



European Federation for
TRANSPORT and ENVIRONMENT

Road transport speed and climate change

A note from Transport and Environment (T&E) for
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Introduction

Traffic speed is a key variable in transport policy. Speed plays a dominant role in a string of transport indicators such as mobility demand, fuel consumption and CO₂ emissions, air pollution, noise, safety and congestion.

This short paper takes reducing CO₂ emissions as a primary angle. First, we will present a short review of the literature on the impacts of speed on CO₂ emissions as well as a range of additional factors. Second, we will look at a couple of policy options to be considered at EU level.

Lower speeds on motorways

A study by Umweltbundesamt (CO₂-minderung im Verkehr, 2003) shows that a 120 and 100 km/h speed limit on German motorways would reduce CO₂ emissions from cars on motorways by 10 and 20 per cent respectively.

A detailed study by CE Delft (*Speed limiters on vans and light trucks*, 1997) calculates that fitting a speed limiter in vans at a level of 100 km/h would reduce CO₂ emissions of this category in 2020 by 7.6 per cent. Limitation to 110 km/h would reduce emissions by some 4 per cent. A subsequent extensive field trial (*Begrenzing op bestelling*, CE Delft, 2002) led to somewhat higher results: limiting the speed to 110 km/h reduced CO₂ emissions by some 5 per cent.

The effectiveness of this measure increases over time because a) the percentage of transport on motorways increases and b) the power output of vans increases, resulting in more frequent driving at speeds over 100 km/h in the baseline scenario.

The French *Plan Climat* (2004) estimates that enforcement of current speed limits would reduce road transport emissions by some 3 Mtonnes (= 2%).

The report *External Vehicle Speed Control* (University of Lees and the UK Motor Industry Research Association MIRA), estimates that 8% of CO₂ emissions could be saved under a mandatory ISA scheme. About half of these savings would be achieved in urban areas, and an important factor here is the more stable speed distribution that results from ISA. The benefit/cost ratio of ISA devices is estimated at 5 to 12, which is a very high figure.

In addition, two indirect effects are worth considering.

The first is that lower speed limits on motorways reduce the need for high-power cars. The average power output of cars currently increases by some 2 per cent per year (*Reducing CO₂ emissions from new cars*, Kageson, 2005). According to the same UBA study, Thirty per cent lower power in cars (or: halting the 2% increase for some 17 years) would lead to 13-19% CO₂ savings for petrol cars and 5-15% savings in case of diesel cars.

The second is the fact that longer travel times will reduce mobility to some extent. Therefore, in the medium term, CO₂ savings from reduced speeds and more balanced speed distributions will be higher than in the direct short-term impacts.

Additional benefits

Safety

There is overwhelming evidence that lower speed limits on motorways reduce fatalities. A 100 km/h limit as applied during the oil crisis and for a couple of years in Hessen showed a 25-50% reduction in fatalities.

According to a study by the UK Transport Research Laboratory, a reduction in average speed of 3 km/h would save 5 000 to 6 000 lives each year in Europe, and would avoid 120 000 to 140 000 accidents, producing a saving of €20 billion. According to the UK's observations, the installation of automatic surveillance cameras reduces average speeds by 9 km/h. If such cameras were fitted everywhere throughout the European Union, it would be possible to avoid a third of accidents and halve the number of people killed.

Seminar on "Killing speeds, Saving lives" organised by the Belgian Presidency of the European Union, 8 November 2001 in Brussels.

(Except from the EC's Road Safety Action Plan 2003/311).

Better enforcement of speed limits in France led in the first year to 21 per cent fewer fatalities on France's roads.

Air quality

The response of on-CO₂ emissions to lower speeds is somewhat more complicated than that of CO₂ emissions. As a rule it can be said that NO_x emissions reductions are stronger than CO₂ emissions reductions, due to the fact that the NO_x emission index generally increases with higher engine loads (= higher temperatures). The response of HC and Pm emissions is also generally found to be positive, related to reduced spread in speed distribution.

Lowering the speeds in Rotterdam from 100 to 80 km/h gave a 25% reduction in NO_x emissions from traffic. This has substantially alleviated the air quality problems in this zone.

The earlier-mentioned CE Delft study on speed limiters in vans and light trucks showed that limiting the speed of vans to 100 km/h would reduce overall NO_x emissions from these vehicles by 13 per cent in 2020. Obviously the reductions on motorways are much higher than this overall amount.

Congestion

Numerous model studies indicate that intercity roads reach their maximum capacity at around 80 km/h. At these speeds the product of speeds and safe distance between vehicles reaches the maximum. In addition, a more homogeneous traffic flow is known to reduce congestion. Therefore reducing speeds to under 100 km/h is generally shown to have a positive impact on congestion.

Besides these modelling exercises, once again the Dutch example of reducing the motorways speed at Rotterdam to 80 km/h gives clear evidence of the better capacity utilisation made possible by lower speeds. Despite an increase in traffic of approx. 3 per cent, the daily congestion period is reduced by some 30 minutes, and the average length by approximately 2 kilometres.

Recent initiatives

- The Netherlands introduced a 80 km/h zone close to Rotterdam in order to improve air quality and reduce noise and congestion;

- Belgium has announced its will to reduce the maximum speed for lorries to 80 km/h, in line with 9 other EU countries;
- The Dutch road transport organizations recently signed a covenant to improve safety and speed of vans, in reaction to a plan to fit speed limiters to vans;
- France decided in 2002 to better enforce its speed limits, resulting in 21 % fewer casualties the next year;

Conclusions and EU policy recommendations

Speed is a crucial parameter for transport policy. High speeds and a wide distribution of speeds lead to more emissions, accidents, noise, and congestion. A UK study shows that perfect enforcement of speed limits could reduce fuel consumption and CO₂ emissions by as much as 8 per cent. If stricter limits were introduced and enforced gains could be even higher digits. The relationship between speed and safety is possibly even stronger. Lowering speed limits is being discovered as an effective measure to improve air quality around motorways.

The EU could improve its speed policies thorough the following means:

- Extend the obligation to fit speed limiters to N1 vehicles (vans). Directive 1992/6 and 2002/85 prescribe speed limiters for heavy (>12t) lorries and (>10t) buses, and light lorries and buses respectively. There are strong arguments for this extension. The share of vans in traffic is increasing - by 2020, their share in total road transport CO₂ emissions will have risen to some 11 per cent in the 'old' EU15 (112 Mt vs 1,000 Mt resp.) In addition, unequal treatment of different vehicles for the transport of goods (N1, N2, and N3) cause an increasing economic distortion in the freight transport market.
- Turn Commission Recommendation 2004/345 on road safety enforcement into a Directive. The provisions in the Regulation imply that a Directive could enter into force only as early as in 2009, which is a five year unnecessary delay in achieving the Community targets on road safety and Kyoto;
- Include mandatory fitting of Intelligent Speed Adaptation (ISA) in the type approval procedure for cars that links to local speed limits. This regulation should enter into force as soon as maps covering speed limits in the EU are available. This process is now well under way, driven by commercial aspirations or mapping companies, and is likely to be completed in 2009.
- Put the issue of maximum speed limits on the EU's agenda. Subsidiarity concerns have too long prevented the issue from being taken up at EU level.