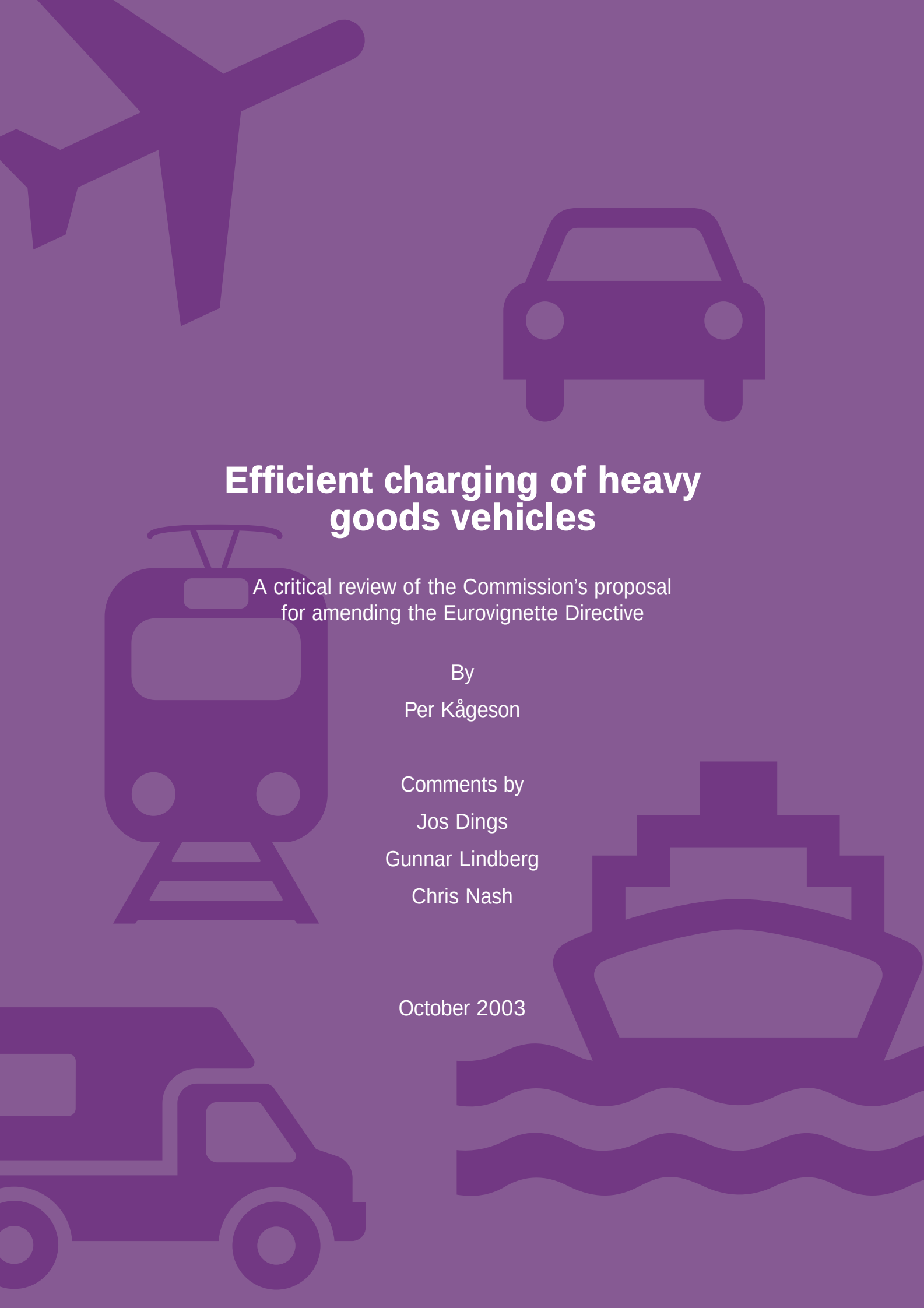

# Efficient charging of heavy goods vehicles

A critical review of the Commission's proposal for amending the Eurovignette Directive

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Swedish Institute for Transport and
Communications Analysis

Swedish Institute for Transport and Communications Analysis, SIKA
sika@sika-institute.se
www.sika-institute.se
Tel: +46-8 506 206 00
Fax: +46-8 506 206 10
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# Preface

The Swedish Institute for Transport and Communications Analysis, SIKA, is an agency under the Ministry of Industry, Employment and Communications. SIKA is responsible for official statistics in the transport and communications sector, and has also the task of developing forecasts and planning methods and to initiate and carry out studies of relevance for Swedish transport policy making.

During the last couple of years, SIKA has been instructed to calculate and monitor the external marginal costs of transport with the purpose of furnishing the Government and the various transport agencies with information on which to base efficient infrastructure charges. Such charges have repeatedly been proposed in policy documents from the European Commission, including the 1998 White Paper on "Fair Payment for Infrastructure use", as well as in Swedish transport policy declarations.

Recently, on July 23, 2003, the Commission released a proposal for amending the Eurovignette Directive – "Proposal for a Directive of the European Parliament and of the Council amending Directive (1999/62/EC) on the charging of heavy goods vehicles for the use of certain infrastructures" (COM(2003)448final). Since this new document, by favouring average rather than marginal cost pricing, by suggesting earmarking of revenues and by putting restrictions on charging levels, seems – at first sight at least – to be a step in a direction different from the path of implementing the White Paper, SIKA found it important to initiate a closer examination.

To accomplish this, SIKA commissioned Per Kågeson, Nature Associates, to evaluate the proposal. The analysis was to focus on two issues:

- The extent to which the proposed amendments will make it possible for Member States to use charges or road tolls for internalising the social marginal costs of road transport.

- Whether the proposal strikes the right balance between what needs to be regulated at a European level and what should, in line with the principle of subsidiarity, be left to the individual Member States to decide.

SIKA further commissioned three experts in the field – Jos Dings from the

Netherlands, Chris Nash from the U.K. and Gunnar Lindberg from Sweden, to comment on the draft version of Kågeson's paper and, also, to present their own views on the Commission's proposal.

Kågeson's paper along with the comments are included in this report. Since the report may also be of interest to people in other Member States, it has been written in English.

SIKA considers that the contributions made here can best speak for themselves and has refrained from presenting its own view. It hopes that the report will be a useful reference in the lively discussions concerning the Commission's proposal that have obviously already begun.

Per-Ove Hesselborn, e-mail <per-ove.hesselborn@sika-institute.se> has been responsible for the project at SIKA. Copies of the printed version of the report may be ordered by e-mail <sika@sika-institute.se>. The report is also available at SIKA's website www.sika-institute.se.

Staffan Widlert
DIRECTOR
SIKA

# Content


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# Efficient charging of heavy goods vehicles

## A critical review of the Commission's proposal for amending the Eurovignette Directive

*Per Kågeson*

### The aim of this paper

This is an attempt to analyse the European Commission's proposal for a directive amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures (COM(2003)448 final), sometimes also referred to as the "Eurovignette directive". The draft directive is broader in scope than the current directive in terms of vehicles, roads and cost elements and provides an improved structure for the differentiation of charges and tolls. However, in a number of circumstances the proposed amendments restrict Member States in ways that can be questioned in the light of the Treaty's principle of subsidiarity. Restrictions that are not needed for securing efficiency and fairness should be avoided, as the directive must be designed to work well in 25 different Member States, and to take account of varying local and regional conditions with regard to scope, environmental impact, accident rates and degree of congestion.

Economic theory suggests that infrastructure charges should reflect the social marginal cost of adding an extra vehicle kilometre to the existing use of a road. This implies calculating and charging for the additional cost imposed on society with regard to road maintenance, accident risks, congestion and damage to human health and the environment from exhaust emissions and noise. According to most experts and the Commission's White Paper "Fair Payment for Infrastructure Use", charging traffic for infrastructure investment and other fixed costs should be avoided as this type of financing would reduce the use of pre-existent roads to a sub-optimal level.

The analysis, therefore, will concentrate on two issues:

1. The extent to which the proposed amendments will make it possible for Member States to use charges or road tolls for internalising the social marginal costs of road transport.
2. Whether the proposal strikes the right balance between what needs to be regulated at a European level and what should, in line with the principle of subsidiarity, be left to the individual Member States to decide.

However, before reviewing the draft directive, a short background is required.

## An emerging European policy on charging for infrastructure use

The first studies on a more efficient European policy for transport pricing appeared in the late 1980s and early 1990s (Quinet, 1989, Kågeson, 1993, and Mauch and Rothengatter, 1994).[1] In 1995, the European Commission published a Green Paper, "Fair and efficient pricing in transport". Being a discussion paper it did not contain any concrete proposals, but expressed a preference for a system of infrastructure charging aimed at covering both capital costs and operating costs. The Commission's White Paper "Fair Payment for Infrastructure Use" took a different stand on full cost recovery. It underlined the importance of marginal social cost (MSC) pricing, meaning that transport charges should as closely as possible reflect the extra costs for wear and tear, congestion, accidents and pollution caused by additional infrastructure use.

Based on the White Paper, the Commission asked a "High-Level Group on Transport Infrastructure Charging" (1999a and 1999b) to provide additional insight into the methods for calculating and internalising external costs.

In the 2001 White Paper "European Transport Policy for 2010", the Commission said the aim of Community action should be "gradually to replace existing transport system taxes with more effective instruments for integrating infrastructure costs and external costs". The Commission decided to prepare legislation in three steps; (i) a methodology paper (to appear in 2002), (ii) a framework directive covering all modes of transport, and (iii) a daughter directive for each of the four modes of transport. For road transport the new directive would replace or amend the current "Eurovignette directive" on the charging of heavy goods vehicles.

However, in the spring of 2003, the Commission scrapped its three-step-strategy in favour of two new directives, the first being a "proposal on the widespread introduction and operability of electronic road toll systems in the Community"



1 In addition several studies on improved national pricing systems were published, for instance for Sweden, Hansson and Lindberg, 1992.

(COM(2003) 132 final) and the second the proposal for amending Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures.

In response to the 1998 White Paper, the European Parliament on 12 February 2003 confirmed the need for internalising the social costs of transport but did not specifically favour marginal cost pricing. It also added a few extra boundary conditions, e.g. taking into consideration the interests of disabled people, remote regions and public transport.

The European Conference of Ministers of Transport (ECMT) has passed several resolutions (among them 1998/1 and 2000/3) recommending a gradual shift of the transport tax structure to ensure non-discrimination and promote internalisation of external costs.

## Principles of infrastructure pricing

The general principles expressed in the different papers on infrastructure charging as well as the reports of the "High Level Group" can be summarised as follows:

- Charges should be linked as closely as possible to underlying costs;
- Charges should reflect the social marginal cost of infrastructure use, accidents, environmental damage and congestion;
- The price structure should be clear to transport users (transparency);
- Charges should be non-discriminatory for the nationality of the vehicle and the origin or destination of the goods transported;
- Charging should be non-discriminatory across modes;
- The revenues should flow to authorities in Member States where the costs are factually caused (principle of territoriality);

The above principles apply to all types of vehicle and to all parts of the infrastructure.

The 1998 White Paper recognises that most costs caused by heavy road vehicles cannot be efficiently internalised without taking both distance and vehicle characteristics into account. Kilometre charging is a method that allows for this kind of differentiation and that can be applied to all vehicles regardless of nationality. As charges, from an efficiency point of view, should be linked as closely as possible to underlying costs, it makes sense to use km-charging for internalising all costs except those directly associated with the choice of fuel.

## The current directive

Directive 1999/62/EC on the charging of heavy goods vehicles (HGVs) regulates the road tolls and user charges that Member States can apply to HGVs with a Gross Vehicle Weight (GVW) exceeding 12 tonnes for their use of motorways. The directive took effect on 1 July 2000.

According to the current directive, Member States may maintain or introduce tolls or user charges on motorways and other multi-lane roads with characteristics similar to motorways, as well as on bridges, tunnels and mountain passes. However, in a Member State where no general network of motorways or dual carriageways with similar characteristics exists, tolls and user charges may be imposed in that State on users of the highest category of road as defined from a technical point of view.

The directive defines toll as "payment of a specified amount for a vehicle travelling the distance between two points" and states that "the amount shall be based on distance travelled and the type of vehicle" (article 2b). A user charge is, according to the directive, payment of a specified amount conferring the right for a vehicle to use the specified infrastructure "for a given period" (article 2c). The directive does not mention km charging but from its definitions it is evident that km charging should be regarded as a form of road toll as the charge relates to the distance driven and not to the duration of the use of the infrastructure.

Tolls and user charges may not be imposed at the same time for the use of a single road. However, Member States may also impose tolls on networks where user charges are levied, for the use of bridges, tunnels and mountain passes.

The weighted average toll shall, according to article 7(9) of the directive, be related to the costs of constructing, operating and developing the infrastructure concerned. The weighted average toll can be differentiated for vehicle emission classes, provided that no toll is more than 50 per cent above the toll charged for equivalent vehicles meeting the strictest emission standards, and for the time of day, provided that no toll is more than 100 per cent above the toll charged during the cheapest period of the day.

Member States preferring user charges may differentiate the annual and monthly charges for vehicle emission classes. The directive, however, puts upper limits on the amounts of user charges. The annual maximum permissible amounts of user charges (other than vehicle tax) for vehicles fulfilling the requirements of EURO 2 is €750 and 1 250 for respectively a maximum of three axles and a minimum of four axles.

Directive 1999/62/EC also regulates the minimum levels of the annual vehicle

tax for different categories of heavy goods vehicles. The minimum tax rate is differentiated according to Gross Vehicle Weight and number of driving axles, with a reduction for driving axles with air suspension (or recognised equivalent).

The directive does not prevent the application by Member States of parking fees and specific urban traffic charges or regulatory charges specifically designed to combat time- and place-related traffic congestion (article 9).

## Shortcomings of the current directive

The most noticeable defect of the current directive is that the same maximum amount of user charges applies regardless of the size and characteristics of the network. This restriction makes it difficult and in many cases impossible to relate the charge to actual costs.

The legal situation is different where road tolls are concerned. They shall, according to article 7(9), reflect "the costs of constructing, operating and developing the infrastructure network concerned". The directive does not define an upper limit for the rate of road tolls.

If km charging is regarded as a form of road toll, the current directive does not limit Member States wishing to shift to a distance-related charge. However, the current directive requires Member States to set the level of road tolls so that they reflect not only short-term social marginal costs but also the fixed costs of infrastructure. This is a deviation from the theory of marginal social cost pricing.

Another significant drawback of the current directive is that it only allows road tolls and user charges to be applied to motorways.[2] From a cost-efficiency point of view motorways should not be charged more heavily than trunk roads as this may stimulate trucks to shift to roads with a higher marginal infrastructure cost. Accident risks are also generally higher on trunk roads than on motorways. The only factor that may argue in favour of charging more for motorways is that hauliers would in many cases be willing to pay a little extra for a fast and convenient road. However, taking this into account would imply a shift from charging based on costs to a system where charging is value-based.

## The development of kilometre charging

Currently six Member States run an integrated system of user charges known as the "Eurovignette" for heavy goods vehicles with a gross vehicle weight exceeding

2 A Member State may, according to article 7(6), provide that vehicles registered in that Member State shall be subject to user charges for the use of the whole road network in its territory. This, however, is nothing but another name for annual vehicle taxation, and would cause distortions in competition with foreign hauliers if carried too far.

12 tonnes. The Eurovignette is a charge for the use of the motorway systems of the participating Member States. The future of the Eurovignette is uncertain as Germany will replace it with a kilometre charge in the autumn of 2003. It may not make sense for the remaining parties to the Eurovignette to continue this regime when the most centrally located and most important transit country no longer participates. Denmark, Sweden and the Benelux countries are discussing the feasibility of shifting to a kilometre charge. Austria and the United Kingdom, who are not parties to the Eurovignette, have announced that they will introduce km charging in 2004 and 2006 respectively.

As underlined in the White Paper on "Fair Payment for Infrastructure Use", electronic kilometre charging for heavy goods vehicles is a very attractive policy option for achieving fair and efficient pricing. On-board electronic units provide an opportunity for an extensive differentiation of user charges. Differentiation according to total weight, number of axles, exhaust performance and noise would be based on vehicle registration just as in the case of the current vehicle tax. GPS, or a combination of the tachograph and roadside beacons, would add information on annual mileage in different Member States and on different kinds of roads.

Several Member States are now in the process of establishing a computerised national road database, which will in a few years cover the entire public road system down to its smallest elements. Such a database could also be made to include information on road characteristics such as road surface conditions, accident risks and environmental concerns. In a GPS-based system this would provide an opportunity to differentiate charges in order to make heavy goods vehicles choose roads where an increasing level of traffic would cause minimal additional costs (especially road wear and tear).

One motive for the Commission to launch a proposal for amending the directive is the fast development in km charging. The Commission thinks that the existing Community charging framework must be "reinforced" in the face of the isolated initiatives on the part of Member States, as these initiatives risk creating new distortions. Another reason is, according to the Commission's explanatory memorandum, that the current directive links charges only to a very small extent, or not at all, to damage to infrastructure, congestion or accident risks. In response to repeated requests from Member States, the European Council and the European Parliament, the Commission is therefore presenting its proposal to amend Directive 1999/62/EC.

## The Commission's proposal for amending the "Eurovignette directive"

The Commission proposes that road tolls (including km charging) should reflect the "costs of constructing, operating, maintaining and developing the network". Important improvements over the current directive are that:

- coverage is extended to all vehicles above 3.5 tonnes of gross vehicle weight ;
- the vehicle categorisation required for avoiding distortion to competition is more comprehensive;
- the external costs of accidents are included,
- that Member States who introduce road tolls are obliged to apply them on the "main road network";
- Member States shall no later than 1 July 2008 be required to vary the rates according the particular route in the road network, depending on the environmental sensitivity of the area, the population density and the accident risk;
- Member States are allowed to extend the geographical scope of road tolls and user charges to the entire national road network.

However, there are also a number of defects, most notably that:

- Member States are not allowed to include in the toll system cost elements reflecting the social marginal cost of pollution or congestion, leaving them with the option of differentiating the toll (calculated as the costs of constructing, operating, maintaining and developing the network + the cost of accidents) for differences in specific vehicle emissions and degree of congestion;
- Member States are prevented from making their own choice between a system designed for full cost recovery and a system that reflects the short term social marginal costs;
- extension of road tolls and/or user charges to other roads of the "primary road network" is conditional on the approval by the Commission;
- the Member States' decisions on rates are in a few cases limited to certain levels that may in some circumstances not allow for social marginal cost pricing;
- revenues from road tolls and user charges shall be earmarked "for the maintenance of the infrastructure concerned and for the benefit of the transport sector as a whole".

A strange feature of the draft directive is that it makes no reference to the Commission's White Paper on "Fair Payment for Infrastructure Use" nor to the principles identified by the Commission's "High-Level Group on Transport Infrastructure Charging". The proposal does not explain why the Commission deviates from its own earlier recommendations.

In summary, the strength of the proposal is that it is broader in scope than the current directive in terms of vehicles, roads and cost elements, and that it provides an improved structure for the differentiation of charges and tolls. The weakness is that it restricts Member States in a number of circumstances where, in view of the Treaty's principle of subsidiarity, they should be allowed to make their own choice. This paper now goes on to examine those shortcomings as well as to comment on some of the improvements over the current directive.

## Full cost recovery versus social marginal cost pricing

The Commission says that road tolls should reflect the "costs of constructing, operating, maintaining and developing the network". The proposal, however, limits the construction costs that can be taken into account. For reasons not explained, the cost of capital invested may, in addition to that of new infrastructure, include the interest on the capital of infrastructure completed not more than 15 years before the entry into force of the directive.

The Commission distinguishes between "the costs of structural maintenance" that are proportional to the infrastructure damage caused by the traffic, and "regular maintenance costs" that are less closely connected to the composition and intensity of traffic. The former varies as a function of axle weight, and the Commission notes that the damage is generally estimated to be equivalent to the fourth power of the axle weight. For this reason, the Commission proposes that the directive should provide for a classification based on four categories of vehicle that allow for a more sophisticated differentiation of tolls according to maximum permissible gross laden weight, the number of axles and the suspension type.

Where the costs of *structural maintenance* are concerned, the proposal is fully in line with the general principles expressed in the Commission's White Paper on infrastructure charging. However, charging traffic for *regular maintenance costs* and the costs of new investment contradicts these principles.

The issue of full cost recovery versus short-term marginal cost pricing is complicated. The Commission's Green Paper "Towards Fair and Efficient pricing in

Transport" came out in favour of full cost pricing, while the White Paper on infrastructure charging and the different reports of the Commission's "High-Level Group" did not. In the proposal for amending the Eurovignette directive, the Commission returns to the position expressed in the Green Paper. The conflicting views on this choice give rise to several issues:

1. Full cost recovery may lead to a situation where non-congested roads are not used in an optimal way.
2. The revenues from marginal cost pricing (including congestion) would in most circumstances and at the level of the entire road network be large enough to deliver full cost recovery (Roy, 2003). However, this may not be the case in Member States with few large cities and little congestion on the main arteries. One should also take into consideration that over time the revenues reflecting the costs of air

pollution will decline sharply as vehicle fleets become cleaner. Thus the revenues from marginal cost pricing may in some cases fall short of full cost recovery.

3. Normally markets manage both demand and supply through pricing. Thus the question arises as to whether incentives should also be given to infrastructure providers. However, the need for supply side incentives varies with institutional arrangements and ownership of the infrastructure.
4. In principle marginal cost pricing should apply to all modes of transport, including pipelines, power lines and telecommunications, as the risk of full cost pricing resulting in under-utilisation is evident in all modes. Currently most Member States use different principles for differing modes. As each mode competes with other modes to some extent, such differences in charging for the infrastructure may distort inter-modal competition.
5. Full cost recovery, under the provisions provided by the Commission's proposal, may put more of the burden of km charging on sparsely populated peripheral regions than would a scheme based on social marginal costs. The marginal costs of air pollution, noise and congestion are high in metropolitan areas and non-existent or low in rural areas.

The many papers and reports on infrastructure charging from the European Commission do not shed much light on the issues raised above. The White Paper on "Fair Payment for Infrastructure Use" says that should full cost recovery not be reached and should Member States wish to arrive at a higher level of cost recovery, this should be done through the imposition of additional non-discriminatory and non-distorting fixed user charges. The Commission, however, does not provide an example of such a charge. A problem in this context is that Member States cannot enforce fixed charges on vehicles registered abroad. That means that almost by definition fixed charges are discriminatory and distorting. However, this may not constitute a major problem as marginal cost pricing would in most cases exceed average costs or come relatively close to full cost recovery.

The "High Level Group" (1999b) recognises that in certain situations, marginal cost recovery will not provide sufficient revenue to cover all the necessary costs of infrastructure operation. The group recommends that marginal social cost pricing should be introduced in conjunction with two-part tariffs or Ramsey-Boiteux Pricing, in such a way as to minimise distortions to competition. In recommendations for further work, the "High Level Group" says that there is need for further consideration and clarification of the criteria under which full cost recovery is necessary, and the best ways of achieving it.

In the absence of calculations of the alternative social costs connected to financing road construction from the general budget (with contribution from fuel taxes) or by the revenue from fixed transport charges, it may be difficult for Member States to take a final stand on the issue of full cost recovery. However, one may question whether the choice between full cost and marginal cost pricing needs to be resolved on a European level. The Commission does not question the right of Member States to tax road fuels for fiscal reasons. Why then, should the Community decide for its members on whether they should or should not finance fixed infrastructure costs through road tolls? Would differing preferences among Member States on this issue distort trade and competition?

A distortion could possibly occur in cases where hauliers can choose between routes in two different Member States and where one country enforces full cost pricing and the other pricing based on social marginal costs. This is a situation that might develop if Austria were to charge for the social marginal costs of alpine transits, while Switzerland maintained its current system based on full cost pricing. However, so long as Member States are not prevented from charging trucks at levels above the short term marginal cost, Austria would be free to choose a charge that is comparable to that of its neighbour.

## Should charging be limited to motorways?

The Commission wants to limit the road tolls (including km charging) to the 60 000 km of motorways and other high-quality roads that belong to the trans-European transport network (TEN-T) as defined in Decision 1962/96/EC of the European Parliament and the Council of 23 July 1996. However, Member States may (according to article 7 of the proposed directive) extend the imposition of tolls and user charges to other roads of "the primary road network". No exact definition of "primary" is provided but in the preamble (point 6), the Commission says that in order to avoid traffic being diverted, "Member States must be able to introduce charging on any road which is in direct competition with the trans-European network". When a Member State wants to use this opportunity, the extension shall be subject to a certain procedure (referred to in article 9c(5)) which involves prior consultation and the approval of the European Commission. However, the Commission does not provide any explanation for its wish to make the extension to other primary roads subject to approval.

The risk of traffic being diverted from high-quality motorways to toll-free

trunk roads is real. A Swedish study commissioned by the Ministry of Industry and Communications shows that a charge of SEK 0.96 (€0.11) per vehicle km on motorways covered by the current Eurovignette would reduce the amount of HGV traffic on that network by 13 per cent, most of which would be shifted to roads not covered by the charge (SIKA, 2000). A km charge of SEK 1.16 (€0.13), based on estimated short-term marginal costs, would displace approximately 15 per cent of the current HGV traffic.

However, extending the tolls to nearby first order trunk roads may in turn divert traffic from those roads to other first class trunk roads or to second class trunk roads. This problem is not recognised by the Commission. However, the draft directive does not prohibit Member States from extending the toll-system to other roads. The Commission proposes article 7 to be amended as follows:

"This Directive shall be without prejudice to the right of Member States to apply tolls and/or user rights on roads other than those of the main road network, in compliance with the rules of the Treaty."

In this case the Commission does not prescribe that the decision should be preceded by a procedure of European consultation and approval! If the sentence cited above means what it appears to imply, there should be no need to regulate the right of Member States to extend the toll system to roads that are in direct competition with the trans-European network.

German figures can be used for illustrating the loss to society of diverting truck traffic from motorways to secondary roads. Table 1 compares the short-term social marginal cost of HGVs on German motorways to the cost when the same type of vehicle uses the country's entire public road network. Please note that the motorways are part of the latter. A comparison between motorways and all other roads would thus reveal a greater difference in short-term marginal cost.

Table 1. Infrastructure costs for HGVs with GVW > 3.5 tonnes as a group, and for lorries with trailers, in Germany (in € per vkm at 1994 prices)

| *All HGVs* | Marginal cost |
|---|---|
| A. Motorways | 0.0212 |
| B. Total road network | 0.0857 |
| | |
| *Lorry with trailer* | |
| A. Motorways | 0.0256 |
| B. Total road network | 0.0870 |

Source: DIW et al (1998)

It is hardly surprising to find that the marginal cost of HGVs is much lower on motorways than on the total road network (in non-congested situations). However, the introduction of km charging on German motorways would probably result in a smaller shift of heavy goods traffic to trunk roads compared to the Swedish case, the reason being that alternative routes in Germany are more congested. Nevertheless the negative socio-economic effect on Germany would be considerable. The way to avoid this would be to allow Member States the right to introduce km charging on their entire public network.

There is one more argument in favour of extending km charging to the entire public network. Local distribution by trucks accounts for a large percentage of the total annual mileage in goods transport by road, and most of the traffic uses roads other than motorways. The external costs of these vehicles cannot be internalised without taking both distance and vehicle characteristics into account, and this can only be done by a system of km charging. Extending km charging to all roads would have limited impact on long-distance freight traffic as the vehicles involved mainly use motorways.

## Extending tolls to all categories of heavy duty vehicles

The Commission proposes systems for road tolls (including km charging) and user charges to be extended to goods vehicles with a maximum permissible gross laden weight between 3.5 and 12 tonnes. This is an important improvement of the current directive and will contribute to a fairer pricing system and reduce distortions in road freight transport.

In addition, the Commission says that the phasing-in of charges on commercial transport may serve as a model and encourage Member States, if they so wish, to introduce charges for private cars. Five or ten years from now most new cars will probably be equipped with GPS and have an onboard computer that could be made to work as a simple tachograph.

## Vehicle classification

The proposal for amending the directive provides the necessary vehicle classification for a European system of km charging. However, there may be cause to con-

sider additional classes for a fair allocation of the costs of structural maintenance. Differentiating km charges according to a harmonised classification makes different national schemes interoperable and would facilitate the allocation of revenues in a case where several Member States decided to operate a joint scheme in the future.

It makes sense to base the environmental differentiation on EURO 0, EURO 1, EURO 2, EURO 3 and EURO 4, and on future vehicle standards that have already been decided upon (i.e. EURO 5 and EEV). Where the charges for respectively structural maintenance and regular maintenance are concerned, the Commission proposes a classification system that takes into consideration size, axle weight and type of suspension.

## Uncovered costs of accidents

The Commission wants road tolls to include a charge that equals the costs of accidents that are not fully covered by insurance, e.g. the costs of public services mobilised in the event of accidents, the cost of medical services, losses of human capital and the cost of physical damage. To avoid charging twice for the same cost, the Commission finds it necessary to subtract insurance premiums and user's contributions to insurance companies from the full cost.

To guarantee consistent, harmonised application of toll systems, the Commission in an annex to the proposed directive presents a common methodology for calculating the various cost constituents. Average values are proposed for situations where there are no figures for the cost of accidents. A fatal accident is assumed to cost on average €1 million per case, while cases of serious and slight injuries are set at respectively €135 000 and €15 000.

In his contribution to a methodology developed for the UNITE-project, Lindberg (2000) distinguishes between:

1. *System externalities* – the expected accident cost to the rest of society (mainly medical and hospital costs) when users expose themselves to risk by entering into the traffic flow;
2. *Traffic volume externalities* – the ex-ante Willingness To Pay (WTP) among vehicle users, relatives and friends for avoiding a statistical fatality or injury, and costs for the rest of society related to the increase or decrease in the accident risk for all other users of the same mode, caused by an additional user;

3. *Traffic category externalities* – the WTP of the vehicle users, relatives and friends, and costs to the rest of society related to the altered accident risk in other modes of transport.

Lindberg's categorisation (also used in the RECORDIT-project) provides a theoretically correct determination of the external costs of accidents. However, from a practical point of view, the problem is that the marginal cost varies greatly with local and regional circumstances, including road quality, time of day, weather and traffic intensity. The marginal cost may in cases of increasing congestion even be negative. Thus, there is currently no reliable way of calculating the social marginal cost of road accidents in a way that fully reflects differences in time and space. The main problem is lack of data concerning the traffic volume externalities (point 2 above). However, where the other categories of traffic externalities are concerned, it should be possible to develop a simplified formula.

In the absence of a perfect model, it is particularly important from a socio-economic view to take into consideration that the average risk of accidents varies greatly between modes of transport. By excluding from the toll system an element representing the average risk, society would distort competition between road transport and low-risk modes such as rail, inland water and short sea shipping. Another important aspect is that the *average* externality differs greatly between categories of road users. A heavier mode inflicts a much greater risk on a lighter (including unprotected road users) than vice-versa. A third aspect to consider is the difference in risk between motorways and the rest of the road network.

The Commission is right in suggesting that the average external cost of traffic accidents should be made one of the constituent elements of the road toll. However, its proposal for how to calculate the unit cost per accident type is far from straightforward. According to annex III, the unit cost should be adjusted by the risk involved per "accident type" and "vehicle type". It is unclear what vehicle type stands for. It would, in this context, be appropriate to distinguish between cars and other light duty vehicles and one or two classes of heavy duty vehicle (in the latter case for instance vehicles above and below 7.5 tonnes) provided that national accidents statistics are broken down into these categories.

The Commission's wish to deduct insurance premiums is understandable as a matter of principle but makes the model complicated. In all Member States, where the citizens' willingness to pay for avoiding fatalities and injuries has been surveyed, the WTP component of the social cost of accidents is five to ten times larger than the component covering material damage and medical costs. Taking into consideration that most of the latter component is already covered by insurance premiums,

one might conclude that there is little cause to complicate the toll system by trying to include the remaining part. Where insurance coverage is relatively low, it makes more sense to stimulate Member States to raise the level of coverage.

Another problem with the Commission's proposal is the fact that traffic accident statistics are notoriously unreliable where slight injuries are concerned. The "dark figures" (injuries not reported as resulting from traffic accidents) are known to be high. The same is to a lesser extent true for serious injuries.

Taking into consideration these problems and the possibility of a future extension of the toll system to cars and light duty vehicles, an alternative could be to develop a simplified model for calculating the external cost of traffic accidents. One option would be to disregard uncovered material and medical costs and base the charge exclusively on the "risk evaluation", i.e. the WTP for avoiding a statistical fatality or injury. Such valuations are established through recurrent surveys of the citizens' willingness to pay (stated preference). The explicit risk value (or human value) in most Member States is of the same magnitude or higher than the total costs for fatalities and injuries mentioned by the Commission in annex III. Slight injuries could be left out of consideration as the total sum would be small compared to the aggregate costs of fatalities and severe injuries.

The individual risk depends on the composition of traffic and on the mode of transport used by the individual concerned. The risk of someone in a car being injured or killed is much greater, for example, if the driver encounters a truck during a hazardous manoeuvre than if he encounters a motorcycle. The greatest overall risk is to pedestrians and cyclists. From a risk perspective, each category of vehicle should be liable for the risk that it inflicts on other categories of road users. In accidents involving different types of vehicle (including unprotected road users) it would make sense to make the heavier category liable for the "net effect", in the form of calculating how many more people are killed and injured in the lighter type (Kågeson, 1998). CE (1999) applies a similar method when allocating the risk in multi-party accidents according to an ex-post key based on the victims "at the other side". In the case of Sweden, the *traffic category externality* of heavy trucks makes up around 10 per cent of the overall social costs of road traffic accidents.[3]

WTP is known to vary with citizens' ability to pay. Thus, WTP is higher in Member States with a high GDP per capita. The value used for internalising the risk of accidents in the European Union should reflect such differences.

The draft directive does not discuss how to calculate the accident risk for different categories of road in order to differentiate the charge. To do so becomes an interesting alternative in a case where the road toll system is extended to some



3 Own calculation based on data from "Vägtrafikskador 2001", SIKA and Statistics Sweden.

trunk roads or to the entire public road network. The risk of fatalities and injuries is a great deal lower on motorways and dual carriage ways (separated by a fence or a dividing strip) compared to other roads. The geographical differentiation of the accident element of the toll should reflect such differences. It would also make sense to use differing fees on urban and rural roads.

## Congestion charging

The Commission's proposal for amending the directive says differentiation according to specific roads in the network to take account of the level of congestion will be optional initially. According to the Commission's explanatory memorandum, the proposal envisages requiring Member States to vary tolls on different roads in the network from July 2008.[4] However, it is unclear from the wording of article 7, paragraph 10, what the rules for this differentiation are meant to be. Paragraph 10(b) states that a provision for varying tolls for degree of congestion is that no toll is more than 100 per cent above the toll charged during the cheapest period of the day, while paragraph 10(c) says that any variation in tolls charged with respect to different types of vehicle, time of day and congestion level "shall be proportionate to the objective pursued".

Limiting the range of tolls to 100 per cent above the cheapest rate would in some cases make marginal cost congestion pricing impossible. Take, for example, a congested motorway where for geophysical or environmental reasons (e.g. the Community's air quality standards) constructing additional lanes is not an option. Such a motorway would have very low fixed costs and also low accident costs (as motorways are generally relatively safe). This means that the toll could be too low to allow for a meaningful differentiation. In such a case congestion charging would have to be additional to the basic infrastructure toll.

If the Commission for some purpose (the reasons behind the proposal to limit the variability of the toll are not explained) wants to prevent Member States from charging too much, it would be better to say that the objective of congestion pricing should be to allow a maximum number of vehicles to pass a section of the motorway in a given amount of time. This is what Singapore achieves with congestion charges that are calibrated to achieve a certain average speed on its main streets. In other words, the variation in tolls charged with respect to congestion level "shall be proportionate to the objective pursued" (as stated in Article 7, paragraph 10(c)).

4 However, from the proposal for a new directive (article 7 § 10(c)) it is unclear whether differentiation shall be mandatory for degree of congestion or only for "environmental sensitivity of the area, the population density or accident risk".

To make marginal cost pricing possible it is important to allow Member States to introduce a separate charge element for congestion, i.e. this charge must be added to the elements of the toll which are related to the costs of structural maintenance, accident risks and environmental pollution.

## Environmental costs

The weighted average tolls shall, according to the Commission's proposal, include an element based on "the infrastructure costs designed to reduce nuisance related to noise and costs of actual payments made by the infrastructure operator corresponding to objective environmental elements such as for example soil contamination". Indirect costs, such as those arising from damage to human health or crops or wildlife, are not included. The draft directive, however, allows Member States to differentiate the road toll according to a vehicle's emission category ("EURO" classification). Such differentiation must be proportionate to the objective pursued (article 7, paragraph 10(c)).

The proposal deviates from the principles of marginal cost pricing by not accepting indirect environmental costs as a constituent element of the road toll. This need not be a major problem so long as the toll is high enough to allow for a differentiation that reflects the difference in environmental impact, including the indirect effects of noise and air pollution. The important point is for the toll system to be able to provide a correct incentive for upgrading engines, introducing additional exhaust after-treatment or shifting to vehicles of a higher EURO-class. Provided, in a case of full cost recovery, that the element of the toll that corresponds to the cost of investment in new roads (or upgrading of existing roads) is based on the average cost of a network rather than the cost of an individual road (which might be very low), there should be no difficulty incorporating a differentiation that reflects both direct and indirect environmental costs.

An optimal solution, though, would be to apply the principle of marginal cost pricing to the costs of air pollution and noise. This implies allowing the constituent representing environmental costs to be *added* to the constituents that reflect the structural maintenance cost, the accident risk and the marginal cost of congestion.

To make it easier for operators of fleets used for long-distance transport to calculate the benefit of upgrading vehicles or shifting to a less polluting vehicle class, the Commission should consider presenting guidelines for how Member States shall cal-

culate the environmental externalities. For this purpose it would probably be sufficient to divide roads into three geographical categories (dense urban, other urban and rural) and to allow Member States to use a higher fee in certain sensitive areas.

The draft directive says that in exceptional cases concerning infrastructure in particularly sensitive regions and after consulting the Commission, "a mark-up may be added to the tolls to allow for cross-financing the investment costs of other transport infrastructures of a high European interest in the same corridor and in the same transport zone". However, the mark-up may not exceed 25 per cent of the toll. Again, the feasibility of such a differentiation depends on the size of the basic toll and on whether the differentiation is based on the toll of a specific link (which may be small due to low fixed costs) or on the average toll of the entire network. It is understandable that the Commission wants to limit the mark-up. The Commission's objective is probably to prevent Member States from introducing high tolls in transit corridors used mainly by international traffic. However, a better way would be to introduce a special constituent for environmental damage, following

the principle of marginal cost pricing, and make sure that the increase in particularly sensitive areas (above standard levels) is proportionate to the cost. How the revenue is used is a separate issue that will be discussed later in this paper.

## Compensating for the introduction of road tolls

In a new article 7b to the directive the Commission provides an opportunity for Member States who introduce an infrastructure toll system to "provide compensation for these charges, in particular by reducing the rates of vehicle taxes, where appropriate, to a level below the minimum rates in Annex 1 to the Directive". It is not clear from the proposal whether Member States are allowed to scrap vehicle taxation altogether. Not allowing a complete shift from vehicle tax to km charging would force Member States to use two different tax regimes for more or less the same purpose.

The sentence cited above talks of compensation in general terms, which means that road users could potentially be compensated in some other way than by a reduction in vehicle taxation. The Commission does not explicitly mention the diesel tax. However, on 20 March 2003 the Economic and Finance Ministers agreed on new minimum rates for the taxation of road fuels by amending the "mineral oil directive" (92/81/EC). The new minimum rate on diesel as of 1 January 2004 will be €302 per 1000 litre, to be raised to €359 on 1 January 2010. The new directive provides an opportunity for Member States to reduce the tax rate on diesel fuel in cases where they introduce a system of road tolls or user charges on heavy duty trucks. However, the reduction is provisional on total taxation remaining at approximately the same level, on the Community's minimum rate not being violated and on the national excise duty on diesel fuel used for road transport that was in force on 1 January 2003 being at least twice as high (i.e. €604) as the minimum rate that will be applicable on 1 January 2004.[5]

The last of these three provisions seems to be unjustified. It may make it politically difficult for some Member States to apply road tolls that are fully based on the social marginal costs as this might, in combination with a relatively high fuel excise duty, lead to a situation where freight transport by road is very heavily taxed. If the Community wants to avoid distortions to competition it should aim at harmonising the tax on diesel fuel used in heavy duty vehicles as previously suggested by the Commission in its proposal for amendments to Directive 92/81/EC and Directive 92/82/EC (COM(2002) 410 final).

On the introduction of km charging, and when the sulphur content of road



5 The United Kingdom is the only Member State that fulfils this requirement.

fuels has been reduced to close to zero, carbon dioxide will be the only remaining cause for internalisation of social costs through fuel taxation. The new minimum level for the taxation of diesel oil used as a road fuel corresponds to approximately €115 per tonne of $CO_2$ emitted. This is more than the marginal incentive required for reaching the Community's commitment under the Kyoto Protocol. The average taxation of fossil fuels in EU15 equals around €45 per tonne $CO_2$ (Kågeson, 2001). Earlier work commissioned by DG Environment indicates that under a regime of European emissions trading, covering all sectors of society, the additional marginal cost for achieving the target would be around €30 per tonne $CO_2$ (Capros and Mantzos, 2000). The total marginal cost (current average taxation + the incremental cost) would thus be around €75.

This means that a diesel tax equal to €115 per tonne $CO_2$ corresponds to a more radical target than -8 per cent. This could be taken to mean that any taxation above €75 per tonne $CO_2$, equal to €195 per 1000 litres of diesel fuel, is a fiscal tax. In this example, the fiscal element of the tax would be €107 (€302 – €195). This corresponds to a fiscal tax rate of around 25 per cent[6] (on the untaxed fuel price plus €195 for the carbon content). Thus the excise duty on diesel fuel (after deducting the "carbon tax" element) falls somewhat below the rates used for income tax and capital tax in most Member States. This means that most Member States will have no reason to lower their current diesel fuel taxes as they introduce km charging.

Extending km charging in future to cars and light duty vehicles would relieve society of all the difficulties and administrative costs associated with dual diesel and petrol tax systems. In such a situation the fuel taxes could be based strictly on the carbon content of the fuel and the fiscal tax element. This would also allow for a perfect tax relief for renewable road fuels. They would be exempt from the carbon tax, and possibly the fiscal part of the excise duty tax, but the vehicles concerned would, of course, have to pay km charges correlated to other types of social costs. The tax on diesel fuel could then be the same regardless of whether the fuel is used in transport or for other purposes. This would remove the risk of fraud.

## The technical systems for charging for infrastructure use

It is important that technical systems used for km charging in different Member States are made interoperable. Of particular importance is ensuring that the electronic tachograph has a standardised interface to connect an "On-Board Unit" (OBU) for km charging.

6 20–30% depending on the price of crude oil and local circumstances.

The proposal for amendments to the directive includes a new paragraph 5a that demands that Member States shall make available to all vehicles the "appropriate vehicle on-board units ("OBU")". The current directive already includes a paragraph requiring that tolls and user charges shall be applied and collected, and their payment monitored in such a way as to cause as little hindrance as possible to the free flow of traffic and avoid any mandatory controls or checks at the Community's internal borders.

The issue of interoperability need not be solved within Directive 1999/62/EC, but it is essential that Member States preparing for the introduction of systems for km charging co-operate with each other, as prescribed in article 11, with the aim of achieving an appropriate level of interoperability. To this end, the Commission adopted a proposal for a separate directive on 23 April 2003 concerning a European electronic fee collection system.

## Should revenues be earmarked?

In the explanatory memorandum to the proposal, the Commission explains that charging will have a better chance of being understood and accepted by users if the tolls reflect an improvement in the quality of service offered by the infrastructure managers. To make the general public accept infrastructure charging, the revenue should, according to the Commission, be invested in transport infrastructure networks.

Economic theory does not support the idea of earmarking revenues for investment in transport infrastructure. An obvious drawback of earmarking is that the government is not allowed to value all types of public investment on the ground of costs and socio-economic benefits.

However, where the revenue from a charge for *structural maintenance costs* is concerned, the money should obviously be used for repairing the roads from damage caused by traffic. Earmarking is in this case a natural consequence of the principle of marginal cost pricing. To extend this type of earmarking to the revenues from a charge related to *regular maintenance costs* would hardly be controversial. The border-line between regular and structural maintenance is not always crystal-clear, and earmarking would make it easy for users to understand the connection between charges and expenditure. If a majority among road users want better maintenance, there would be little reason to deny them the improvement as they would pay the cost.

Earmarking revenues for investment in new infrastructure is a different case as it often involves damage to landscape and nature that needs to be balanced against the benefits in a socio-economic cost-benefit analysis. Funding in itself is not enough for justifying a new construction. If money is in abundant supply, decision makers would probably in some cases consider expanding construction to projects that are not socio-economically beneficial. They may also choose construction of new lanes or roads in cases where congestion pricing or investment in public transport are more viable options from a socio-economic point of view. Thus, full cost pricing in combination with earmarking would, indeed, require strict rules for environment impact assessment and socio-economic cost/benefit analysis.

In a case where the revenues from a motorway network are designated for the expansion of that particular network, earmarking might make it difficult for the government to finance alternative road projects that do not benefit from a tax-base of their own. This may result in a lower social rate of return compared to a situation where the revenue can be used more freely.

In the explanatory memorandum to the proposal, the Commission underlines the need for funding of the trans-European transport networks. The cost of completing the network is now estimated at €600 billion as a minimum, including €100 billion in the ten countries due to join the EU in 2004. The Commission thinks that a differentiated infrastructure charging system will generate more revenue than is the case today and suggests that the surplus should be used for financing the trans-European transport networks.

The draft directive, however, does not specifically mention the trans-European transport networks in this context. It states that "the revenue from tolls and/or user charges shall be used for the maintenance of the infrastructure concerned and for the benefit of the transport sector as a whole" (Article 9b, paragraph 2). This must be taken to mean that the money can be used for any purpose related to transport, including cross-financing of other modes or public transport.

Some Member States may want to earmark some or all of the revenues from infrastructure charging. The mayors of London and Stockholm, for instance, have decided to use the revenue from congestion charging for improving and enlarging the public transport systems of their cities as this is likely to make the charges more acceptable to the general public. However, the allocation of revenues is not an issue that needs to be resolved on a European level. The political situation differs among Member States and so do the priorities. The directive should leave it to Member States to decide for themselves on how to spend the money.

## Harmonisation versus subsidiarity

The objective of the amendments to Directive 1999/62/EC is, according to the proposal, to eliminate distortions of competition and guarantee a proper functioning of the internal market. In addition, the Commission says that a fairer system of charging is crucial in order to ensure sustainable transport in the Community, make optimum use of the existing road network and reduce significantly the negative impact of transport.

A relevant question in this context is to what extent common European regulation is needed for achieving this. The Commission proposes a number of rules and restrictions, some of which can be questioned in the light of the principle of subsidiarity (enshrined in article 5 of the Treaty).

A proper functioning of the single market may call for a common methodology for calculating external costs, and a non-discriminatory way of charging for those costs that can replace all or part of the current system of distorting taxes on diesel fuel and vehicles. One virtue of km charging is that it provides equal treatment to all vehicles (of the same type) regardless of origin, destination or country of registration. For long-distance trucks this is in itself a good reason for European intervention. It also makes sense to develop a common system for classification of vehicles.

The extension of the toll and/or charge system to trucks with a gross vehicle weight between 3.5 and 12 tonnes is reasonable as leaving them out might cause some vehicle or freight owners to shift from large trucks to smaller vehicles. This would cause more damage to infrastructure and nature per tonne kilometre as small trucks carry fewer goods than do heavy goods vehicles.

The geographical limitation proposed for the common system of road tolls (or user charges) is less convincing. It is true that the TEN-T network carries about half of all goods transported, counted as tonne kilometres, and the share is substantially higher where trucks in international traffic are concerned. This may argue in favour of delimiting the geographical scope of the system to roads that play an important role in international movements of goods. On the other hand, approximately 50 per cent of the overall freight movements take place on other types of road. In addition, restricting the scheme to the TEN-T network will make some trucks choose parallel trunk roads where traffic gives rise to higher costs in terms of road damage and accidents.

To extend the pricing scheme to the entire public network of a Member State is probably cheaper in terms of investment and operational costs than to limit the

tolls to motorways. In the first case, beacons are only needed at border crossings (at least during the first phase when charges need not be differentiated for differences in time and place), while limiting tolls to motorways requires beacons and toll stations at all motorway entrances and exits. However, in a situation where all vehicles are equipped with both GPS and OBUs, there would be no significant difference between a limited regime and one that covers the entire national network.

Other elements of the system proposed by the Commission are even more difficult to defend. Why, from a subsidiarity point of view, should the Community:

– force Member States to use the tolls for recovering fixed costs;
– prevent Member States from including, as constituent elements, charges reflecting the social marginal cost of congestion and the marginal cost of environmental impact, thus forcing them, as a second best solution, to differentiate the toll for road construction and maintenance;
– limit the range of congestion pricing (to 100% above the toll charged during the cheapest time of the day);
– force Member States (by 2008) to vary the tolls for environmental sensitivity of different areas, population density and accident risks (despite it being a good idea);
– decide for Member States on how they shall use tax revenues?

Decisions on these issues should be left to the Member States under the proviso that the measures that they take are non-discriminatory and proportionate to the objectives pursued.

The Commission underlines the importance of using pricing for reducing congestion and wants to make differentiation of the toll for degree of congestion mandatory by 2008. It is important in this context to consider whether congestion pricing should apply only to commercial vehicles. In most circumstances passenger cars contribute more to congestion than trucks. This is true in particular for peak hour congestion in metropolitan areas. Charging trucks but not cars would make congestion pricing rather inefficient.

The Commission proposes the creation in each Member State of an independent infrastructure supervision authority to oversee the operation of the national charging systems in a manner guaranteeing transparency and non-discrimination between operators, to verify that the revenues will be ploughed back into the transport networks, and to promote synergies between the different sources of funds earmarked for transport infrastructure. The first of the three tasks is relevant for the functioning of the road toll systems, the latter two, however, contradict the

principle of subsidiarity. Where the first task is concerned, Member States should be free to place the responsibility with the finance ministry, the ministry of transport or the national road administration. Alternatively they can, if they so wish, create a new body for this purpose. It is not important from a European perspective to regulate how Member States should organise themselves.

## Summary and Conclusions

For the proper functioning of the internal market it is important to shift to a road tax regime that is non-discriminatory and reflects the social marginal costs of transport. Road tolls based on distance driven (kilometre charging) is an appropriate response to this challenge. An efficient toll system will provide incentives to road users to take measures that will reduce wear and tear, pollution, traffic accidents and congestion.

The proposed directive represents a clear advance on the existing directive in several ways. It makes kilometre charging possible in motorways and provides an option for charging vehicles in all roads of a Member State. The draft directive is also broader in scope than the current directive in terms of vehicles and cost elements. Another advantage is that it provides an improved structure for the differentiation of charges and tolls.

However, in a number of circumstances the proposed amendments restrict Member States in ways that violate the principle of subsidiarity and prevent them from introducing a charge system which includes elements fully reflecting the social marginal costs of air pollution and congestion. Forcing Member States to use the tolls for recovering fixed costs and to earmark the revenues for infrastructure investment are other violations of this principle. In some Member States, earmarking would even require constitutional change.

A European directive on infrastructure charging should make it mandatory for Member States to cover, as a minimum, the full social marginal cost of road wear and tear, the cost of air pollution, and the risk of road traffic accidents. Member States should also be free to introduce a separate charge covering congestion.

For heavy vehicles it makes sense, as proposed by the Commission, to allow a geographical differentiation of the road wear component of the charge as the cost will differ greatly depending on the condition of the roadbed. The element of the charge reflecting the risk of traffic accidents should also be differentiated

between high quality roads, such as motorways, and trunk roads. It may also be wise to differentiate the pollution charge between rural and metropolitan areas. Many more people will be affected by emissions of a gram of small particles, hydrocarbons and nitrogen oxides in large cities compared to rural areas.

The directive should, as proposed by the Commission, include common principles for how costs shall be calculated and allocated among different categories of vehicle. However, there is no ground for limiting the level of any of the charge elements as costs vary greatly depending on local and national circumstances. It should be enough to underline that all measures (in terms of rates and application) must be in compliance with the rules of the Treaty.

More important than anything else is to make it crystal-clear that the final directive does not prevent a Member State from introducing km charging on its entire national road network, including trunk roads that run parallel to motorways. Unilateral action by one Member State to this effect would not have any negative impact on the internal market, as the kilometre charge is non-discriminatory and based on the principle of territoriality.[7]

Mandatory systems for charging heavy goods vehicles (above 3.5 tonnes) may be introduced in two stages, the first covering traffic on the TEN-T network, and the second traffic on the remaining roads of the national networks. Member States that wish to go directly to the second phase should be free to do so. Differentiating the charges for degree of congestion, local sensitivity to air pollution and noise or accident risks could be part of the second phase as this would probably require all vehicles concerned to be equipped with GPS.

In accordance with the Treaty's principle of subsidiarity the directive should leave it to Member States to decide on how they want to finance investment in new infrastructure.

After more than ten years of research and discussions there is still no common agreement on the exact size of road transport externalities. However, the issue is much better understood today. Now is the time to start to learn by doing. There is no risk that a shift to kilometre charging will turn out to be a move from bad to worse. The current ways of charging heavy road traffic are in most cases distorting to trade and competition and do not accurately reflect the underlying social costs. The feedback from experiences with kilometre charging based on social marginal costs will allow for gradual improvement of the schemes.

The current Eurovignette directive is a barrier to the introduction of nationwide schemes for kilometre charging. Therefore it is essential that the directive is amended. However, the Commission's proposal is far from crystal-clear. The



7 However, unilateral introduction of km charging is less attractive than multilateral for a number of reasons identified by Kågeson and Dings (1999).

Council should clarify matters and avoid regulating aspects that need not be harmonised on a European level. The Commission, on the other hand, should provide additional guidance to Member States on the calculation of transport accident externalities and the social marginal cost of air pollution.

## REFERENCES


Capros, P. and Mantzos, L. (2000), "The Economic Effects of EU-Wide Industry-Level Emission Trading to Reduce Greenhouse Gases, Results from PRIMES Energy Systems Model", E3M Lab, Institute of Communication and Computer Systems of the National Technical University of Athens, May.

CE (1999), "Efficient Prices for Transport", Delft, the Netherlands.

DIW/INFRAS/Herry/NERA (1998), "Infrastructure capital, maintenance and road damage costs for different heavy goods vehicles in the EU", commissioned by European Commission DG VII, Berlin, March.

European Commission (1995), "Towards Fair and Efficient Pricing in Transport", Green Paper, Brussels 20 December, COM(95) 691 final.

European Commission (1998), "Fair Payment for Infrastructure Use: A phased approach to a common transport infrastructure charging framework in the EU", White Paper, DG VII, 22 July.

European Commission (2001), "European Transport Policy for 2010: time to decide", White Paper, Brussels 12 September, COM(2001) 370 final.

European Commission (2003), "Proposal for a Directive on the widespread introduction and operability of electronic road toll systems in the Community", Brussels 23 April, COM(2003) 132 final.

European Council (2003), "Directive reconstructing the framework for the taxation of energy products and electricity", (97/0111(CNS), Brussels 20.3.2003.

European Parliament and Council, "Directive 1999/62/EC on the charging of heavy goods vehicles for the use of certain infrastructures".

Hansson, L. and Lindberg, G. (1992), "Trafikavgifter på samhällsekonomiska villkor", Ministry of Transport, Stockholm.

High-Level Group on Transport Infrastructure Charging (1999a), "Final Report on Estimating the Costs of Transport", Brussels May 26.

High-Level Group on Transport Infrastructure Charging (1999b), "Final Report on Options for Charging Users Directly for Transport Infrastructure Operating Costs", Brussels September 9.

Kågeson, P. (1993),"Getting the Prices Right. A European Scheme for Making Transport Pay its True Costs", European Federation for Transport and Environment, T&E 1993/6, Brussels.

Kågeson, P. (1998), "Konkurrensen mellan transportslagen efter en internalisering av de externa kostnaderna", Banverket Rapport S 1998:1, Borlänge, Sweden.

Kågeson, P. (2001), "The Impact of $CO_2$ Emissions Trading on the European Transport Sector", VINNOVA, The Swedish Agency for Innovation Systems, VINNOVA Report VR 2001:17.

Kågeson, P. and Dings, J. (1999), "Electronic Kilometre Charging for Heavy Goods Vehicles in Europe", European Federation for Transport and Environment, T&E 1999/6, Brussels.

Lindberg, G. (2000), "Marginal Cost Methodology for Accidents". UNITE (UNIfication of accounts and marginal costs for Transport Efficiency) Interim Report 8.3. Funded by 5th Framework RTD Programme. VTI, Borlänge, Sweden.

Mauch, S. and Rothengatter, W. (1994), "External Effects of Transport", Project for UIC Paris, Final Report, IWW Universität Karlsruhe and INFRAS AG, Zürich.

Roy, R. (2003), "Optimal Transport Pricing", Revised Final Report of the ECMT/EC DG-TREN research project comparing current transport taxes and charges with an optimal pricing benchmark (prepared as Chapter 2 of the forthcoming ECMT Report, Efficient Transport Taxes and Charges, OECD Publications, Paris, 2003), London, June.

Quinet, E. (1989), "The Social Costs of Land Transport", Discussion paper of the Environment Committee, Group of Economic Experts, Paris.

SIKA (2000), "Effekter av alternativ till eurovignettesystemet", SIKA Rapport 2000:4, Stockholm, Sweden.

# Comment

*by Jos Dings*

In many ways the proposal is a major step forward from the current situation. It opens the door for distance-based charging and, even more importantly, differentiation of these charges on the basis of important parameters such as road damage, air pollution, congestion, and the environmental sensitivity/population density of the region. Furthermore, innovative proposals are made for vehicle classification and regional differentiation of charges and the setting-up of an infrastructure authority. It is, although not compulsory, the most far-reaching and ambitious proposal on transport charging issued to date.

What follows is an analysis of the degree to which the proposed system is in line with the principles of efficient transport charging and an analysis of the subsidiarity issue.

Although the proposal is certainly not theoretically perfect and contains a number of seemingly arbitrary choices with respect to cost items to be included, it might in practice come pretty close to a welfare-optimal system of HGV charging, closer perhaps than suggested in Dr Kågeson's paper. Three arguments can be raised for this.

First, let's treat the issue of full infrastructure cost recovery at which the proposal aims. At first sight, this is far from a welfare-optimal marginal cost charging approach. But the proposal limits the construction costs that can be taken into account to those for infrastructure to be built in the future or which has just been built, i.e. not *all* infrastructure but the *additional* or marginal infrastructure. Nowadays most new infrastructure aims at relieving congestion, and there is a good theoretical case for charging road users the fixed costs of new congestion-relieving infrastructure[1].

Second, the issue that the proposal only covers infrastructure and external accident costs and excludes environmental costs and congestion costs. Although this is certainly true, it could be asked whether this is actually a problem in practice. The proposal provides ample room for differentiation of costs on the basis of location, time (i.e. congestion) and engine Euroclass. So a charge *structure* that provides incentives to shift to clean and off-peak vehicles, times and routes is there. Only noise is not covered although this is understandable as noise cost



1 See, inter alia, the recent study "Returns on Roads, Optimising road investments and use with the 'user pays principle" (CE Delft et al., 2002).

calculation is extremely difficult if not unfeasible in practice. But what about the charge *levels*? We should not forget that the good-old fuel tax with its EU-wide minimum levels is still in place and the proposal does not mention the fuel tax as a possible compensation mechanism. The kilometre charge plus the fuel tax together provide for an appropriate minimum charge level. It might well turn out that the combination of a strongly differentiated kilometre charge and the fuel tax comes in many cases pretty close to the theoretical first-best optimum (see box).

Third, the use of revenues. As Dr Kågeson's paper says, using road maintenance charges for road maintenance is very logical. The same goes for road investment charges, which were discussed previously. The important question is what should be done with the revenues of the road accident charges. In the Dutch case these could amount to some hundreds of millions of euros, quite an amount of money to earmark for use in the transport sector. Ministers of Finance will certainly have difficulties with this.

Finally, the important issue of geographical scope. The Commission decides to limit its action to the trans-European network plus some competing high-quality roads. Most accidents, nuisance and infrastructure damages etc. take place on other roads, however. The system as proposed is an incentive to make less use of the 'best' roads and could therefore have adverse impacts. The inclusion of roads that compete with the TEN does not really help because there are smaller roads that in turn compete with these roads. It could be argued that this restriction is the most important deviation from an optimal transport infrastructure charging scheme.

All elements taken together, the proposal therefore could in practice, despite all scientific uncertainties, legal boundary conditions (fuel tax) and political wishes (earmarking), come surprisingly close to what economists call 'a first-best solution'. The most important weak point is the proposal to limit the scheme to the large arteries and hence exclude the smaller roads that are more prone to damage, accidents and nuisance.

Then the subsidiarity issue.

It could be said that anything that has to do with charge *structures* is an EU issue, as different charge structures in different Member States hamper the functioning of the internal market.

Whether charge *levels* are an EU or a national issue is a little more complex. In case of fuel and vehicle taxes the EU sets minimum levels as these instruments do cause economic disadvantages for domestic hauliers and therefore bear the risk

### An indication of charge levels

It might be useful to think a little of possible charge levels resulting from the scheme as proposed by the Commission. For small lorries, charges could be as low as 5 to 10 €cts in the case of old infrastructure, and some cents higher if fixed costs for new or recent infrastructure investment are also charged for. For larger lorries, charges could vary between just under 10 cents and, say, around 25 cents, depending on specific infrastructure costs and accident risks[2]. These are charges of the same order of magnitude as the German ones, and can be considered high enough to justify transaction costs (OBUs etc.). Leaving aside accident costs and concentrating solely on infrastructure costs lowers the bill a few cents per km which means that for small lorries the ratio between transaction costs and expected benefits from kilometre charging could become questionable.

The fuel tax ranges from about 4 (small lorry, Luxembourg diesel) to about 15 cents (heavy lorry, German diesel, UK not considered) per kilometre.

Total use-based charges could thus vary from roughly 10 to roughly 40 cents per kilometre, quite well in the range of most European studies on external and infrastructure costs of heavy goods vehicles. See "External and infrastructure costs of road and rail traffic; analysing European studies", CE Delft, 2003

of the 'race to the bottom'. Territory-based charging does not have this disadvantage. It could therefore be argued that anything that has to do with charge levels is a national issue. Member States may choose themselves which economic activities they wish to tax heavily and which not. On the other hand, the Directive does not prescribe precise charge levels, but rather which cost components to include, in an attempt to increase the efficiency and transparency of transport charging. An analogous, albeit much less specific, approach can be found in the rail charging Directive 2001/14. Only the limit on congestion charges (+100 %) seems very arbitrary and unnecessary.

The *use of revenues* is in principle an issue for Member States, but as already discussed it is very logical to use the infrastructure costs component of the charges to cover these infrastructure costs. Only the way in which the accident



2 Estimates, derived from "Efficient transport for Europe" (ECMT, 1998) and "Efficient prices for transport", CE Delft, 1999. These are the only studies known that calculate variable and fixed infrastructure costs for HGVs.

cost component should be ploughed back in the system remains very unclear and it seems the Commission exceeds its mandate here.

The conclusion can be drawn that from a subsidiarity point of view, a similar albeit much less detailed approach has been tried and tested before in the rail directive, so the main line of the proposal seems to comply with this criterion. Some details can hardly be defended, however.

In summary, the proposal seems to strike a reasonable balance between scientific, political, legal and technical feasibility and can be seen as a major step towards better infrastructure charging, both in terms of charge levels and charge structures. The geographic limitation to the large motorways and trunk roads and some details like the compulsory use of revenues from accident charges and the arbitrary limit to congestion charges seem counterproductive, useless or unfeasible.

# Comment

*by Gunnar Lindberg*

## Uncovered costs of accidents in the Commission's proposal for a new Eurovignette Directive

This comment only deals with the treatment of accident costs in the proposed directive and the corresponding section in Kågeson's paper.

### Introduction

The Commission clarifies the approach of the proposed directive in the explanatory memorandum (section II.1.b), in the new article 7.a and in an Annex. In the explanatory memorandum the principle is presented as; '*…account should be taken of the real costs for society as a whole. These include vehicle repair and replacement costs, which are generally covered to a large extent by insurance schemes, as well as the administrative costs of the public services mobilised in the event of accidents, the costs of medical services and losses of human capital (discounted losses of productive potential) and the cost of physical damage. So as not to include the costs already internalised by insurances, it is then necessary to subtract insurance premiums and users' contributions to insurance companies.*'

Article 7.a.1 refers to the methodology and unit costs in Annex III. The Annex presents the cost in a paragraph and in a formula; according to the Commission, the external cost is equal to the product of the total cost per accident type and the accident risk (for that type of accident) involving heavy goods vehicle subtracting the insurance premium per kilometre. If a Member State does not have accurate cost estimates, the Commission offers unit values (by accident type) to use, €1 000 000 /fatality, €135 000/severe injury, and €15 000/slight injury. Obviously, 'accident type' should be interpreted as fatality, severe and slight injury.

## The proposal compared to state-of-the-art research

The price relevant accident cost is an *external marginal* accident cost. It is, according to state-of-the-art research (UNITE – Lindberg (2003)), a product of the cost per accident (type), the accident risk (for that type of accident) involving heavy goods vehicles and adjusted for the internal accident cost part and the risk elasticity (that is the change in the number of accidents as the traffic flow changes).

It seems that the Commission does not care about either the internal/external or the marginal/average cost distinctions. The Commission suggests in fact a *total average cost pricing* principle, although with deductions of the insurance premium.

The proportion of internal costs varies from almost 100% for bicyclists, to 50% for passenger cars, 30% for light goods vehicles, and 3% for the heaviest heavy vehicles. To ignore the external/internal distinction is therefore a serious simplification.

The average cost approach taken is equal to a marginal cost approach with an assumption of zero risk elasticity. However, we know that the elasticity varies strongly under different circumstances and is often negative on interurban roads and probably positive in urban areas. The assumption of a zero elasticity could possibly be a justifiable simplification, but the principle should not be ignored.

The cost per accident type put forward by the Commission is lower than the average value used in the UNITE project (€1 500 000 /fatality). However, the latter value is adjusted according to the purchasing power in each Member State. The Commission's recommendation is to use the value when no other justifications exist. The value is reasonable as a lower limit but it will be above the adjusted UNITE value for some of the new Member States. The relations between the values for fatalities and injuries, respectively, are also sound.

Nevertheless, the text by the Commission raises serious questions. The argument put forward is that the recommended value is based on the human capital approach (i.e. the present value of all future lost production). This approach has been abandoned in a majority of countries where values of risk reductions are used; risk reductions are valued irrespectively of the production capacity of human beings. If the human capital approach is to be used, it is difficult to justify the levels suggested. A comprehensive value of a statistical life based on the human capital approach would in Sweden be around €600 000 compared to €1 920 000 based on the willingness-to-pay method[1].

1 The table below describes the Swedish recommended risk values (SIKA 2002:4) and values based on a human capital approach.

| | *Willingness-to-pay* | | *Human Capital* | |
|---|---|---|---|---|
| | VOSL | TOTAL | Gross Net Production | TOTAL |
| Fatality | 1 783 882 | 1 920 066 | 577 872 | 598 482 |
| Severe Injury | 164 803 | 232 895 | 34 884 | 71 581 |
| Slight Injury | 12 390 | 19 189 | 1 732 | 6 798 |
| Damage only | 0 | 1 425 | 0 | 1 425 |

## Comments on Kågeson's paper

It now appears as possible to base accident cost pricing attempts on proper theory. The internal/external cost ratio has been estimated successfully in a number of cases and according to some studies that ratio could be stable between Member States (Lindberg (2003). We also have information on accident risks for different vehicle types on different infrastructure types. Moreover, accident valuation is an area with consensus on the relevant approach and is the subject of active economic research. The biggest problem in applying the theory seems to be the uncertainty surrounding the estimates of risk elasticity.

Thus, I find Kågeson to be too negative towards the possibility of basing accident cost pricing on proper theory. However, the discussion in the paper follows in many dimensions the recommendation from the theory. The variability in accident cost, and especially external accident cost between different vehicle types, should be taken into account. The latter dimension is a reflection of the internal cost ratio discussed above. The accident risk should be differentiated according to vehicle type and infrastructure type. In the paper, the following vehicle types are proposed – passenger cars and two classes of heavy vehicles. This level of differentiation is, however, never justified in the paper and the optimal differentiation is still an open question that should be analysed.

The Commission wishes to deduct the insurance premium. According to the paper, this is understandable for reasons of principle, but makes the model complicated. The distinction between variable and fixed premiums is not discussed in the paper. In principle it is correct to deduct the variable insurance premium although the compensation should be included (Lindberg (2001). In most, if not all, Member States the compensation in the insurance system only covers a minor part of the socio-economic costs of accidents. This low coverage is reflected in low insurance premiums. It is never discussed which type of insurance premium should be deducted, the premium for self-protection or the third party premium. According to the relevant theory, only the latter part should be deducted.

An approach suggested in the paper, that may be justified, is that the insurance market internalises the material costs of accidents, so that the only market failure is the coverage of the marginal external cost based on the value of statistical life. The accident cost that could be included in the toll is then only the value of statistical life. In Member States where the coverage of the insurance system is poor, an increased responsibility for the insurance market could be promoted.

The section in the paper on 'the net effect' of risks in accidents between vehi-

cle categories is unclear. The general theory referred to above that takes the internal/external dimension and the risk elasticity into account, solves the issues and can be applied to collisions between vehicles or modes of different mass (Lindberg (2003).

Kågeson suggests that the risk value should be differentiated according to citizens' ability to pay which is the approach taken in UNITE. However, the costs suggested in the directive can be seen as an approximation and a differentiation in line with Kågeson's suggestion could be made.

Finally, the Commission's approach, with a suggested low accident cost and an average cost principle, could in practice come rather close to the theoretically correct approach on interurban roads (where we often find a negative elasticity), assuming the cost is adjusted for the internal/external dimension. However, this is mere luck and not the result derived from a clear approach. It will not hold in many other areas and it is recommended that the regulation be based on relevant theory, possibly with simplified assumptions on necessary parameters.

## REFERENCES


Lindberg, G (2003) Deliverable 9, "Marginal accident costs – case studies". UNITE (UNIfication of accounts and marginal costs for Transport Efficiency) Deliverable 9. Funded by 5th Framework RTD Programme. ITS, University of Leeds, Leeds, July 2002.

Lindberg, G. (2001), "Traffic Insurance and Accident Externality Charges", Journal of Transport Economics and Policy, Vol. 35, Part 3, pp 399-416.

Nellthorp, J. T. Sansom, P. Bickel, C. Doll, G. Lindberg (2001), "Valuation conventions for UNITE", UNITE project.

Nilsson, K., U.Persson, A.Trawén (1999), "Revidering av Vägverkets olyckskostnader". Lunds Tekniska Högskola, Lund.

SIKA Rapport 2002:4, "Samhällsekonomiska metoder och kalkylvärden på transportområdet - ASEK."

# Comment

*by Chris Nash*

## A critical analysis of the proposed reform of the Eurovignette Directive

The central point of Kågeson's critique is that the proposed new directive is not consistent with the policy of short run marginal cost pricing adopted by the European Commission in the White Paper on Fair Charges for transport infrastructure. The reason is the decision to tie user charges to the cost of "constructing, operating, maintaining and developing the network", as well as other limits on the extent to which tolls may be varied to reflect, for instance, marginal costs of congestion. In essence, this criticism is surely correct.

The importance of this criticism depends on two issues; firstly, whether there is any good reason to introduce such constraints, and secondly whether the constraints will in fact lead to serious distortion.

On the first point, it is widely recognised (e.g. Verhoef, 2001) that there are many reasons why "pure" short run marginal social cost pricing may not be the optimal policy in the real world. The main reasons are second best responses to immovable distortions elsewhere in the economy, budgetary issues, institutional problems and implementation costs and risks. A rather different barrier to short run marginal cost pricing, but one which may force compromises to be reached, is political and public acceptability.

Given that the constraints imposed on the level of charging will in some cases (e.g. on severely congested roads such as many in Great Britain) lead to charges that are below marginal social cost, and in other cases where congestion is limited lead to charges above marginal social cost, it is very hard to think of any general second best conditions that could make these constraints sensible. Nor is there any reason to suppose that budgetary problems will cause it to be necessary to exactly recover infrastructure costs from user charges in all countries. Indeed, given the arbitrary conclusion that only capital charges on new infrastructure or that built in the last 15 years may be included, and as it appears that the share attributable to hgvs is to be based on vehicle km rather than on the degree to

which they are responsible for the construction of new roads, it seems likely that only a low level of infrastructure capital costs will typically be applicable and that charges under these proposals are more likely to be too low than too high.

The conclusion must be, therefore, that the constraints reflect compromises in order to make the proposals generally acceptable throughout the Union, and/or institutional issues. It is certainly a common finding that user charges are made more acceptable if it is clear that they reflect actual money costs incurred by the authority levying the charges and if the revenue is earmarked to be spent in ways that benefit those paying the charge. Indeed this argument is explicitly cited in the explanatory memorandum. The exclusion of environmental costs from the total costs to be covered appears to be justified on the grounds that these are more uncertain than infrastructure and external accident costs, despite the enormous amount of work the Commission has funded on their measurement and valuation in recent years.

It follows therefore that this aspect of the proposal must be judged in terms of the degree of inefficiency to which it will lead, and in particular the degree to which this will be reduced relative to that caused by the existing Directive.

On the latter point, the proposed Directive represents a clear advance on the existing Directive in a number of respects. It makes it clear that kilometre based charges are a permitted form of user charge, and that they need not be confined to motorways; they may be levied on other competing roads, and indeed on all roads in a particular country. It permits user charges on lighter good vehicles (those above 3.5 tonnes gvw rather than solely above 12 tonnes gvw) and increases the degree of differentiation allowed (for instance, allowing differentiation according to the degree of congestion as well as emission factors) and indeed making this compulsory from 2008. (It is doubtful however whether 4 categories of vehicle present enough variety to reflect efficiently the variability of wear and tear with axle loads.) It also permits a surcharge in environmentally sensitive areas which may be used for rail infrastructure enhancement rather than road.

However, it does appear that the limits on permitted levels of charge may lead to significant degrees of distortion, for instance in Great Britain, charges for articulated goods vehicles related to marginal social cost would exceed charges based on the cost of infrastructure provision by nearly 150 % (Sansom et al, 2001). Judging by the British evidence, the limit on congestion charges that peak charges should not be more than 100 % above those for the cheapest times of day looks less of a problem, although if only heavy goods vehicles are charged for congestion this is more of an issue. Clearly only charging hgvs congestion costs is enor-

mously less efficient than charging all traffic. But it appears that in these circumstances second best charges for hgvs are actually above those that would be optimal were all traffic charged (Nash and Niskanen, 2003).

There is an issue relating to compensatory reductions in other taxes. Kågeson claims that an efficient allocation of taxation for fiscal purposes between labour, capital and energy, will require continued tax on diesel at the current EU minimum or above. It is hard to understand the basis for this argument. Second best arguments do not suggest that different inputs should be subject to similar levels of taxation given that they are subject to differing demand and supply elasticities and are not perfect substitutes.

But the constraints the Commission suggests on the levels of charge may be a reaction not just to acceptability problems, but also to particular institutional issues. There is good evidence that when the setting of charges is decentralised between governments covering different geographical areas of a single market, individual governments may have incentives to deviate from marginal social cost pricing in order to influence the distribution of revenues and costs. For instance, even if they are precluded from discriminating against foreign hauliers, countries with a high level of transit traffic may have an incentive to impose charges that are inefficiently high (Nash and Niskanen, 2003). The result of this is not solely inefficient routeing of international traffic, but distortions to production and distribution decisions throughout the economy. Thus there may be justification for imposing constraints on the levels of charges at the European level. Ideally these constraints would take the form of checking that charges are correctly based on marginal social cost. As Kågeson says, originally the Commission proposed to produce a methodology paper and a framework directive which would have sought to ensure that a standard methodology was adopted for the calculation of marginal social cost in all countries. In its absence, this Directive limits charging to those elements of cost it claims are easiest to calculate, and also suggests methods of calculating them which are very simplistic. The constraints in this proposed Directive may be designed to prevent overcharging, but – as indicated above – in terms of efficiency they are a very poor substitute for a clearly spelled out methodology covering all marginal social costs.

In summary then, this proposed Directive does significantly improve on the existing situation. If it is really the best compromise that could be reached then it can at least be welcomed on those grounds. But it falls a long way short of the aspirations of the 1998 White Paper, and appears certain to perpetuate severe inefficiencies, including requiring charges to be held inefficiently low in much of Europe.

## REFERENCES

C. Nash and E. Niskanen (2003) "Policy conclusions from MC-ICAM". Paper presented at the fourth Imprint-Europe seminar, Leuven.

T. Sansom et al (2001) "Surface Transport Costs and Charges". Great Britain 1998. Institute for Transport Studies, University of Leeds

E.Verhoef (2001) "Marginal cost based pricing in transport: key implementation issues from the economic perspective". Paper presented at the first Imprint-Europe seminar, Brussels.

# The contributors

*Jos Dings* is manager at CE Delft's Transport division. He became an expert on the 'Auto Oil' dossier on new EU vehicle standards and has gradually moved into transport economics, becoming an expert on pricing policies, infrastructure assessment methodologies, and strategies to reduce the environmental impact of aviation. email: <dings@ce.nl>

*Per Kågeson* is the author of "Getting the Prices Right" (1993) and several other reports and papers on the pricing of transport. He is director of Nature Associates, a private consultancy in Stockholm, and specialised on the cost-efficiency of measures and policies for improving the environmental performance of transport. e-mail: <kageson@comhem.se>

*Gunnar Lindberg*, economist, is a research leader at the Swedish National Road and Transport Research Institute (VTI). His research is focused on marginal costs of infrastructure use with the emphasis on accident costs. He has been an active contributor to various EU-financed research projects on transport pricing, such as PETS, UNITE and IMPRINT. e-mail: <gli@du.se>

*Chris Nash* is professor of transport economics in the Institute for Transport Studies, University of Leeds. His research interests include particularly transport pricing, rail demand forecasting, project appraisal and deregulation and privatisation. He has managed several EU research projects on internalising transport externalities, including PETS, CAPRI, UNITE, MC-ICAM and IMPRINT. e-mail: <cnash@its.leeds.ac.uk>

**Efficient charging of heavy goods vehicles**

*A critical review of the Commission's proposal for amending the Eurovignette Directive*

The Swedish Institute for Transport and Communications Analysis, SIKA has the task of producing official statistics, developing forecasts and planning methods and initiating and carrying out studies of relevance for Swedish transport policy making.

During the last couple of years, SIKA has been instructed to calculate and monitor the external marginal costs of transport with the objective of providing the Government and the transport agencies with information on which to base efficient infrastructure charges. Such charges have been proposed by the European Commission in its 1998 White Paper "Fair payment for infrastructure use".

Recently, the Commission released a proposal for amending the Eurovignette Directive on charging of heavy goods vehicles. This proposal seems to be a step in a different direction from that in the 1998 White Paper. SIKA has therefore commissioned Per Kågeson, Nature Associates, to evaluate the proposal, and Jos Dings, the Netherlands; Gunnar Lindberg, Sweden; and Chris Nash, U.K. to comment on Kågeson's evaluation. In the hope that it will be of interest in other EU Member States, SIKA has published the report in English.

Swedish Institute for Transport and Communications Analysis,
SIKA
sika@sika-institute.se
www.sika-institute.se
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