

SIPTRAM

Multistakeholder Dialogue

**Discussion paper on technical standards for vehicles
and infrastructure**

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1. Introduction

During the last years there has been an increase of motorised transport and it is expected that this trend will continue. Passenger transport in Europe is estimated to grow by 24% between 1998 and 2012. In a 'business as usual' scenario it is predicted that the majority of this growth will be covered by private cars. Even if there had been a technical progress in reducing emissions from cars this will lead to an increase of negative environmental effects: CO₂, noise and land-use. At present 28 % of all GHG emissions in the EU come from transport, to which road transport contributes by 84 %. The European Union commitment under the Kyoto Protocol requires a reduction in greenhouse gas emissions by 8 % between 2008 and 2012. If the trend continues, the CO₂-emissions from transport in 2010 will be 40 % higher than 1990.

1.1 New standards for air quality and noise

The EU adopted a framework on air quality to reduce the impact of important air pollutants. Stronger limit values are foreseen for SO₂, NO_x, Particles and Lead, which come in force 2005 and 2010 respectively. Cities have to design action plans to show which measures will be undertaken if the values are exceeded. As transport is one of the main sources for important pollutants (PM, NO_x) this could also lead to restrictions to the use of cars. Many cities in Europe stated that they will have big difficulties to reach the limit values for PM in 2005. The values are mainly exceeded at traffic sites (e.g. in Berlin PM emissions have to be reduced by over 60 %). PM mainly comes from diesel trucks and buses.

A second directive is dealing with environmental noise. Until 2007 noise emissions in big cities and along main transport infrastructure (motorways, long distance railway lines, airports) have to be drawn up in noise maps. The aim is to reduce noise at the source (vehicles and infrastructure).

1.2 Environmental performance of public transport

A shift to public transport has the potential to reduce the negative impacts described above. For this it is important to extend public transport and to improve its quality. Also environmental aspects have to be taken into account. Public transport should be part of the solution and not part of the problem.

A comparison between buses, trams and cars on the environmental effects done by VCD has shown that there is still a problem resulting in higher exhaust emissions from old diesel buses and noise from trams.

New challenges have to be faced in the light of liberalisation and market opening. Competitive tendering will be more and more used in the public urban transport market. Public transport companies and cities have to be well prepared. If handled properly, competition may be a chance for an environmentally-friendly and customer-oriented public transport.

This discussion paper presents suggestions on how to improve the environmental performance of public transport through a tendering process. The focus is on buses, which have a huge impact on the local emission situation.

2. Environmental standards for buses

2.1 Exhaust emissions

Emissions of buses depend on different parameters: kind of fuel (e.g. diesel, natural gas ...), age of bus, vehicle size etc. Most important pollutants are NO_x and PM. To reduce direct vehicle emissions, in 1992 the EU introduced the so-called EURO standards, which currently regulate the legal emission levels of both new cars and heavy-duty vehicles (including urban buses). These are applied progressively, becoming stricter over time. Currently, following Directive 1999/96/EC¹, the EURO 3 standard is in force for all new vehicles, with EURO 4 to be introduced in 2005, and (only for heavy-duty vehicles) EURO 5 in 2008. These regulations also contain the EEV standard (Enhanced Environmentally friendly Vehicles) with even stricter limits than EURO 5 for heavy-duty vehicles.

Old buses with lower emission standards could still be used. But there is the risk that buses might not be allowed to operate in highly polluted areas. Also there is the risk that „dirty“ buses might get a lower price when sold off after some years. When purchasing new buses this has to be taken into account. To avoid these risks, public transport companies are better off to make a far-sighted choice and purchase clean buses with high emission standards. Buses reaching the EEV standard are already on the market.

The European Court of Justice ruled in the so called “Helsinki bus case”, that strong environmental criteria can be required by tendering public transport authorities, even if they are higher than the present legal requirements. For this reason and because of the already existing EEV buses the German Federal Ministers for the environment decided to push the procurement of EEV vehicles in public authorities.

Criteria air pollutants:

- All new buses must meet the EEV standard for emissions

2.2 Noise

Noise emissions of trucks and buses are regulated in the Directive 92/97 EWG. Limits for low noise vehicles are fixed to 80 dB (A) (150 kW vehicle power and more) and 78 dB (A) (vehicle power less than 150 kW). An analysis of different new buses has shown that the noise values are below these limits.

Noise is also coming from wheels. Noiseless wheels can significantly reduce the total noise emissions and have also a positive effect on the fuel consumption (a list of noiseless wheels can be found at: www.umweltbundesamt.de).

Criteria noise:

- 77 dB (A) (vehicle power > 150 kW)
- 75 dB (A) (vehicle power <150 kW)
- use of noiseless wheels

¹ Directive 1999/96/EC of the European Parliament and of the Council, of 13th Dec 1999 on the approximation of the laws of the Member States relating to measures to be taken against the emission of gaseous and particulate pollutants from compression ignition engines for use in vehicles, and the emission of gaseous pollutants from positive ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles and amending Council Directive 88/77/EEC

2.3 Energy consumption

Although public transport has advantages concerning energy consumption in comparison to the car, there is still a potential for the efficient use of energy in public transport that has to be exploited. But fuel savings realised thanks to the development of new vehicle engines is contradicted by additional comfort and safety requirements (e.g. airconditioner, heavier vehicles). In the mid-term, energy savings can be realised through optimised fleet management and increased passenger number. One option is the use of smaller buses and the integration of buses on demand.

Fuel savings up to 30 % can be received through environmental training of drivers. In addition driving style meters in the bus help monitoring fuel consumption. As mentioned before, noiseless wheels – and special oils - also reduce fuel consumption.

Criteria energy consumption:

- training of drivers in Ecodriving
- driving-style meters
- use of noiseless wheels
- use of special oils
- Air condition: use of climate friendly additives

2.4 Measures to reduce emissions for older buses

In many fleets buses with EURO 2 or less are dominating. To reduce their emissions the following options can be used:

Air pollutants	GHG	Noise
Use of sulphur-free diesel	Optimised fleet management	Use of noiseless wheels
Refit with a particulate trap	Use of noiseless wheels Ecodrive	

Sulphur-free diesel can lead to NOx and PM reductions from up to 15 %. By using a particulate trap PM can be reduced up to 99 %. One filter system is the so-called CRT (Continuous Regeneration Trap). Currently 20.000 trucks and buses are using CRT in Europe. The price of one filter is around 6.000 Euro. As buses using a CRT will reach EURO 4 limit values with the exception of NOx, a particulate trap should be compulsory for all buses. As the rules for tendering have foreseen not to require a special technique, the following should be part of the tendering criteria:

Criteria for bus fleet:

PM emissions of old buses (EURO 1 to 3) should reach EURO 4 standard (if a particulate trap is used durability has to be assured and ultrafine particles must be filtered).

2.5 Alternative fuels

The dominant drive for buses is the diesel combustion engine. Advantages are low fuel consumption and the high degree of effectiveness. Rising requirements to emission reductions have thrown the focus on alternative fuels. The most common alternative is natural gas.

At present natural gas buses are the most environmentally friendly alternative to diesel. These are available at the market and many companies already have a high share of gas buses. Advantages are low exhaust emissions (buses reach EEV) and, in comparison to a diesel bus, they emit less noise.

Although the purchasing price for gas buses are higher, the real costs have to be compared to a similar diesel bus reaching the same emission level. A cost-monitoring in Germany has discovered that the additional costs for gas buses can be neglected.