with the aid of chemical fertilisers.

- *Bioethanol* can be produced in either of two ways: from sugar cane, sugar beet and grain or – in newer processes – from cellulose, in other words from materials such as straw and wood. The distillation of bioethanol from sugar plants and grain represents the state of the art, especially in Brazil and the United States. Like biodiesel, bioethanol can be used as an additive and can also be used up to a level of 85% as a petrol substitute (E 85). This, however, can only be done with flexible-fuel engines, which have been on the market in Brazil for several years – some of them, indeed, made by German manufacturers – but are scarcely available in Europe. These engines can take ethanol mixed with petrol in any ratio.

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[33] Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport, Brussels, 8 May 2003.

[34] See the Communication from the Commission on an EU strategy for biofuels, Brussels, 8 February 2006, pp. 8-9.

[35] The international implications of a renewables strategy and in particular the opportunites created by such a strategy for developing and newly industrialised countries are set out in detail in a resolution adopted by the Green Group in the German Bundestag entitled *Weg vom Erdöl – hin zu nachwachsenden Rohstoffen* ('Away from oil – towards regenerative raw materials'): http://www.gruene-fraktion.de/cms/beschluesse/dokbin/48/48208.pdf (in German).

- The use of entire plants is possible in *BTL (biomass-to-liquid) fuels*. In a two-stage process, any form of biomass, from wood residues and straw to whole plants, is converted into a synthetic fuel by means of Fischer-Tropsch synthesis. The trailblazer in the development of BTL fuels is the Choren company from Freiberg in Saxony. BTL is a synthetic fuel which also has particularly good combustion properties. It is considerably less pollutant than fossil fuels, which means that it also permits the development of engines with lower fuel consumption. A production plant with an annual output capacity of 15 000 tonnes of BTL fuel is due to start up in Freiberg in 2007. The company, which cooperates with firms such as DaimlerChrysler, Volkswagen and Shell, has announced plans to establish production capacity for a million tonnes of BTL fuel by 2010. These plans are based on an optimistic assumption, and it seems likely that it will take 15 years for significant BTL capacities to become available. Another advantage of BTL is its synthetic fuel quality, which can serve as the key to the development of low-consumption, low-pollution engine technology (HCCI process; see page 32 above). Even allowing for the energy input involved in the process, initial estimates therefore suggest a very healthy energy balance sheet for BTL fuel.

- *Biogas as a fuel*, also called biomethane, is usable in engines that can run on natural gas. The potential for biogas as a fuel is considerable. The biogas, however, must first be processed, and it must be refined to pipeline quality so that it can be fed into natural-gas grids. This will require grid-transmission laws or the imposition of grid-transmission obligations.

- New biofuels such as BTL or bioethanol from cellulose can produce a great deal of fuel from a relatively small area. The greatest potential for biofuels lies in set-aside areas, which can return to agricultural use after being harvested. For the sake of sustainable forestry, it is also necessary and logical to carry out more thinning of forests and woodland.[36]

Compressed natural gas (CNG) is also set to play an increasingly important role alongside biofuels, but only as a transitional fuel. Natural gas produces about three quarters of the CO_2 produced by petrol. Sulphur dioxide and soot particles are not emitted by CNG combustion. Numerous manufacturers in Europe sell vehicles that run on natural gas. Much of the infrastructure for CNG can subsequently be used for the hydrogen supply system.

The public sector can play a pioneering role in the procurement of clean, green vehicles. To this end, the Commission has presented a proposal (COM(2005) 634 final) for a directive on the promotion of clean road-transport vehicles, which contains an obligation for the public sector to ensure that 25% of the vehicles it procures in a given year are clean vehicles, i.e. vehicles complying with an 'enhanced environmentally friendly vehicle' (EEV) standard. This draft directive, however, which has not yet been adopted by the European Parliament, covers only vehicles weighing 3.5 tonnes or more. Passenger cars and light utility vehicles could be included at a later date.

There is also a need to step up research into efficiency enhancement for conventional engines and into new forms of propulsion technology and new fuels and to set

[36] Biofuels are part of a comprehensive strategy formulated by the Green Group in the German Bundestag for a switch from oil to renewables, which also addresses the problems arising in connection with competing land uses; see the special feature (in German) on the Greens' website at http://www.gruene-bundestag.de/cms/default/rubrik/4/4002.htm.

up demonstration and pilot projects. A large amount of revenue from the European ecotax we have proposed should be made available every year for this purpose.

It must also be made clear, however, that technical means alone will not be enough to stop the present contribution of transport to climate change. For this reason, besides the need to make the aforementioned technical innovations as quickly as possible, there is also a need for a sea change in European transport policy.

(B 3) **There is a need to develop a European strategy for intermodal logistics and to develop combined road, rail and inland waterway transport by means of competition, standardisation and quality assurance.**

On 31 March 2006, the Commission presented a consultation document on logistics for promoting freight intermodality,[37] which was to be followed by a Communication in or before June 2006 and an action plan in 2007. In conformity with the aims set out in the White Paper of 2001, the Commission sees its task as targeted coordination for the purpose of establishing better basic conditions for the development of intermodal logistics solutions.

A European strategy for intermodal logistics with the aim of shifting as much traffic as possible from road to rail or waterway must certainly be one of the European Commission's core projects for the next few years. Today's environmental and climatic challenges can only be met if the growth in freight transport is largely confined to the railways and the share of the freight market accruing to rail starts to grow again.

Important preconditions, such as the fair distribution of the environmental and health costs arising from road transport and investment in the development of Trans-European Networks, which should be reprioritised to make the TEN projects instruments of European unification, have been defined above.

In a parallel effort, the complex processes of intermodal logistics – which, unlike unimodal road transport, always involve at least one and usually two trans-shipment operations – must be sufficiently improved to make them an attractive proposition for shippers operating on most of Europe's axial routes, as otherwise hardly any freight transport will be shifted off the roads.

If the railways' share of freight business cannot be perceptibly increased, the coming years will see a discussion on whether there is any economic justification for investing billions in the development of rail transport. For this reason alone, a European strategy for intermodal logistics is one of the conditions for the sustainable success of a policy designed to shift freight operations from road to rail and waterway.

The fact that the policy of altering the modal balance of freight traffic is not based on a pipe dream is illustrated by the case of Switzerland, where the population voted in a referendum for all transit traffic to be shifted from road to rail. The latest figures show that two thirds of transalpine traffic in Switzerland is now carried by rail, com-

[37] See http://europa.eu.int/comm/transport/logistics/consultations/doc/2006_03_31_logistics_consultation_paper_en.pdf

pared with only a quarter in Austria. The three-pronged political strategy – an embargo on the construction of new motorways, the introduction of a mileage-based heavy-vehicle levy (LSVA), which costs four times as much as in Germany and twice as much as in Austria and applies to all HGVs on all roads in Switzerland, and the construction of new transalpine rail links with the 35-kilometre (22-mile) Lötschberg Tunnel, due to open in 2007, and the 57-kilometre (35-mile) Gotthard Base Tunnel as the key element, originally scheduled for 2012 and now expected to open in 2016 – will lead to a further considerable shift from road to rail. This will not only have implications in Switzerland but will also affect the access routes in France, Germany and Italy.

Besides the development of the rail and terminal infrastructure, the keys to the success of an intermodal logistics strategy are more competition within Europe's rail system, standardisation of loading units and a high level of quality assurance.

- More *competition* will lead to an expansion of the market in rail freight transport by lowering costs and by making more customised services available. New rail-freight companies have also breathed fresh life into cross-border freight transport by offering one-stop logistics services through subsidiaries in other countries. The German company TX-Logistik, for example, which now has a majority shareholding in Trenitalia, can thus provide transalpine transit services with a punctuality rate of over 90%, according to its own figures, which puts it well above the industry average.[38] Such success can only be achieved, however, if the basic conditions are right. A comparable company in Austria, for example, had to close when the ecopoints system was abolished.

- The lack of *standard loading units* is sometimes a barrier to trans-shipment from haulage vehicles to goods trains. For this reason, the Commission is proposing the introduction of standard European intermodal loading units (EILUs). In addition, semi-trailers must be constructed in such a way that they can be lifted by cranes, so that no problems arise in terminals when they have to be transferred from lorries to goods wagons and *vice versa*.

Within the framework of the European intermodal logistics strategy, programmes such as Marco Polo II must be implemented and even extended where appropriate in order to shift more traffic to the railways.

Other factors besides the proposals outlined above augur well for the transfer of freight traffic from road to rail. Two current trends seem likely to boost the prospects of an accelerated shift in the modal split:

- Since the energy it takes to carry goods by lorry is considerably greater than the energy needed to carry the same goods by rail, and since that energy is almost entirely based on mineral oil and will remain so for the foreseeable future, rising fuel prices will have a disproportionately high impact on road haulage.

- The wage factor in the haulage trade will tend to rise somewhat over the coming years. The social legislation on driving times and rest periods will be tightened, as will its enforcement through the digital tachograph. Provided the

[38] See M. Cordes, 'Privatbahnen machen Dampf', in *Verkehrsrundschau*, 11/2006, pp. 23-24.

Member States are sufficiently diligent in monitoring compliance, road haulage will lose the illegal competitive edge it enjoys over the railways through the dangerous practice of allowing drivers to work overtime.

3 C Political measures relating to pricing

In accordance with the user-pays principle and the principles of cost-covering charging and fair competition, the social costs arising from the various modes of transport must gradually be transferred to their users. To this end, we propose a number of measures, the main one being the introduction of a European climate-protection tax on vehicle and aviation fuel.

(C 1) **A European climate-protection tax on aviation fuel should be introduced; revenue should be used primarily for transport projects designed to promote European unification, with the emphasis on international rail links.**

The price of air and road transport today does not reflect environmental reality because the **social costs** (the cost of accidents and invalidity, the cost of medical treatment and incapacitation, pension payments, rent reductions resulting from road-traffic noise, etc.) are not factored into the prices we pay but are borne by society at large. In Germany, for example, every car is indirectly subsidised by the taxpayer to the tune of €3 000 a year, according to a study conducted by the Environment and Forecasting Institute UPI in Heidelberg. This, in fact, is a conservative estimate, which does not include the costs arising from global factors such as climate-related disasters and the hole in the ozone layer.

Moreover, **selective tax subsidies**, particularly for air travel, distort competition between modes of transport, to the detriment of the more environment-friendly rail transport. Passenger and cargo flights today are not subject to excise duty on aviation fuel (kerosene tax), whereas fuel used in rail transport is dutiable, and cross-border flights are VAT-exempt into the bargain. Furthermore, in many EU Member States, the railway system is subject to user charges, such as track-access charges, which apply to all routes and trains, whereas for its competitor, road freight, such charges only apply to lorries weighing over 12 tonnes driving on motorways. It is hardly surprising that a shift is now taking place in road haulage from large to small HGVs and from motorways to major roads. And although the common rules on charges for heavy goods vehicles allow Member States to levy charges on all HGVs and all roads, they are not exercising this option. Switzerland shows how this can be done. In Switzerland, tolls are four times higher than in Germany and apply to all roads and all HGVs. This has demonstrably resulted in a shift from road to rail.

In order to correct this distortion of competition in the transport market and reflect the true cost of transport, we advocate the **introduction of a European climate-protection tax on aviation fuel (kerosene)** on all domestic and intra-EU flights (with the possibility of exemptions on routes served by non-EU carriers)**.** This revenue is necessary for the funding of measures to combat climate change and for transport projects designed to promote European unification, with the emphasis on international East-West rail links. Priority should be given to modernising existing routes in preference to embarking on costly and time-consuming major projects. This will not

only achieve greater efficiency more quickly; it will also create more jobs than machine-intensive construction projects.

Although the aviation industry may fight tooth and nail to defend its tax privileges, they are objectively unwarranted, historically outdated and environmentally counterproductive. Emissions from aircraft are two to four times more damaging to the climate than the direct impact of CO_2. This has to be factored into all measures, for example through levies based on emissions of nitrogen oxides (NO_x). Appropriate measures are needed, not only to create a level playing field in the transport market but also to give the airlines additional incentives to forge ahead with the development of cleaner and more efficient technology. The Green report of MEP Caroline Lucas on the climate change impact of aviation - adopted with a large majority by the European Parliament in July 2006 - proposes a wide range of measures to deal with the climatic impact of the aviation industry.

A tax on aviation fuel can already be levied in respect of domestic flights under the current European Directive restructuring the Community framework for the taxation of energy products and electricity (2003/96/EC). So far the Netherlands is the only Member State to have introduced such a tax, which is levied at the rate of about €0.20 per litre. Outside the EU, India, Japan and the United States also apply kerosene taxes for domestic flights. If aviation fuel were subject to the prescribed minimum tax rate for mineral oil of €302 per 1 000 litres (i.e. about €0.30 per litre), such a tax would generate **revenue** of about €14 billion a year; if the tax were based on the Dutch rate, it would yield about €9 billion. Applied to the price of a ticket for a 625-mile flight within Europe, this would increase the fare by no more than €8 to €10, a contribution to the cost of minimising the environmental impact of air traffic which would seem affordable for both holidaymakers and business travellers and which must become as much a fact of life as the fuel supplements and charges for enhanced security that have been added to air fares in recent years and, incidentally, have not in any way slackened demand for air transport.

Not least in the aftermath of the hard-won compromise on the Financial Perspective for the EU budgets for the years 2007 to 2013, louder calls have been made for a European tax that would guarantee the European Union its own source of revenue. In the summer of 2004, the Commission presented a proposal for an EU tax,[39] which was initiated under the responsibility of the outgoing Commissioner for Budgets, Michaele Schreyer (Germany, Greens).

Although the move did not initially meet with approval, the picture has changed since the tough financial negotiations of December 2005. Tony Blair, then President-in-Office of the Council, in his concluding report to the European Parliament, called on the Union to examine the possibility of introducing an EU tax. In his inaugural address to the European Parliament, the Austrian President of the Council, Wolfgang Schüssel, expressed support for the introduction of such a tax. The Belgian Prime Minister, Guy Verhofstadt, had already advocated an EU tax in his book, *The United States of Europe – a Manifesto for a New Europe*, published at the end of

[39] Commission of the European Communities, *Financing the European Union – Commission report on the operation of the own-resources system* (COM(2004) 505 final), 14 July 2004.

2005. José Manuel Barroso, President of the European Commission, and Bavarian Premier Edmund Stoiber are both receptive to the idea.[40]

There is, therefore, reason to hope that the funding of the EU could be supplemented in the foreseeable future through the introduction of a European tax in addition to the existing instruments.

In the report presented by the Commission in the summer of 2004, the first option proposed was an EU levy on road-transport fuel and an EU levy on aviation fuel. The argument advanced for the EU road-fuel levy at the time, which remains plausible today, was that there was already a Directive on the taxation of energy products which prescribed minimum rates and was intended to harmonise taxation throughout Europe. An additional argument in favour of a levy on aviation fuel is that European aviation policy is, to a great extent, an integrated transport policy and that the polluter-pays principle cannot be adequately applied in the form of national levies, since aviation emissions do not stop at national borders.

The introduction of a European climate-protection tax would not distort competition within the Union either, as it would affect all Member States to the same extent. Moreover, the environmental steering effect of an accelerated substitution of oil imports would bring about a lasting improvement in Europe's competitiveness in sunrise markets.

At the same time the minimum rate of excise duty on fuels, which presently stands at about €0.30 per litre, should be increased by 5% each year in the framework of a phased plan. Countries with low rates of excise duty, some of which – Luxembourg, for example – attract considerable volumes of petrol-pump tourism, would thereby be compelled to fall into line with European taxation standards.

[40] A very instructive contribution to this debate was made by Matthias Belafi's article 'Eine Steuer für Europa? Konzepte steuerbasierter Direktfinanzierung der Europäischen Union', in Bertelsmann Forschungsgruppe Politik, *CAP Aktuell*, No 2, March 2006 (available in German at http://www.cap-lmu.de/download/CAP-Aktuell-2006-02.pdf).

Final energy consumption by sector 2003 (in million tonnes of oil equivalent)										
	All sectors	**Industry**	**Households, services, etc.**	***- Households***	***- Services***	**Transport**	***- Road***	***- Rail***	***- Air***	***- Inland waterway***
EU25	**1 129**	316	469	300	129	343	***284***	9	***45***	6
EU15	**1 002**	277	408	262	113	317	***260***	7	***43***	6
Belgium	**38.1**	13.3	14.6	9.9	3.8	10.1	***8.2***	0.2	***1.5***	0.3
Czech Republic	**25.5**	9.6	10.1	6.0	3.5	5.8	***5.3***	0.3	***0.3***	0.0
Denmark	**15.0**	2.9	7.2	4.3	2.0	4.9	***3.9***	0.1	***0.8***	0.1
Germany	**230.4**	58.7	109.6	76.9	24.0	62.2	***52.9***	1.9	***7.2***	0.2
Estonia	**2.7**	0.6	1.4	1.0	0.3	0.6	***0.6***	0.1	***0.0***	0.0
Greece	**20.5**	4.3	8.4	5.4	1.7	7.8	***6.0***	0.1	***1.2***	0.6
Spain	**89.7**	29.3	23.7	13.7	7.0	36.7	***29.7***	1.0	***4.5***	1.5
France	**158.0**	37.4	69.4	41.1	24.9	51.3	***42.7***	1.3	***6.5***	0.8
Ireland	**11.3**	1.9	4.9	2.6	1.7	4.4	***3.6***	0.0	***0.8***	0.0
Italy	**130.2**	40.7	46.5	29.4	13.5	43.0	***38.2***	0.9	***3.6***	0.3
Cyprus	**1.8**	0.4	0.4	0.2	0.1	1.0	***0-9***	-	***0.3***	-
Latvia	**3.7**	0.7	2.1	1.5	0.6	0.9	***0.8***	0.1	***0.0***	0.0
Lithuania	**4.0**	0.8	2.0	1.4	0.5	1.2	***1.1***	0.1	***0.0***	0.0
Luxembourg	**3.9**	0.9	0.7	0.6	0.1	2.3	***1.9***	0.0	***0.4***	
Hungary	**17.6**	3.5	10.4	6.6	3.1	3.6	***3.2***	0.2	***0.2***	0.0
Malta	**0.5**	0.0	0.1	0.1	0.1	0.3	***0.2***	-	***0.1***	-
Netherlands	**51.6**	14.3	22.6	10.5	7.6	14.7	***10.9***	0.2	***3.3***	0.3
Austria	**25.5**	7.4	10.8	7.3	2.8	7.4	***6.6***	0.3	***0.5***	0.0
Poland	**55.6**	17.1	28.3	17.7	6.2	10.2	***9.4***	0.5	***0.3***	0.0
Portugal	**18.3**	5.7	5.6	3.1	2.0	7.1	***6.2***	0.1	***0.8***	0.1
Slovenia	**4.7**	1.6	1.8	1.2	0.2	1.3	***1.3***	0.0	***0.0***	-
Slovakia	**11.0**	5.1	4.2	2.8	1.1	1.7	***1.6***	0.1	***0.0***	
Finland	**25.7**	12.2	8.8	5.2	1.7	4.6	***3.9***	0.1	***0.5***	0.2
Sweden	**33.8**	12.7	13.0	7.7	4.7	8.1	***7.0***	0.3	***0.7***	0.2
UK	**150.1**	35.3	62.6	44.1	15.9	52.2	***38.9***	1.1	***11.1***	1.1

Source: Eurostat

FIGURE 4: **Final energy consumption in Europe by sector, 2003**

Such a European climate-protection tax would have no net impact on competition. The bulk of the tax revenue would probably come from the countries of Western Europe, whereas the rest of the EU, and particularly the new Member States, would only contribute a small percentage on account of their limited volumes of traffic. The

energy consumption ascribable to road transport in the ten newly acceded countries, at 24 million tonnes of oil equivalent, does not even constitute 10% of the total consumption of the 25 Member States; in the case of aviation fuel, the new Member States' consumption was only two million tonnes of oil equivalent, which is only about 5% of aggregate consumption in all 25 Member States.

The expenditure priority should be the urgently needed increase in funding for the trans-European transport networks, which, as recently as March 2006, had their budget slashed to a third of the proposed allocation for the period from 2007 to 2013, which leaves only €7.2 billion available (see pages 47-48 below). **At the same time, priority should be given to the modernisation of existing lines.**

Furthermore, this extra revenue in the Community budget should also be used to fund additional political action to provide support and promote research in the field of transport as outlined on pages 27 *et seq.* above. The agreement of the peripheral Member States, which fear that the taxation of energy will be economically damaging to them because of the greater distances to their export markets, could be more easily secured if they – and particularly the Member States in Central and Eastern Europe – were to be connected to the European transport network and thereby brought closer to the heart of Europe more quickly.

(C 2) **Road tax for passenger cars and light utility vehicles should be assessed in all Member States on the basis of fuel consumption and hence CO_2 emissions.**

A CO_2-based vehicle excise duty (road tax) in the Member States has also been mooted by the Commission in a proposal for a directive on the standardisation of road tax. As part of this shift in the basis of assessment, the initial registration taxes levied in some EU countries would be abolished and incorporated into the road tax.

We support the proposal in principle. If CO_2, emissions, and hence fuel consumption, become the assessment basis for road tax, a twofold benefit can be expected to accrue: more car buyers will opt for low-energy models, which will accelerate the overall reduction of fuel consumption as well as helping to protect the climate. A study conducted for the European Commission's Directorate-General for the Environment has shown that the introduction of a CO_2-based road tax in Germany would have brought a 6% reduction in consumption by 2008. Car-owners can also be expected to replace their old vehicles more quickly, which would speed up the modernisation of the vehicle fleet, thereby enhancing road safety and benefiting the car industry.

For all the great successes in the realm of air-quality management, the steering effect of differentiated taxation based on the European pollutant standards must not be downplayed, and the new road tax should maintain that differentiation. Considerably more road tax should be payable for old bangers that belch out fumes than for modern environment-friendly vehicles.

We also advocate the taxation of light utility vehicles throughout Europe on the basis of CO_2 levels. On the other hand, we do not believe that general compulsory abolition of the initial registration tax by virtue of EU law, which the Commission also proposes in its draft directive, serves any useful purpose, since this type of tax has beneficial effects in some countries. In Denmark, for example, it has evidently helped to keep car-ownership rates considerably lower than in neighbouring countries, despite a

high general standard of living. Member States should therefore have the option of retaining initial registration taxes.

Contribution to the reduction of CO_2 emissions from transport operations: high

(C 3) **We want an increase in European HGV tolls based on the polluter-pays principle, with the social cost of road haulage factored into the charges, reduction of the liability threshold to 3.5 tonnes and gradual extension of the toll system to the entire road network.**

The EU Directive on the charging of heavy goods vehicles for the use of certain infrastructures has just been revised. It creates the conditions for the levying of HGV tolls on Europe's roads. The amount of the HGV toll varies widely from country to country. The highest tolls are levied in a non-EU country, Switzerland, where the charge works out at about €0.49 per kilometre.

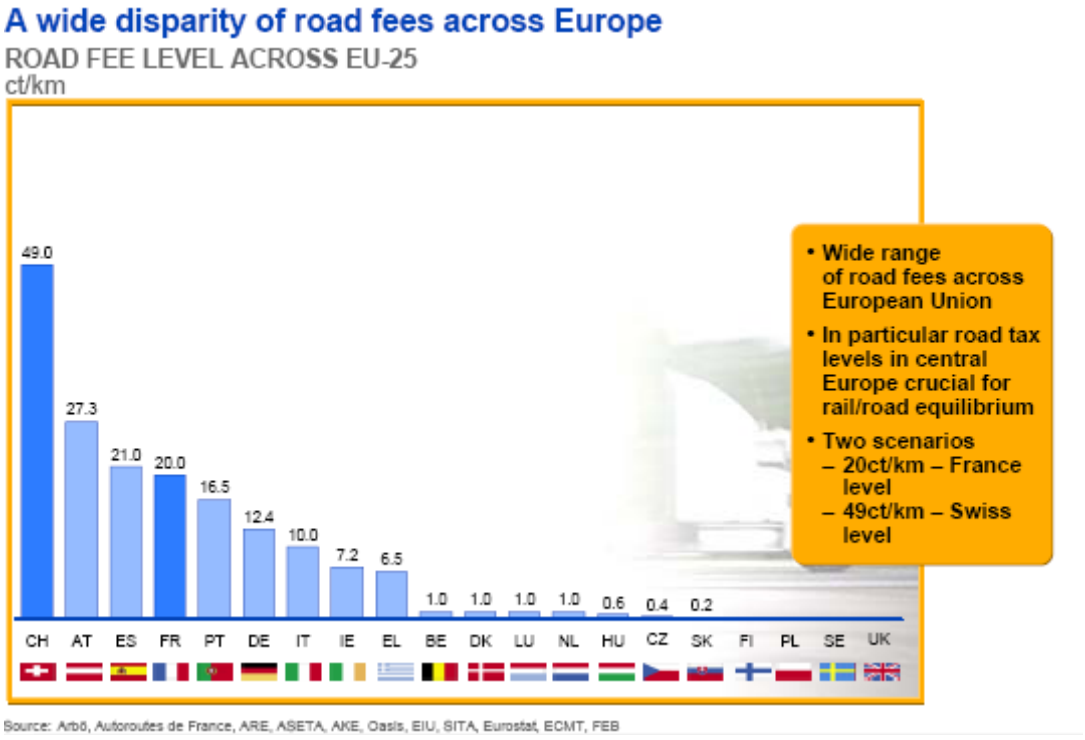

FIGURE 5: **HGV tolls across Europe in cents per kilometre.**

Source: McKinsey, 2005

Following the agreement between the Council and the Commission, the new version of the Directive does provide for some improvements, but these are outweighed by detrimental provisions. The instrument certainly continues to fall far short of what the European Parliament wanted and had voted for, such as the inclusion of social costs as a 60% supplement over and above the amount charged to cover infrastructure costs.

Among the improvements is the possibility of extending HGV tolls to the entire road network, as is the case in Switzerland. In addition, tolls can now be imposed on goods vehicles weighing 3.5 tonnes or more. The fact that this is only an option and not an obligation is due, we regret to say, to the intervention of the German Minister

of Transport, Wolfgang Tiefensee. We welcome the authorisation to levy supplements in environmentally sensitive regions, although the permissible level is too low to have a deterrent effect and does not even match the existing toll levels for transalpine road traffic in Austria and Switzerland.

Another black mark is the fact that social costs arising from the adverse impact of road haulage on public health and the environment have not been factored into the calculation of the permissible toll level. Although the Committee on Transport and Tourism of the European Parliament had agreed to accept a 60% environmental supplement to the toll if no other calculation method were presented within five years, this compromise did not attract majority support in the plenary chamber. Parliament merely agreed that the Commission should present a proposal within the next two years as to how the social costs could be factored in. This means, for example, that the amount of the toll in Germany cannot be increased above 15 cents per kilometre. This arrangement sees the EU fall far short of the spirit and letter of the Commission's White Paper of 1998 on fair payment for infrastructure use, the core substance of which was reaffirmed in the White Paper on European transport policy for 2010, which was presented in 2001 and remains valid today. Those White Papers clearly and unmistakably proclaim the objective of ensuring that the social costs arising from haulage operations are the responsibility of hauliers. The new version of the Directive on HGV tolls does at least enable Member States to extend the tolls to all heavy goods vehicles and all roads. The only limitation is on the amount of the toll, a restriction we regret. The scope for surcharges in sensitive areas (up to 15%) and mountainous regions (up to 25%) and in heavily congested cities is too minimal to change transport patterns.

The current European compromise on HGV tolls will continue to apply for the next few years. Until another revised Directive can enter into force, it is essential to ensure that the following minimum requirements are met:

1. All Member States that have not already done so should introduce an HGV toll based on distance travelled and emission levels.

2. In accordance with the Swiss model, the toll should be chargeable for the entire road network, not just for motorway use. Tolls for the network of subordinate roads should be higher in order to concentrate as much of the heavy goods traffic as possible on the motorways.

3. All vehicles weighing 3.5 tonnes or over should be liable for tolls, particularly to close any loopholes that might result from the lowering of the weight threshold from 12 tonnes.

4. Toll rates should be differentiated according to the sensitivity level of the region, the emission category of the vehicle and possibly also the time of day or night. A charge that is increased to take account of these factors will promote a shift in the modal balance from road to rail and, as is currently observable in Germany, will accelerate the replacement of the HGV fleet with vehicles that meet the latest environmental standards.

Where these measures do not suffice to reduce the harmful effects of transport to a level at which they will not adversely affect public health, there may be a need to impose traffic restrictions to protect the health of the population, such as temporary or graduated prohibitions of vehicular traffic when there are high levels of pollution in

sensitive areas and conurbations, block admission systems for HGVs (such as the drip-feed system used for tunnels in Switzerland) or upper limits on vehicle numbers, especially for HGVs, in particular regions.

When the Directive on the charging of HGVs is next revised, which should be done by 2008 at the latest, the following objectives must be pursued:

1. the full cost of damage to public health and the environment should be factored into the calculation of toll levels; the 60% addition proposed by the Transport Committee of the European Parliament represents an absolute minimum;

2. compulsory introduction of HGV tolls on the entire road network of all EU Member States after a transitional period;

3. compulsory introduction of HGV tolls from a weight threshold of 3.5 tonnes with no loopholes;

4. additional higher surcharges for environmentally sensitive regions;

5. introduction of a minimum rate for HGV tolls in Member States.

The purpose of tightening the rules on HGV tolls is to enable the railways to become far more competitive, so that more freight traffic can be shifted from road to rail. In this respect, a recent McKinsey study for the Community of European Railway and Infrastructure Companies (CER) does not paint a very optimistic picture. It concludes that the introduction throughout Europe of the Swiss toll rate for HGVs and a successful restructuring of Europe's railways would only increase the railways' share of the freight market in the 15 older EU Member States to 16 or 17%, compared with the 2003 level of 14%. If the level of tolls remained at the present European average, the McKinsey study found that, even if they were successfully restructured, the railways' share of the market would plummet to about 8-10%. This would put an extra 20 000 to 30 000 large HGVs on Europe's roads.[41]

Contribution to the reduction of CO_2 emissions from transport operations: high

(C 4) **Air and sea transport must be included in CO_2 emissions trading under Kyoto II. Tax privileges, subsidies and grants, including those for inland waterway transport, must be eliminated.**

Air and sea transport are the fastest-growing modes of transport in global terms, and yet they have hitherto been exempted from any obligation to reduce greenhouse-gas emissions, since they are not covered by the Kyoto Protocol. All transport operations – especially air and sea transport – **must be included in CO_2 emissions trading**

[41] A presentation of the McKinsey study for the European Parliament is accessible at http://www.cer.be/files/McKinseyFINAL-164934A.pdf

under Kyoto II to rectify this omission. There is no long-term justification for tax privileges, subsidies and grants, not even for inland waterway transport. The air-transport industry has even shown a degree of sympathy for the inclusion of air transport in emissions trading, particularly in the United Kingdom.

This measure can only be effective if initial certification depends on the total volume of emissions. On no account should it be misused as a substitute for the long-overdue excise duty on aviation fuel.

The airlines' enthusiasm for emissions trading stems from their expectation that it will do little to hinder their continued growth. Airlines must be forced to compete among themselves for limited emission rights, ideally through a sectoral allocation scheme of their own.

Since many of the international airlines and shipping lines can no longer be assigned to a particular country of origin, their emissions should be calculated separately from the national quotas. Reduction targets should be set for each airline or shipping line, along with negligibility thresholds.[42]

An alternative model involving the levying of charges for the use of common global assets ('global commons') was developed by the German Advisory Council on Global Change in a special report it presented in 2002.[43] In particular, the report proposed the introduction of user charges for international airspace and the high seas, the revenue from which would be ringfenced for the protection of these common global assets and especially of the global climate. The International Maritime Organization (IMO) has already enacted guidelines for the indexing of CO_2 emissions, although these are voluntary and are only intended at the present time for use in trials.[44]

The *excise duty on aviation fuel (kerosene tax)* should be levied in the framework of the climate-protection tax we have proposed (see pages 38 *et seq.*). Another important step towards the elimination of subsidies is the introduction throughout Europe of VAT on cross-border air transport along with an obligation to levy VAT on domestic flights for those Member States which do not already do so.

We believe that a *tax on air tickets*, which France will introduce on 1 July 2006 and to which other states, including the United Kingdom, have committed themselves, is a good means of increasing public development aid to 0.7% of GDP, as promised in the phased plan adopted by the EU Member States in May 2005. This tax should be regarded as complementary to the inclusion of air transport in emissions trading, which is an essential instrument of climate-protection policy, and to the introduction of a tax on aviation fuel, a long-overdue measure in the field of competition policy.

Contribution to the reduction of CO_2 emissions from transport operations: high

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[42] CO_2 reduction targets in the realm of sea transport would be another argument for the use of new energy-saving technology. A German company, for example, has developed a fully automatic towing-kite propulsion system with which the fuel consumption of cargo ships can be reduced by an average of 10-35% and even by up to 50% in ideal wind conditions. The first commercial cargo ship equipped with this system will put to sea in 2007 (see www.skysails.info/index.php?L=1).

[43] http://www.wbgu.de/wbgu_pp2002_engl.html

[44] See http://www.imo.org/Newsroom/mainframe.asp?topic_id=233

State aid to seaports and airports should be entirely outlawed by means of an EU directive. At the present time, the northern-range ports of Antwerp, Rotterdam, Amsterdam, Bremerhaven and Hamburg are being massively subsidised because they are competing with each other. The result is that the port dues and charges in these ports come nowhere near covering their running costs. They are extremely low by international standards too, amounting to only about 30% of the charges levied by the Port of Singapore, for example.

Regional airports in particular benefit in many ways from subsidies, which are also contributing to the boom in low-cost air travel. These must also be prohibited by new state-aid legislation.

Contribution to the reduction of CO_2 emissions from transport operations: medium

Inland waterway transport in Europe has never been liable for excise duty on mineral oil. This tax concession should also be withdrawn, although this would entail the amendment of international agreements such as the Mannheim Convention for Rhine Navigation.

3 D Infrastructure measures

Investments in the creation of new infrastructure or upgrading of infrastructure can also be counterproductive in terms of their contribution to protecting the global climate. It is an established fact, for example, that new routes also generate new traffic, because they remove the barrier of geographical distance. The high-speed rail line between Paris and London, for example, not only attracts travellers away from the roads and the airlines but also makes it possible for people working in London to live in Paris and *vice versa*.

The crucial point is therefore the nature of the infrastructure measures that are taken. Because of the time factor, among other things, priority should be given to organisational and technical measures that speed up processes, increase capacity and, not least, enhance customer satisfaction rather than to the construction of costly new 'hard' infrastructure.

(D 1) **Trans-European transport network (TEN-T) projects must be reviewed as to their contribution to European unification and be supplemented by a new support project for the development of intermodal terminal infrastructure.**

The trans-European transport networks are still based in some cases on the pursuit of the wrong priorities; above all, they are hopelessly underfunded.

We advocate a new prioritisation of TEN transport projects to put the main emphasis on projects that promote European unification, especially those that serve to provide rail links between the old and new Member States.

To fund these unifying projects we propose the introduction of a European ecotax (see page 38 above), the great bulk of which should be ringfenced for the construction of these transport networks.

New corridors should not be designated without a detailed strategic environmental assessment of every project as prescribed in the Directive on the assessment of the effects of certain plans and programmes on the environment (Strategic Environmental Assessment (SEA) Directive). An essential part of this process is the assessment of the climatic effects of each new project. New roads could then be approved only if evidence had been produced to show that there was no alternative, such as the upgrading of a rail link or of an existing road. The same principles should apply to part-funding from the EU Structural Funds and the Cohesion Fund.

Top priority on the list of projects should go to those schemes through which bottlenecks can be eliminated. The precept that upgrading existing infrastructure takes precedence over new construction works should apply. Expensive showcase projects that involve large-scale engineering works, such as new tunnels or bridges, must not only be assessed on the basis of construction costs but also on the basis of subsequent maintenance costs. Improvement work on roads and railways also has a far more beneficial effect on jobs, because the contracts are awarded in smaller lots and are generally labour-intensive. It is estimated, for example, that twenty jobs are safeguarded by every kilometre of roadway refurbishment, compared with only four jobs per kilometre for the construction of new roads.

The main purpose of railway infrastructure schemes should be to segregate faster and slower traffic and to make sufficient capacity available for freight traffic.

As a new priority project we propose the development throughout Europe of the terminal infrastructure for intermodal logistics solutions (combined transport). On the basis of the axes carrying the highest volumes of combined traffic, support should be given for road/rail trans-shipment facilities in the form of upgraded or new intermodal terminals as part of TEN-T projects; such support should cover up to 50% of the project costs.

One of the prerequisites for support should be the fact that a high percentage of the competitors in the field intend to use the terminal. On the one hand, this is a clear indication of the commercial viability of infrastructure and prevents misallocations of support funds. On the other hand, such a strategy prevents the sort of structural duplication that occurs when each of the national market leaders, the successor companies of the national railways, funds its own exclusive facility at great expense.

(D 2) **Paradigms for intelligence instead of concrete in transport: improving cross-border rail transport through Europe-wide technological and regulatory harmonisation under the flagship ERTMS/ETCS project is an absolutely paramount priority.**

For decades the railways formed the backbone of the European transport system. If the climate-protection targets for the transport sector are to be achieved, rail must win back parts of the market from road and air transport. Besides the creation of a level playing field, the main requirement is the establishment of a European rail system that is not restricted by waiting times at borders, which have long been a thing of the past in road haulage, and by differing track gauges and train-protection and signalling systems. It is therefore gratifying that a European Railway Agency was set up in Valenciennes in 2004 with the primary task of establishing interoperability between the various national rail networks.

The European Rail Traffic Management System and the European Train Control System (ERTMS/ETCS) form the central flagship project for the technical harmonisation (interoperability) of the European rail system. The essential function of ERTMS/ETCS is to ensure that the same system is used for rail operations throughout Europe and that a single system will one day replace the 20-odd national systems on Europe's main lines. The use of ERTMS/ETCS also serves to optimise the use of infrastructure capacity on busy routes, since the new technology enables trains to run safely at shorter intervals, thereby increasing line capacity by up to 20% without the need to lay a single metre of new track.

Freight transport by rail is five times more climate-friendly than road haulage. Another environmental advantage is electric traction on the railways, which provides scope for greater diversification of energy sources and thus helps to reduce Europe's dependence on oil in the transport sector. We, the Greens in the European Parliament, want to see the electricity for the European rail network being generated from renewable sources one day, which would reduce the net climatic impact of rail transport to zero.

There is enormous untapped potential for a modal switch in the domain of freight transport. Compared with travellers, freight shippers can choose their modes of transport on the basis of far more objective criteria. Whereas the decision to buy a private car severely limits a person's use of other forms of passenger transport, freight services that are superior to road haulage in terms of cost, time and, above all, reliability can induce shippers to switch to rail for their transport operations.

It is therefore a matter of urgency to implement the initiative of the European Parliament and support the establishment of ERTMS on the core European network with the aid of 50% part-funding from the EU budget. At the same time, the introduction of ERTMS must become a precondition for the allocation of TEN funds to projects for the construction or upgrading of railway lines. The report compiled for the European Parliament by its rapporteur, Michael Cramer of the Greens/European Free Alliance Group, on the deployment of the European rail signalling system ERTMS/ETCS (the Cramer report), was adopted by a large parliamentary majority along with the three key amendments inserted by the Committee on Transport and Tourism:

- Financial support from the EU for railway infrastructure projects will only be granted in future if ERTMS is installed.
- The six freight corridors in Europe[45] on which the European railway companies agreed in their memorandum of understanding with the European Commission now have the backing of a large majority of the European Parliament too. The choice of corridors also takes account of East-West links with the new Member States.
- Parliament takes the view 'that for ERTMS at least in "cross-border" areas the maximum aid rate should be set at 50%'.

[45] A: Rotterdam-Genoa, B: Naples-Berlin-Stockholm, C: Antwerp-Basel/Lyon, D: Seville-Lyon-Turin-Trieste-Ljubljana, E: Dresden-Prague-Brno-Vienna-Budapest, F: Duisburg-Berlin-Warsaw

4 Priority measures for a sustainable European mobility policy

There follows a list of the main measures we have proposed in this paper:

1. Introduction of a compulsory ceiling for CO_2 emissions from road traffic. At the same time there should also be binding CO_2 ceilings for new vehicles in each class, based on the 'top-runner' principle.

2. Introduction of a climate-protection tax on aviation fuel (kerosene) throughout Europe

3. Assignment of priority to support measures and research activities in the following areas:
   (1) Intermodal logistics strategy
   (2) Urban mobility projects
   (3) Enhanced technical efficiency of vehicles

4. Extension of HGV tolls to vehicles weighing 3.5 tonnes or more and, gradually, to the entire road network in conjunction with measures to minimise the level of nuisance to those who live or work close to main routes.

5. Inclusion of sea and air transport in Kyoto II.

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