

EU Project on Transport GHG: Routes to 2050?

ACEA comments

ACEA, the European Automotive Manufacturers Association, notes that DG ENV of the Commission is funding the project: *EU Transport GHG: Routes to 2050?*, whose main objective is to consider long-term transport policy framework in view of the need to reduce greenhouse gas (GHG) emissions economy-wide. The project began in December 2008 and will run to March 2010. ACEA assumes that the results of the project will be reflected on the White Paper on Transport Policy that the Commission intends to release in 2010 and welcomes that the transport stakeholders are given the opportunity to comment on the content of the presentations made by the contractors and other guest speakers at the stakeholders meeting that took place on 27 March 2009¹ in Brussels.

ACEA hereby submits to the contractors its contribution to the debate.

Elements to be taken into account when approaching transport GHG emissions

1. How much should the transport sector contribute to CO₂ emissions abatement?

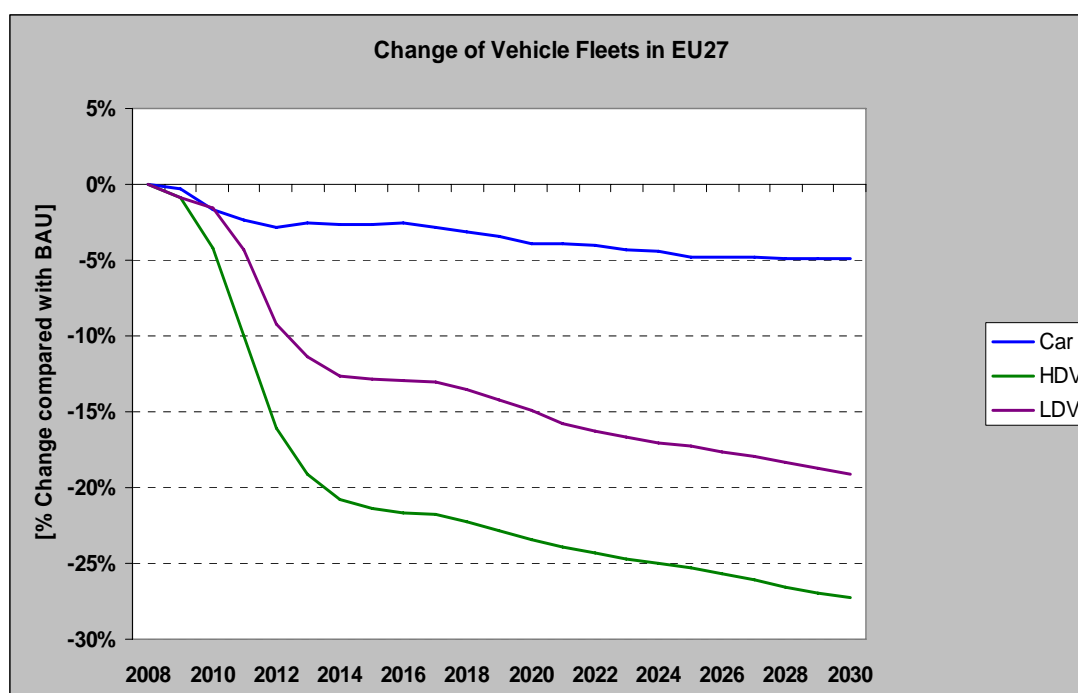
The transport sector accounts for roughly a quarter of total CO₂ emissions from fuel combustion, but absolute CO₂ emissions should not be the primary basis for selecting abatement measures in an economy. **Cost-effectiveness** is the most important factor. Some of the measures already adopted in the road transport sector are very expensive per tonne of CO₂, and some of the lowest cost opportunities for emission reductions in transport have not been exploited so far: better use of CO₂-based taxation for vehicles, support for eco-driving, better road infrastructure and the optimization of freight logistics. Taxation should be EU harmonized to promote fuel efficient vehicles without disrupting achieved dieselization.

¹ www.eutransportghg2050.eu/cms/first-stakeholder

2. The long-term impact of the current economic situation on transport GHG emissions needs further analysis

We are facing an unprecedented crisis that is twofold in nature: financial (a drastically limited access to credit) and economic (a dramatic drop in demand). Four months into the year, the European market of new registrations of PC is down 15.9% compared to the same period in 2008 and European registrations of new CV contracted by 37.8%, reflecting a significant drop in demand for all four categories: -37.1% for vans, -42.8% for heavy trucks, -39.7% for trucks and -24.8% for buses and coaches.

There is no doubt anymore that the crisis has an impact on the economy and on transport in particular, and that the initial EU expectations of a **GDP growth close to 2% per year are no longer valid**. The graph below shows the possible impacts of the financial crisis on EU27 vehicle fleets by showing the change of indicators compared with BAU (Business As Usual) (scenario without consideration of Financial Crisis).²



Source: ASTRA sensitivity simulations

² iTREN-2030: Integrated transport and energy baseline until 2030: Sensitivity test of crisis impacts on scenarios
http://www.isi.fraunhofer.de/projects/itren2030/files/ws4/Krail_Schade_IWW_ISI_iTREN_2030_ASTRA_impacts_of_economic_crisis.pdf

Future policies will have to take into account the impact that the financial crisis is expected to have in the transport sector in general and on the future of motor vehicle fleets in particular.

The downturn in the automotive sector will have lagged second round effects, because the automotive industry has one of the largest ‘multipliers’ (creating economic activity in other parts of the economy through the supply of materials and tools as well as through vehicle sales, after sales services and in transport related business).

3. The close link between transport and the economy

Transport must be seen as part of the European sustainable growth and competitiveness, and the importance of **road transport**, which fulfils and **will be fulfilling such an overwhelming majority of the transport needs for companies and individuals in Europe, should be recognized**. Long-term transport policy framework in view of the need to reduce greenhouse gas (GHG) emissions economy-wide should be based on a much more positive approach to road transport. **The benefits that transport brings to the society and its direct link to GDP indicators have to be highlighted**. All efforts should be made to improve its efficiency but at the same time efforts should be made to avoid burdening the sector with additional taxes, charges and restrictions.

4. Policy must be based on a cross-modal understanding of the whole transport system rather than on a modal shift approach

There is still a continuous reference to “modal shift” in EU documents, projects and initiatives. **The wrong belief that some modes are by default better from an environmental point of view** than others is at the origin of such a “modal shift” approach.

Regarding the transport of passengers, individual and collective transports offer different services and therefore fulfil different needs. They are not, as often assumed, communicating vessels. Public transport plays without any doubt a crucial supportive role, mainly on mainstream routes. Its role can be enhanced if its service is further adapted to the needs of its users (comfort, flexibility, modal integration, etc.). A forced modal shift policy based on traffic restrictions and increased costs for individual transport will lead to a high loss of welfare without the expected benefits for mobility and quality of life.

Regarding freight transport, a general perception seems to be that all modes of transport compete with each other; **the fact is that some modes are in competition for transport of certain commodities but in general modes are complementary**. One way of identifying which modes are in competition and which are complementary is to look at the value of the goods that are transported by the different modes. Existing analysis of transport within EU demonstrate that the value of the goods is the main criteria for the selection of the mode to be used. Other important criteria are distances and volumes.

As mentioned above, different commodities have different conditions connected to their transport and such an example is the transport of food.

CO2 emission associated with different freight transport modes related to food transportation

Transport mode and transport distance	g CO ₂ /kg
Short distance (400 km)	
Truck	54.66
Electric freight train	69.15
Inland vessel	
Bulk	29.77
Non-bulk	79.72
Continental transport	
Truck	204.98
Electric freight train	259.32
Freight aircraft	2149.20
Sea vessel	
Bulk	599.82
Non-bulk	1605.98
Intercontinental transport	
Freight aircraft	8509.68
Sea vessel	
Bulk	2399.29
Non Bulk	6423.90

Note: Significant differences were found across the different types of transport and for different distances. The calculations are based on averages from a variety of different sources and emphasise that large differences can occur when different load factors and flights with intermediate landings are assumed in food transportation. This analysis also excludes the transport to and from the loading points.

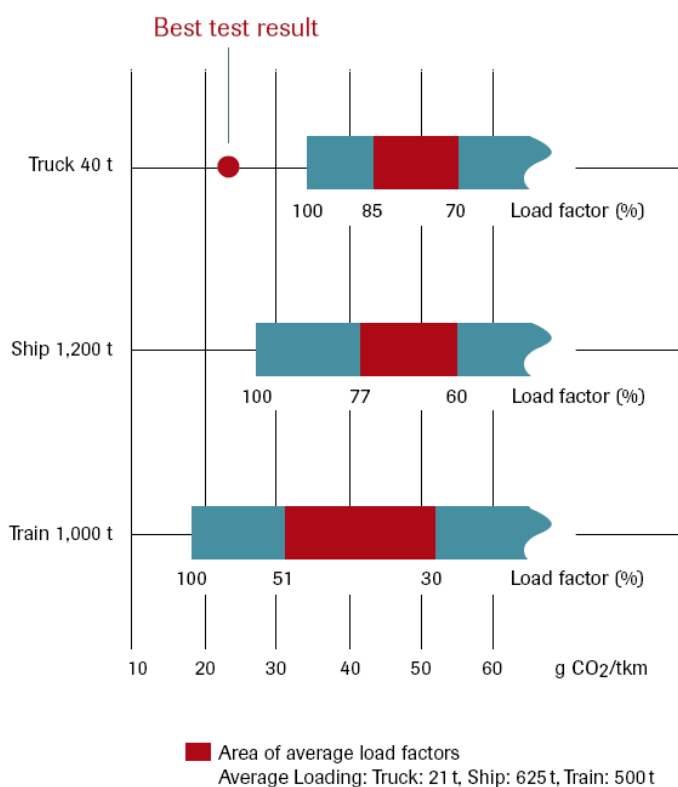
Source: EEA Technical report No 12/2008 (Saunders & Hayles 2007)³

In freight transport, the reality is different and to a great extent it depends on the utilization of its maximum capacity, which depends on the volume and the weight of transported goods, the need for loading and unloading, the density of its network, source of energy, energy need loaded compared with unloaded and specific needs with respect to the commodity to be transported.

³ www.eea.europa.eu/publications/technical_report_2008_12, page 28

The graph below shows that the CO₂ emission value per ton-kilometre for a heavy truck is close to the values of other modes when all modes are compared at their average capacity utilization.

CO₂ emissions per “ton-kilometre” from different modes Depending on average load factor



Sources: Charterway, Deutsche Bahn, IFEU, Daimler

We firmly believe that **the debate of how to approach transport GHG emissions has to avoid addressing policies on the basis of “modes of transport” but on the basis of “efficient transport”**. Contrary to a wide spread belief, modal shift is suitable from an environmental point of view in some very specific cases, but it is neither possible nor suitable in the majority of the traffic flows. It is not acceptable that European policies are based on the assumption that some modes of transport would be, by definition, more environmental friendly than others and should therefore be given preeminence over the others.

European policies must encourage the transport sector being more innovative with the tools that already exist today. It has to promote that transport providers, and rail transport

providers in particular, further incorporate in their business culture the principle of “customer service provider” instead of the one of “modal operator”. In road transport, an EU wide application of the “**modular concept**” that was introduced in 1996 is likely one of the **most cost-effective ways to address CO2 emissions**. It might now be opportune to seriously explore this modular concept for Europe, leaving aside some national interests that may risk harming the general interest of the whole EU.

5. An integrated approach for reducing CO2 emissions from road transport

The greatest environmental issue challenge for road transport remains the reduction in CO2 emissions. Great progress has already been made –partly offset by an increase of the traffic flows- and will continue to be made, mainly driven by competition and market demand. The increased diversity of fuels and power trains is also changing the situation. Average CO2 from new passenger cars has come down by close to 20% in 13 years, thanks primarily to technology measures. CO2 for a typical European 40t-truck has been reduced by 20% over the last 20 years. In order to continue making significant CO2 reductions, it will be imperative to address all the ways for reducing CO2 in an **Integrated Approach**, not just the vehicle technology. Driver/consumer behaviour and infrastructure have indeed an important role to play.

(a) driver/consumer behaviour

As important as technology is consumer behaviour, such as the choice of the vehicle, which has a strong link to affordability, eco-driving and fleet renewal. Fiscal policy has an important role to play in indicating behaviour to consumers. The current fragmented approach across Europe is indeed ineffective.

By slightly changing their driving style, car users can significantly reduce fuel consumption and CO2 emissions. “Eco-driving” is easy to apply:

- shift into a higher gear early, maintain a steady speed in the highest possible gear, anticipate traffic flow and switch off the engine at short stops;
- check and adjust the tyre pressure regularly;
- make use of in-car fuel saving devices such as on-board computers and dynamic navigators;
- remove surplus weight and unused roof racks.

Training programmes have also been developed to meet new requirements for professional competence. All commercial vehicle drivers will be required to undertake this training on a five-year basis. But manufacturers have also offered courses that encourage more eco-friendly, safe driving since the 1960s. Skills learned by operators are helping boost fuel efficiency by around 10% and contribute to the safety of drivers and all road users. Some of the key skills taught include:

- adopting a driving style that anticipates hazards ahead for quicker reactions;
- selecting the right gear to stay in the engine's most economic speed regime;
- using cruise control for smooth driving;
- block shifting gears when safe to do so;
- recognising tyre maintenance, pressure, condition and axle alignment as key safety and economy issues.

Eco-driving training leads to a fuel economy of up to 25 %, with a significant long-term effect of 7% under everyday driving conditions. Eco-driving could be part of the learning package for new drivers. Training could also cover professional, experienced drivers. The European Climate Change Programme calculated that the CO₂ reduction potential of eco-driving would be in the order of 50 million tonnes of CO₂ emissions in Europe by 2010. Research clearly indicates that eco-driving is highly cost-effective. The independent research institute, TNO, estimates cost savings of up to €128 per tonne CO₂ saved.

(b) alternative fuels

Alternative fuels can significantly help reducing CO₂ emissions from vehicles. Manufacturers have developed and adjusted engines for different kinds of alternative fuels. But now these alternative fuels **will have to be developed, produced and made available on a much larger scale** and for this, action from fuel companies and public authorities is needed.

Biofuels offer a solution for reducing CO₂ emissions from transport and dependency on fossil fuels. First generation biofuels coming from products such as corn (e.g. ethanol blended with petrol) and vegetable oils (e.g. FAME blended with diesel) remain viable pathways pending EU agreement of sustainability criteria and addressing a number of technical concerns to ensure market fuels that are 'fit for purpose'. Additionally hydro treated vegetable oils (HVO) are a viable option.

However, the longer term must be addressed through policy intervention now that encourages and stimulates investment in sustainable **second generation biofuel** production pathways. They are likely to be compatible with the whole vehicle fleet even in higher blends because their properties are similar to hydrocarbons currently in use, such as diesel and petrol. Moreover, second-generation biofuels can be made of non-food feedstock such as agricultural waste material.

Generally speaking, the success of any new technology or alternative fuel is directly linked to the density of the **corresponding distribution network**. The establishment of distribution networks for new fuel types such as electricity and hydrogen is indispensable for the employment of the corresponding technologies.

A large-scale switch to such alternative fuels in Europe requires more than ever coordinated action by all stakeholders to achieve market penetration. In the end, it is however a global market acceptance and penetration that are needed to meet the challenge of climate change and to safeguard the competitiveness of the European automotive industry.

(c) **vehicle technology**

There will be an increased diversity of fuels and power trains in the market as innovations are made by energy suppliers and vehicle manufacturers to reduce CO₂. The European automotive industry is developing and investing in many technologies at the same time. It is impossible to say today which technology will prove to be the most viable. Most likely, the future will see a number of technological combinations entering the market, perhaps tailored for different usage, driving locations or circumstances and consumer preference. The increased diversity in the medium term is part of the process of innovation which may overtime rationalize to several mainstream solutions. It is possible that different solutions will prove to be appropriate for different segments of road transport such as heavy goods vehicles, buses and passenger cars as their use is very different.

From a technological point of view the **reduction of CO₂ in road transport therefore raises issues of energy supply, fuels (energy transport) and associated powertrains.** Well to wheel analysis is needed to measure CO₂ impacts.

The **internal combustion engine will remain the dominant source of power in the coming** decades, in part due to the high cost of alternatives. The same goes for conventional fuels. There is still some potential to improve fuel efficiency of conventional vehicles. However, this is limited by physics. Moreover, the costs to further reduce CO₂ emissions will be even higher in the future given that combustion engine technology is already highly developed, especially in Europe, where the most progress has been made on fuel efficiency so far. The Commission's impact assessment on reducing CO₂ emissions from passenger cars confirms this. **Cost-effectiveness assessments are therefore of increasing importance.** This concerns amongst others the **question of affordability, but also the cost to industry.**

There are mainly two options in the long term:

- electric battery-powered vehicles;
- hydrogen powered vehicles.

Both electric battery power and hydrogen have the potential to be the long-term solution for mobility. Significant progress has been made over the last few years, however more breakthrough development is needed to bring the cost of technologies

further down. While electric and hydrogen vehicles do not emit tailpipe emissions, it is important to also consider the Well-to-Wheel impact, i.e. including the production of electricity and hydrogen. New technologies generally first come in low volume and at a significant cost premium, which needs to be off-set by a positive policy so that vehicles remain affordable and mobility is guaranteed.

A supportive policy framework is needed for companies to innovate and successfully launch the new technologies Industry and consumers need EU-wide harmonised incentives and standardisation of regulation. In order to **safeguard industry's global competitiveness**, public authorities need to enable the EU automotive industry to reach policy objectives more cost-effectively.

A sufficient infrastructure is indispensable for new technologies as well, for instance when new fuels are required.

Joint efforts by all stakeholders are needed when launching new technologies so to reduce costs. This concerns in particular the fuel industry, energy suppliers, the automotive supplier industry, public authorities and customers.

Knowing that technological developments are by definition not completely predictable, ACEA believes that at this point **none of the options should be discarded**, and that no **“winners” should be prematurely selected**.

Technological progress made by using one technology sometimes reduces the progress made with another one. This reduces the potential for overall technological progress. Conflicting affects in terms of engine efficiency increase, weight and costs of exhaust after treatment emissions, have to be applied by evaluating new technologies.

(d) **infrastructure**

Improved road infrastructure and further implementation of ITS (Intelligent Transport Systems) also offer significant potential for reducing CO₂ by enhancing journey efficiency. The establishment of distribution networks for new fuel types such as electricity or hydrogen is indispensable for the employment of the corresponding technologies.

Japan already estimates and calculates the CO₂ reduction contribution of road infrastructure measures, which contribute more than 12 % to the CO₂ reduction program. For instance, the CO₂ reduction through a measure can be calculated based on the difference in average running speed on a certain road section before and after the installation of an infrastructure measure and by consideration of the traffic volume. Eco-driving is part of the reduction programme as well.

The industry invites public authorities **to work together on identifying ways to measure and monitor measures on infrastructure and driver behaviour** so as to fully implement the integrated approaches to environment.

A **well-functioning infrastructure** is a basic requirement for mobility and economic growth. As a significant modal shift is not expected, road infrastructure will remain and become even more important for overall mobility. Congestion and stop and go traffic are counterproductive for fuel efficiency and CO₂ emissions.

Among infrastructure measures, **traffic flow improvement** is certainly the most influential factor in terms of reduction of CO₂ emissions. The optimization of logistics can include avoiding systematically the most congested axes at peak times, which has a substantial impact. The fuel consumption of a 40-tonne truck (440 hp) and therefore its CO₂ emissions can vary from 1 to 10 according to traffic conditions:

Traffic conditions	Speed	Fuel consumption and CO ₂ emissions for 10 km
Smooth	75 km/h constantly	3.4 litres (9.2 kg CO ₂)
Average congestion (1 stop every 400 m on average)	15 times from 0 to 30 km/h 10 times from 0 to 90 km/h 25 minutes slowly	16 litres (43.2 kg CO ₂)
Strong congestion (1 stop every 100 m on average)	85 times from 0 to 30 km/h 15 times from 0 to 90 km/h 1 hour slowly	36 litres (97.2 kg CO ₂)

Source: Renault Trucks

It is also important to recall that a 40 t truck (with an average payload of 17 tons) emits on average 62 g CO₂ per moved tonne-kilometre.

Priorities in this context are:

- better maintenance of existing road infrastructure;
- extension of road infrastructure;
- better allocation of traffic flows;
- using infrastructure capacity more evenly;
- temporal allocation of traffic flows;
- improving traffic flow;
- individual, dynamic traffic guidance.

Examples for the potential of infrastructure include that, simply through a more efficient planning and management of roundabouts or “green waves”, CO₂ emissions could be reduced by up to 20%. Better road design and more investment in road infrastructure can remove bottlenecks, lead traffic around city centres and complete missing links, which together cost billions of Euro every year in lost fuel and undoubtedly contribute unnecessarily to total emissions from transport.

Better roads in terms of better alignment, sufficient width and capacity, which enable traffic to flow steadily, lead to reduced emissions from road traffic.

As for the environmental impact of road construction, this could be minimized by basing such measures on a sound environmental road design and management, as a combination of processes and techniques including optimised route planning through environmental impact analyses or use of recycled and environment-friendly construction material.

Differences in road surface can lead to reductions in rolling resistance, and therefore of CO₂ emissions. Improved traffic management can reduce traffic delay and congestion, with corresponding energy savings when applied on critical route sections. Traffic light synchronization has the potential to increase intersection throughput for private traffic. Variable message signs (VMS) can guide traffic away from problem areas, optimise section speed and capacity and lead to less accidents as well as less emissions.

ICT (Information and Communication Technologies) and ITS (Intelligent Transport Systems) will play an increasingly important part in infrastructure measures. In fact, applying ICT more widely in industry and infrastructure could help deliver significant energy efficiency gains and cut global emissions.

“Green ITS”, infrastructure & traffic management related technologies and applications are a group of current technologies & best practice for ICT systems not directly involving in-vehicle systems. These can have substantial impact on fuel use and emissions, and are subject only to policy / availability of funding:

- Environmental monitoring & modelling;
- Coordinated dynamic urban traffic control;
- Traffic signal synchronisation (“green wave”) and signal phase information;
- Variable message signs;
- Parking availability and guidance by variable message sign;
- Digital map for navigation;
- Real-time traffic information and guidance (TMC).

These applications could be improved through simply adding positioning, infrastructure-vehicle communication & enhanced driver displays.

(e) vehicle taxation

A CO₂-related taxation creates consumer demand for fuel-efficient vehicles. Currently, a number of EU member states have introduced, in their taxation systems, elements based on the car’s CO₂ emissions and/or fuel consumption and more countries will follow. Yet, the current systems differ greatly across the EU and therefore fail to send clear market signals. Manufacturers face a fragmented EU market and are unable to exploit economies of scale. The European car manufacturers advocate harmonised taxation of cars in the EU. Taxation should neither favour nor discriminate a specific technology, and every gramme CO₂ should be taxed the same.

(f) **urban policies: integration of spatial planning and transport policies**

As rightly pointed out by an OECD/ECMT study⁴, an increasing proportion of CO2 emissions from transport are generated in cities. Its volume is determined by the way cities are organized. Planning for mixed (workplace, residential and leisure) development patterns can limit the demand for long motorized journeys and planning for higher density land use patterns, limiting urban sprawl, can favour public transport.

About ACEA

The ACEA members are BMW Group, DAF Trucks, Daimler, FIAT Group, Ford of Europe, General Motors Europe, Jaguar Land Rover, MAN Nutzfahrzeuge, Porsche, PSA Peugeot Citroën, Renault, Scania, Toyota Motor Europe, Volkswagen and Volvo.

⁴ Cutting transport CO2 emissions. What progress ? ECMT 2007