



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 22.07.1998
COM(1998) 466 final

Fair Payment for Infrastructure Use:
**A phased approach to a common transport infrastructure
charging framework in the EU**

White Paper

(presented by the Commission)

Executive summary

1	Introduction	1
2	Transport problems resulting from existing charging systems.....	2
3	A Community approach to infrastructure charging.....	5
4	A step-by-step approach to implementation	13
4(a)	Phase One: 1998-2000	13
4(b)	Phase Two: 2001-2004.....	14
4(c)	Phase Three: beyond 2004.....	14
5	Implementation, priority actions and modal implications	15
5(a)	Development of consistent costing and accounting practices.....	15
5(b)	Road.....	17
5(c)	Rail.....	20
5(d)	Inland waterways	21
5(e)	Aviation	21
5(f)	Maritime.....	23
5(g)	Transport related tax policy.....	24
5(h)	Efficient provision of infrastructure.....	25
6	Socio-economic evaluation of the strategy	29
6(a)	General economic effects	29
6(b)	Distributional effects	31
6(c)	Cohesion and peripheral regions	31
7	Conclusion.....	32
	References	33
	Glossary.....	35
	Annex I : Different infrastructure charging approaches	37
	Annex II: Existing approaches to infrastructure charging	38
	Annex III: Marginal Social Cost Charging and Recovery of Capital Costs.....	45

Executive summary

1. The great diversity of infrastructure charging systems across modes of transport and Member States undermines the efficiency and the sustainability of Europe's transport system. There are currently nine different charging systems for railway infrastructure, with cost recovery ratios varying between 0% and 100%. Vehicle tax and road charging systems are also fundamentally different; for example annual vehicle taxes on trucks differ by up to 3000 ECU and only four Member States levy tolls on significant parts of their motorway network. Similarly the treatment in terms of VAT imposition and energy taxation differ widely across modes and between Member States. Moreover, charges are seldom levied at the point of use and they are generally not related to environmental or other "external" costs. As a result users are currently given only limited incentives to adjust transport patterns and technologies to reduce costs and infrastructure managers seldom receive sufficient revenues from direct user charges to fund investment.

2. This situation gives rise to significant distortions of competition within and between modes, often on the basis of the nationality of the transport provider. It also limits the incentives to cut environmental costs and holds back the efficient provision of infrastructure.

3. The variety of problems thrown up by the diversity of approaches to infrastructure charging cannot be adequately treated in isolation from each other. That is why the Commission considers that a gradual and progressive harmonisation of charging principles in all major commercial modes of transport is required across the Community to deal with these problems. It is proposed that the charging system be based on the "user pays" principle, i.e. all users of transport infrastructure should pay for the costs, including environmental and other external impacts, they impose, at, or as close as possible to the point of use. It is important to note that changes to charges are not automatically reflected in final transport prices, as commercial operators may adjust their use to lower their costs. Moreover, Member States can obviously continue to support the provision of public services or services in the general interest through subsidies to transport operators using the infrastructure, thereby off-setting effects on prices paid by final consumers. They can also directly compensate infrastructure managers for wider benefits (e.g. improved land use planning) that the provision of infrastructure generates for non-users. Finally, the principles do not impose a centralised Community charging scheme. Rather, they provide a framework within which Member States would be free to set charging levels. The "marginal social cost" charging principle should enhance both the efficiency and the sustainability of the transport system. With this broad framework in place, it is possible to address specific problems effectively.

4. This approach would have to be phased in gradually in order to give transport users and providers time to adjust. The Commission, therefore, proposes a step-by-step approach to implementation, to be accompanied by an advisory committee from Member States experts and with the full involvement of all stakeholders. The Committee could begin its work on the basis of the available evidence, allowing the first steps towards the full introduction of the principles to be taken during the first phase. This phase, to run until 2000, would see the introduction of charging systems in rail and airports, currently under discussion, complementing the charging system in road haulage and ensuring that a broadly compatible structure is in place in the main modes of transport. Charging of external costs on the basis of an agreed Community framework would be allowed but total charging levels would be capped by average infrastructure costs (which is the current rule). The second phase would see a

greater harmonisation and adaptation of charging systems, especially for heavy goods vehicles and rail transport where a kilometre based charging system, differentiated on the basis of vehicle and geographical characteristics would be instituted, and in the ports sector where a charging framework would be introduced. As of this period charges should not exceed marginal social costs (including external costs). It would be for the Member States to decide on how to use the revenues. Obvious alternatives are to allocate funds to the infrastructure operators, to the general budget – for example to restructure existing taxes - , or to earmark some revenues for infrastructure funds, possibly multimodal, on national, regional or city levels. In addition, where new transport charging systems are introduced existing transport charges will have to be amended and/or phased out. The third phase would see an updating of the Community framework in the light of experience gained during the first two phases.

5. This charging principle would lead to a much higher degree of cost recovery from users by the infrastructure manager (although this would not necessarily represent an additional cost to users, since it could be offset by reductions in existing transport charges) and should therefore facilitate the provision and financing of additional infrastructure. In combination with the subsidies paid by Member States directly to Infrastructure managers to compensate for wider social benefits to non-transport users, this is likely to lead to a high, possibly complete, recovery of infrastructure capital costs at the level of the transport system as a whole. Should full recovery not be reached and should Member States wish to arrive at a higher level of cost recovery, then the Commission considers that this should be done through the imposition of additional non-discriminatory and non-distorting fixed user charges. Moreover, at least in the short to medium term, there are likely to be investment projects where higher levels of cost recovery are required from users of these projects. In these cases, higher charges would be allowed for a sufficient period of time, subject to Community rules safeguarding non-discrimination and ensuring that no monopoly profits are made. In summary, the charging principles proposed in this paper, necessary for efficient use of infrastructure networks, would also create the conditions for financing infrastructure from user contributions that could accommodate different financing models. In view of the strongly diverging infrastructure financing systems in place across the EU and in respect of the subsidiarity principle, this White Paper does not lay down principles for financing infrastructure.

6. The charging system would enhance the efficient use of infrastructure and therefore also facilitate the efficient provision of new infrastructure, where needed. However, to ensure this the charging framework would have to be flanked by efficient infrastructure investment decisions based on comprehensive social cost-/benefit analysis (including those related to, for example, improved land use planning and accessibility). Only projects having net social benefits should be undertaken. In an integrating internal market, cross-state effects of new infrastructure projects are likely to increasingly occur. These need to be fully taken into account in the cost-benefit analysis and be reflected by investment and financing decisions. The existence of cross-state benefits is an important justification for the co-financing from the Community budget of Trans-European Transport Infrastructures. However, there are currently no sufficient mechanisms in place to monitor and ensure that negative cross-state effects of infrastructure investments are taken into account. This is particularly relevant in the case of ports where new, publicly funded, infrastructures could be built, partly at the expense of ports in other Member States that do not benefit from similar support. In addition to developing transparent accounting, it is, therefore, proposed that information be exchanged on the costs and benefits of public investments in this sector to ascertain that Member States fully take the

effects of investment decisions on other Member States into account. The Commission will take an appropriate initiative under Article 129C2 of the Treaty.

7. The various studies which the Commission has carried out indicate that the proposed user pays approach would significantly enhance the technical efficiency of the individual modes of transport and greatly reduce environmental costs. Whilst some charges paid by users would rise, the overall costs of the transport system would fall significantly. An extrapolation on the basis of available studies suggests that the introduction of the user pays charging system could lead to savings of the order of at least 30-80 billion ECU per year. A first assessment also indicates that the proposed policy would be beneficial to both relatively developed and economically less developed regions of the Community. However, the Commission recognises that a more gradual introduction of the charging principles in cohesion regions may be needed.

8. For reasons of transport efficiency and sustainability it is imperative that we replace the current patchwork of charging mechanisms across Member States and modes by a harmonised Community approach to transport charging. This White Paper sets out how this can be done.

1 INTRODUCTION

1. European transport infrastructure is of great importance for economic growth, labour mobility, consumers, and the competitiveness of the European Community. It is therefore vital that its provision and use is as efficient as possible. Achieving this objective is among other questions dependent on how users are charged for infrastructure and what means are available to finance investment. Moreover, achieving this objective is becoming increasingly difficult.

2. Relying on the purely public financing of transport infrastructure is becoming more difficult, as Member States face growing financial burdens and seek to develop greater involvement of the private sector in the financing of infrastructure projects. In other cases they are considering how to recoup part of the costs from users when developing new public infrastructure. At the same time, current trends in traffic patterns and growth are also under examination, as escalating congestion and pollution raise doubts about the sustainability of transport. Transport charges have a very clear role to play in addressing all these issues, as changes to charges alter prices, which in turn can change transport use. Moreover, transport users and providers are becoming more and more aware that differences in charges, in different modes and different Member States, affect industry's costs and competitiveness, and distort the functioning of the single market.

3. All three problems can be seen as weaknesses in the European Community's transport market: infrastructure managers are not always able to recoup some of the private or public benefits of providing infrastructure to recover a large part of their capital costs, so they are reluctant to invest; the market fails to reflect external costs in its prices, so the use of some modes is at times excessive; and tax and charge differentials distort the price signals of the market and so distort industry's transport choices. All three problems can be addressed using economic tools: a Community framework for infrastructure charges can correct these market failures.

4. This White Paper explains how infrastructure charging reform can solve many of the transport sector's problems, and help develop European transport services. It has evolved out of the discussions on the 1993 Commission White Paper on "The future development of the common transport policy"¹, the 1995 Commission Green Paper "Towards fair and efficient pricing in transport"², the 1996 report of the high level group on public private partnership³, and most recently, the report of the high level group on infrastructure charging, set up in spring 1998 to advise on the development of a comprehensive set of charging principles⁴. Finally, the joint Transport/Environment Council in June 1998 also called for measures to make the best use of the existing infrastructure, to achieve a shift to less environmentally damaging modes of transport, and the use of economic instruments to reduce fuel consumption, emissions, and noise.

¹ European Commission, COM(92) 494 final.

² European Commission, COM(95) 691. The Green Paper recommended marginal cost pricing, a higher degree of cost recovery and transparency as important principles for an efficient transport system, and launched a wide debate on transport pricing.

³ High level group on Public-Private Partnership, 1997. The high level group report underlined the need for a revenue stream from users to facilitate the setting up of public private partnership.

⁴ High level group on transport infrastructure charging, 1998.

The paper is structured thus:

- (a) the current problems of infrastructure charging and the need for introducing more convergent charging principles are summarised;
- (b) Community wide charging principles are presented and their implications in relation to the problems are illustrated;
- (c) a plan for the implementation of such principles in all modes is outlined;
- (d) the implications of the proposed charging regime are examined.

2 TRANSPORT PROBLEMS RESULTING FROM EXISTING CHARGING SYSTEMS

1. In order to better understand infrastructure charging systems, it is important to consider the underlying cost structure, summarised in the following table. The two main categories listed here are “fixed costs”, which are independent of the flow of traffic, and “variable costs”, which *do* vary with traffic levels.

Cost components related to the provision and use of infrastructure

Fixed Costs		Variable Costs	
Internal Costs	External costs/benefits	Internal Costs	Other external costs
Capital Costs: <ul style="list-style-type: none"> • Repayment of capital • Payment of interest • Return on assets 	Costs: <ul style="list-style-type: none"> Barrier effects Deterioration of landscape Visual intrusion 	Variable running costs: <ul style="list-style-type: none"> • Operating costs (traffic management, enforcement, supporting services) • use-related maintenance costs (resurfacing, rail replacement, repairs) 	Air and water pollution: <ul style="list-style-type: none"> • local pollutants (e.g. particulates) • regional pollutants (e.g. NO_x) • global pollutants (e.g. CO₂)
Fixed Running Costs: <ul style="list-style-type: none"> • Maintenance costs (weather and time-related) • Operating costs (lighting, traffic management, information) • Administration 	Benefits: <ul style="list-style-type: none"> Improved accessibility Network benefits Increased productivity 		Accidents (partly) Noise and vibration Congestion (partly)

Source: based on the high level group on transport infrastructure charging, June 1998.

2. In an efficient⁵ and competitive transport sector, these different costs are taken into account in decision making on the provision and use of infrastructure. For the provision of infrastructure to be efficient it should be based on a full social cost-benefit analysis, taking all private and broader public benefits and costs into account. Effects in fellow Member States should also be included in the analysis. Given a particular level of infrastructure provision, efficient transport use is promoted when the variable costs are reflected in the final prices faced by transport operators and users. However where charges for infrastructure cease to be cost related transport use is no longer efficient and the competitiveness of the European transport sector is reduced. Where charges are too low, excessive demand is likely, generating

⁵ The term “efficient” or “efficiency” is used throughout this paper. It means a situation where the total costs are minimised for a given level of benefits. This implies that all the consequences of transport decisions are considered (external/internal, user/non-user) and no improvement in the allocation of resources or in transport choices is possible.

higher costs than benefits, and individual operators have less incentive to reduce the costs that they impose on society. Where charges are too high, some users who would be able to pay the costs they impose would be discouraged from using the infrastructure, thereby reducing its social benefit.

3. In Member States, charges or taxes have long been levied on the transport sector without bearing much relation to costs at all. They have been used as a part of a broader fiscal policy to raise government revenues, but also to alter prices to reflect industrial, social, and environmental policy considerations. Such charges and taxes often do not reflect costs and vary between mode and Member State. This gives rise to a number of problems:

- (a) distortions of competition between Member States (e.g. competing ports);
- (b) distortions of competition between modes and within modes (most notably road and rail freight);
- (c) the failure to consider social and environmental aspects of transport (so the relative environmental impact of different ways of making the same journey is not reflected in prices);
- (d) and difficulties in funding infrastructure investments (with transport users often paying considerable amounts in tax, disconnected from the financing of the network).

4. These distortions are often thought of as specific problems isolated one from another, such as modal imbalance (excessive use of roads and under utilisation of railways, inland waterways or short sea shipping for instance), congestion (either in urban or inter urban areas) and pollution. The following examples illustrate the seriousness of the problems and also how they are in fact interrelated.

5. Different charging structures between Member States favour some operators at the expense of others. This is clearly illustrated in the roads sector: Only one Member State levies registration taxes on heavy goods vehicles. Five Member States levy road tolls, six others use the Eurovignette scheme for heavy commercial vehicles, one other applies a different form of user charge and three others do not charge for road use at all. All Member States levy annual vehicle taxes, but these vary by up to 3000 ECU, and diesel fuel excise duties vary by as much as 330 ECU per 1000 litres. The result of such variations is that road hauliers from different Member States can face vastly different costs and unfair competition. Instead of organising haulage along the most efficient routes and locations, hauliers may locate their business where ownership taxes are lowest, refuel where fuel taxes are lowest and, where they have a choice, choose routes where road tolls are lowest. Choices made by road hauliers are distorted by the absence of a harmonised charging regime and the efficiency of the road haulage sector is undermined.

6. Current charging practices can also allow some infrastructure operators to take advantage of a monopolistic situation. In the aviation sector, strategically located airports can exploit their quasi monopolistic position and charge airlines prices that do not reflect the costs of services provided. This could lead to unnecessarily high air transport costs and adversely affect the competitive position of Community airlines in the world market.

7. Moreover, when different modes are charged according to different principles the modal balance is distorted. For instance, railway infrastructure charging practices across the

Community include two part tariffs, multi-part tariffs, social marginal cost based charging, negotiation based on willingness to pay and zero charges. The level of cost recovery varies from zero in some Member States to 100%, in principle, in other Member States, and there is no uniformity about what services are provided for the charge being levied or what parameters are to be taken into account in setting charges. Complex, opaque charges confuse the operation of the market. The complexity makes it hard for users merely to understand the structure and level of the charge, and can frustrate competition. It discourages the development of international services, particularly for freight traffic which crosses a number of rail networks. The different charges also inhibit the user from responding to charging signals: whereas one set of charges may encourage short trains on minor routes travelling at night, another may encourage the opposite. As rail freight is often in competition with road haulage, inland waterway and short sea shipping, its more complex charges raise administrative costs, make it slower to bid for business and so less competitive. The other obvious inter modal concern is that railways do not fully benefit from their relatively low external costs since this is not reflected by the relative infrastructure charges levied on users.

8. A further example of distorted inter modal competition as a result of differing charging systems, is the English Channel crossing. Here, for both passenger and freight traffic, there is the choice of using road, rail, sea or air transport. The flurry of competition that began after the opening of the Channel Tunnel was clearly and strongly influenced by the charging regimes of the different modes: port charges, rail and tunnel access charges, unpriced connecting roads, airport charges, even duty free regulations, all constrained in different ways the means by which the different modes and routes could compete. And as the transport market is liberalised, infrastructure improved and integrated through the Trans-European Transport Network examples of such intensifying competition, between all modes, would increase as would the need to reduce distortions arising from divergent charging structures.

9. Another important example of distortion to competition is the effect of charges in the maritime ports sector. Current port charging arrangements are quite diverse and government subsidies can allow ports to reduce prices and attract business from other ports. Inter port competition clearly exists, and is also affected by hinterland and maritime access to the port, so the charging structures of shipping, road and rail freight have a clear impact on the ports sector. Conversely, more concentrated use of more heavily subsidised ports may lead to much higher use of road or rail infrastructure in certain areas, and increased congestion.

10. In summary, different current charging principles distort competition, while common charging principles would create a level playing field and correct intra and intermodal imbalances.

11. Furthermore, current charging schemes seldom promote clean technologies. The shipping sector for instance, produces a considerable proportion of emissions of sulphur dioxide and nitrogen oxide, and emissions could be significantly reduced by greater use of low sulphur bunker fuel and of catalytic converters. If the polluter pays principle is not applied, however, and emissions not charged for, shippers face no encouragement to take such measures. An emissions charging scheme would give operators the incentive to consider reducing environmental pollution, as the reduction in emissions is rewarded by lower charges. When the charges are higher than the costs of reducing emissions, shippers would reduce emissions, and in socio-economic terms, the efficiency of the sector would be improved. The same result would apply to other modes of transport.

12. Finally, the transport sector faces problems in securing financing for new infrastructure investments. The growing difficulty of securing public-sector financial support

for investment in transport infrastructure has brought about an increasing interest in charging and in public-private partnerships (PPP) for financing infrastructure projects, particularly those at a national and Community level, such as those belonging to the Trans-European Transport Network. As has been clearly recognised by the high level group on PPP financing of TEN transport projects, private sector participation will be determined by the prospect of an acceptable level of profitability and a suitable revenue stream, subject to an acceptable level of uncertainty. But, at present, less than 10% of road infrastructure costs and less than 30% of rail infrastructure costs are recovered through direct user charges that accrue to infrastructure managers. Direct charging of the traffic would therefore help provide a revenue stream for the development of PPPs, which could reduce the need for public subsidy.

13. A number of existing Community policies and rules already address some of these problems. For example, there exist a Directive that to some extent harmonises heavy goods vehicle taxes and charges (for example Directive 93/89/EEC harmonises, to some extent, heavy goods vehicle taxes and charges) and a Council Regulation (2978/94) on port charges for segregated ballast oil tankers has clear environmental and safety objectives. Moreover, the Commission has actively pursued infringement proceedings relating to divergences from Community charging regimes and closely monitors State Aids in transport. However, the existing frameworks do not address distortions arising from: certain transport charges and taxes being related to the place of registration of means of transport (e.g. annual vehicle taxes), the absence of a framework for taking external costs into account in a harmonised manner across all modes of transport and the significantly different levels of infrastructure cost coverage across modes of transport. These insufficiencies are widely recognised by transport operators and several Community Institutions who have repeatedly called on the Commission to come forward with proposals to address these problems.

14. Moreover, these problems are likely to worsen as transport markets are progressively liberalised. Given the full liberalisation of the road haulage and the air transport markets in 1998 and the advent of complete market opening in sectors such as inland waterways (in the year 2000) and the efforts to further open up the rail market, it is imperative to urgently address the question of harmonising charging frameworks. Taken together, the lack of correspondence between costs at point of use and charges levied, differences in charging schemes between modes and Member States, distortive governmental interventions and the existence of monopolistic charging make the European transport system much less efficient than it need be. This leads to rising transport and environmental costs in general, which reduces mobility, economic activity, economic growth, and harms peripheral areas of the EU in particular. The potential for improvement, and the cross-frontier dimension of charging policy, creates a clear need for a Community approach to transport infrastructure charging.

3 A COMMUNITY APPROACH TO INFRASTRUCTURE CHARGING

1. A Community approach to infrastructure charging should address the major shortcomings of the existing systems analysed in Chapter 2. The basic purpose of the proposed Community approach on infrastructure charging would, therefore, be to improve the overall efficiency of the provision and use of European transport infrastructure, promote fair competition, safeguard the single market and enhance the sustainability of the transport system

2. At the same time, the development of a Community approach to infrastructure charging should take full account of the subsidiarity principle. More particularly, this means that the system should provide a framework based on common principles for all commercial

modes of transport within which Member States to a great extent would be free to set charge levels. The approach should also safeguard transparent and non-discriminatory schemes which should apply equally to private and public entities. However current concessions should not be affected by the new rules.

3. The principles underpinning the charging approach proposed for commercial vehicles could usefully be extended to passenger cars and this would render the overall charging system more efficient. However, the Commission considers that, for reasons of subsidiarity, this decision is best left to the Member States. But the development and implementation of the common charging system as it affects commercial passenger transport would obviously have to dovetail with decisions taken on passenger cars in order to avoid undermining the position of public transport and other commercial passenger services⁶.

4. It is clear that there is a need for the development of such a framework for commercial transport at Community level. This is because infrastructure charges affect the conditions of competition in the internal market; they can have a bearing on market access and they have a significant influence on the development of international transport. In order to achieve these objectives outlined, the approach should be based on the following basic concepts:

(a) The same fundamental principles should be applied to all commercial modes of transport in each Member State of the European Union, while recognising that the resulting structures may differ by mode and the level of charge may differ by location to reflect different needs and circumstances.

(b) Infrastructure charges should encourage greater efficiency in the use of transport infrastructure and, therefore, be based on the “user pays” principle: all users of transport facilities should be charged for costs they impose at, or as close as possible to the point of use.

(c) Charges should be directly related to the costs that users impose on the infrastructure and on others, including the environmental and other external impacts caused by the users. Charges should only differ when there are real differences in costs and service quality and should not discriminate between users on the basis of nationality and residence/business location.

(d) Charges should promote the efficient provision of infrastructure.

The only charging approach that fully satisfies these criteria is marginal social cost charging: charging users for the costs, both internal and external, they impose at the point of use (see box).⁷ This would give users incentives to adjust transport behaviour in order to reduce total costs to society whilst maximising private benefits, thereby maximising economic and social welfare.

⁶ In addition, it is worth noting that the Commission has already tabled a proposal to improve the functioning of the internal market by addressing cross-frontier problems with registration and taxation of passenger cars arising from private individuals shifting residence from one Member State to another. Moreover, the Commission also intends to come forward with a Communication in 1999 on a Community framework for the taxation of vehicles.

⁷ When the term marginal cost is used it refers to social marginal costs including environmental externalities etc.

In combination with the subsidies paid by Member States directly to Infrastructure managers to compensate for wider social benefits to non-transport users, marginal infrastructure cost charging (including congestion costs, but excluding other “external” cost components) is likely to lead to a high, possibly complete, recovery of infrastructure capital costs at the level of the transport system as a whole. Should full recovery not be reached and should Member States wish to arrive at a higher level of cost recovery, then the Commission considers that this should be done through the imposition of additional non-discriminatory and non-distorting fixed user charges.

In summary, the charging principles proposed in this paper, necessary for efficient use of infrastructure networks, would also create the conditions for financing infrastructure from user contributions that could accommodate different financing models. In view of the strongly diverging infrastructure financing systems in place across the EU and in respect of the subsidiarity principle, this White Paper does not lay down principles for financing infrastructure.

A transport undertaking that faces the real costs would have clear incentives to adjust transport choices, for instance:

- using vehicles that cause less road damage, are less polluting and are safer;
- changing routes and logistics to those with lower levels of road damage, congestion, accident risks, and environmental impacts;
- or switching to a mode with less impacts.

5. Similarly, the charging system would also give incentives to promote transport safety through a range of responses: transport users can purchase or switch to safer means of transport and operate transport systems more safely, whilst infrastructure managers would have incentives to improve the safety characteristics of their networks. Whilst this may increase the direct costs, it would lead to even larger benefits through reductions in accident related costs. Even transport operators that do not adjust their transport patterns would still gain from changes made by others such as less congested traffic conditions, decreased accident risks and so on. All in all, when charges are introduced that better reflect in a balanced manner real costs at point of use in parallel with the abolition of certain existing charge schemes or reductions certain other charges or taxes, most users would benefit.

6. It is also important to stress the fact that the marginal social cost charging principle ties in with and balances other policy measures. Marginal social costs of transport are already reduced by existing safety and environmental regulations. Emission standards on vehicles and aeroplanes reduce external costs, weight restrictions for heavy goods vehicles (HGVs) and railway wagons reduce infrastructure damage costs and safety standards reduce accident costs for all modes. Since the standards reduce the costs, the charges would be lower than they otherwise would have been. Thus, in general, a mode where effective standards are in place will be compensated through lower charges. This type of infrastructure charging is also fully consistent with the provision of services of general interest; notably public passenger transport services. The charging principles only directly affect public transport operators, not final consumers and governments fully retain the possibility of subsidising these transport services. Where, in the absence of direct charging systems, governments currently pay for infrastructure costs, sufficient financial means will be available upon the introduction of new charges to offset any impact on public transport operators. Finally, where governments finance infrastructure investments for other than pure transport reasons (e.g.; to unlock peripheral regions) then marginal social cost charging is likely to lead to low charging levels since users

would not have to pay for the capital costs associated with these investments (see also paragraph 9).

7. Similarly, the development of a common charging system on the basis of the principles proposed in this White Paper would also facilitate consistent land use planning at different policy levels. By improving the efficiency of the transport system, transport links between different locations would be enhanced and this would assist in making rational land use planning decisions. The common transport infrastructure charging system also ties in with the development of the European Spatial Development Perspective (ESDP) which seeks to enforce transport and cohesion goals by identifying the need for improved accessibility and a more sustainable use of infrastructure at EU level.

A PRACTICAL DEFINITION OF MARGINAL SOCIAL COSTS

Marginal costs are those variable costs that reflect the cost of an additional vehicle or transport unit using the infrastructure. Strictly speaking, they can vary every minute, with different transport users, at different times, in different conditions and in different places. Moreover for the last extra carriage on the train, car on the road, or ship at sea, marginal costs can often be close to zero. Clearly such a strict definition is of no practical use, and like all other charging arrangements in the commercial world, a degree of approximation and averaging is necessary to develop understandable, practical charging structures. Marginal costs may at times merely reflect an average of variable costs. More usefully, they should reflect infrastructure damage, congestion and pollution costs, and so would vary according to factors like unit weight or number of axles, peak times, urban travel, and engine emissions.

Marginal cost components can include:

- **Operating costs:** energy, labour, some maintenance costs.
- **Infrastructure damage costs:** maintenance costs, wear and tear of the infrastructure, reflected by such as resurfacing of roads, rails and runways.
- **Congestion and scarcity costs:** The cost of time delays to other users or non users, resulting from congested traffic flows (on roads, queues for airports or railway stations). Moreover, a transport operator's use of infrastructure may prevent another operator from using it (e.g. an airport runway).
- **Environmental costs:** air, water, and noise pollution.
- **Accident costs:** Costs in terms of material damage, pain and suffering and production losses.

8. The Commission proposes that a framework should be drawn up that would introduce this type of charging in all modes at Community level. Clearly, the system would have to be developed gradually and progressively, and not all cost components could be included from the outset. These issues are discussed in Chapter 4.

9. It can also be demonstrated that marginal social cost charging is an important pre-requisite for efficient decisions on infrastructure provision. Only when investment decisions are based on efficient, current and future, levels of infrastructure use will they themselves be fully efficient. As the high level group on infrastructure charging confirmed, investment decisions should be based on a full social cost-benefit analysis covering all costs and benefits to society, public and private. Since some of the benefits of individual projects might accrue to non-users of the network, for example, reduced pollution resulting from replacing a dual-carriage way by a motorway or increased land values in cities connected to a High Speed Rail line, it could be highly inefficient to require all the costs of every individual investment project to be recovered from direct users. If that approach had been followed, very few High Speed Rail lines would have been built in Europe. Imposing full cost recovery at the level of

individual projects would therefore not only lead to major inefficiencies in transport use, it could also lead to significant distortions in investment decisions.

MARGINAL SOCIAL COST CHARGING AND RECOVERY OF CAPITAL COSTS

Marginal social cost charges are not related to capital costs since the latter do not vary with transport use. This raises the question whether a marginal social cost charging approach can recover infrastructure costs from users.

It can easily be demonstrated that in the absence of benefits to non users this depends on the amount of infrastructure capacity and the cost of expanding it: with efficient investment based on a cost-benefit approach, charging for marginal infrastructure costs only (i.e. including congestion charges, but excluding other external costs) will fully recover infrastructure costs if there are no economies of scale in infrastructure construction (Newbery, 1988, Winston 1985 and Annex III). However, some infrastructure investments have other technical characteristics. Available studies based on segments of the European transport network suggest that for the transport system as a whole, such charges would ensure a high degree of cost recovery. The result mainly derives from the fact that efficient levels of infrastructure provision are generally characterised by some scarcity, implying that the congestion element in efficient charges is positive. As far as road infrastructure is concerned, this depends critically on the inclusion of passenger cars.

However, in reality, not all provision of infrastructure is efficient. And there are benefits to non users which suggest that some costs cannot be recovered from users. On the other hand, the proposed charging framework would also incorporate external costs.

Available evidence (e.g. Roy 1998, ECMT 1998) suggests that a consistent application of the marginal social cost charging principle advocated in this White Paper would in the current circumstances lead to a significantly higher degree of infrastructure cost recovery from users in all inland transport modes in the EU than is currently the case. Moreover, at the level of the transport system as a whole, revenues from efficient charges are likely to be close to levels required for full infrastructure cost recovery from users. Thus, whilst the proposed approach would not guarantee cost recovery for every individual infrastructure project, it would generate sufficient revenues to fund the transport system's infrastructure capital costs and pay for further investments.

10. Having said that marginal social cost charges for transport infrastructure are likely to produce revenue sufficient to pay for total infrastructure costs at the level of the transport system as a whole, of course, it is for the Member States to decide how to use the revenues. Obvious alternatives are to allocate funds to the infrastructure operators, to the general budget – for example to restructure existing taxes - , or to earmark some revenues for infrastructure funds, possibly multimodal, on national, regional or city levels. In addition, where new transport charging systems are introduced existing transport charges will have to be amended and/or phased out.

11. Charges will be collected by infrastructure managers, be they public or private. This raises the question of the allocation of these revenues to different bodies (e.g. infrastructure manager, the State) and the use to which they are put. Naturally, the infrastructure manager would keep that part of the charges that are related to infrastructure costs (covering both infrastructure damage and scarcity/congestion⁸). Charges related to other cost components would more logically accrue to the State. The high level group on transport infrastructure charging recommended that revenues related to external costs should be used to reduce the external damage caused, by reducing or preventing the externality, or, where this is not

⁸ Obviously, high congestion charges indicate capacity scarcity and the desirability of expansion through investments. Decisions on this should be made on the basis of a Social Cost Benefit Analysis (see paragraph 9).

possible, to compensate those affected in some way (whilst respecting rules on State Aid). Whilst such an allocation may be desirable, the Commission considers that, in keeping with the subsidiarity principle, such decisions are best left to the Member States.

12. Whilst the analysis presented in the box on marginal social cost charging and in Annex III indicates that marginal social cost charging would lead to much higher revenues from direct user charges than is currently the case, the situation is likely to vary across different (parts of) infrastructure networks. Where marginal infrastructure costs are above average costs (for instance where capital costs are a low proportion of total costs and where capacity constraints are being reached), then charging at marginal costs will both result in the most efficient use of the infrastructure and lead to an over-recovery of costs through the infrastructure part of transport charges based on marginal social costs. This will provide a signal that there is a shortage of capacity and provide a surplus of funds to deal with the problem. Where marginal costs are below average costs, then the reverse is true: revenues will be insufficient to cover costs. In cases where such infrastructures are part of networks that are also partly characterised by capacity shortages, the infrastructure managers are likely to be able to “average out” deficits and surpluses across their networks. Where this is not possible and there are wider benefits then there would be a strong case for government subsidy, regardless of whether the infrastructure is publicly or privately owned. It has to be pointed out, however, that, at present in the Union, there are hardly any infrastructure projects that are fully privately financed without any financial support from the State. The proposed approach will, therefore, significantly reduce the need for relying on direct government subsidies for covering infrastructure costs.

13. Whilst the development of marginal cost charging systems for all transport infrastructure, including all modes, terminals and related information and communication systems offers significant advantages, there are, at least in the short to medium run, cases where there should be scope for a higher degree of cost recovery from users at the level of individual infrastructure projects. A higher degree of cost recovery may be required to ensure that desirable investments, public, mixed and private, can be made and clearly the framework must cater for such projects.

New projects

14. Funding the provision of new infrastructure is a key concern in European transport policy and may need to influence the charging scheme for new infrastructure. This is particularly true for expensive facilities like bridges and tunnels. Public sector provision has traditionally been the most common approach. However as government budgets are under increasing spending pressures, this is no longer the automatic route, for reliance on exclusively public financing can unduly constrain the level of provision of infrastructure and so increase inefficiency.

15. For this reason, and to benefit from other efficiencies in the private sector, public-private partnerships are increasingly used to provide new infrastructure.⁹ However private businesses need to secure revenues to recover all their costs, and depending on the degree of public subsidy available, this can imply charges which may be higher than marginal costs, especially at the beginning of a project when use is relatively low and scarcity related charges are likely to be negligible. Whilst charges above marginal costs are likely to reduce the socio-

⁹ High-level group on Public-Private Partnership, 1997.

economic benefits of a project, this may be necessary if public finance constraints mean that the alternative is not to build the project at all.

16. Given that the differentiation inherent in marginal cost charging should lead to the most efficient result, these supplementary charges should have as limited an impact as possible on transport use, either in terms of total transport volume, or inter- or intra- modal competition. To achieve this, the charges should ideally be of a flat rate nature in the sense that they do not vary with the use of the infrastructure, but for practical reasons they may well have to vary between classes of vehicle types or transport units. In practice, the appropriate design would differ between projects. For example a vignette scheme may be a practicable design for flat rate charges, whereby users pay a fixed “entrance fee” to use a defined infrastructure for a fixed time (two part tariffs). Alternatively market segmentation could be applied with higher charges for market segments with a low price sensitivity (so-called Ramsey pricing).

17. After a period of years, long enough for supplementary charges to recover investment costs and an appropriate return on capital, they should be discontinued.

18. Moreover, Member States need flexibility to define “new infrastructure projects” to fit local conditions. For example, it typically would be appropriate to define a whole motorway link as a new project when a lane is added and consequently charge equal fees on all lanes. The possibility of including some existing connecting or parallel links as a part of a new project for charging purposes should not be excluded either. However, it is clearly inappropriate and inefficient to extend the project definition too broadly.

19. Equally, one of the uncertainties facing potential PPP investors is over future charging regimes (for their own mode, but also for potentially competing modes), since this determines traffic flows, revenue and therefore profitability: by providing a clear framework for charging one barrier to the development of PPPs will be removed.

Competing infrastructure

20. The case where infrastructure projects or sectors are in direct competition at the European level applies predominantly to terminals and interchanges such as major ports, combined transport terminals, and even airports within the same catchment area. As long as Member States are entirely free to decide on infrastructure investment and not take the effects of their decisions on other Member States into account, the introduction of a marginal cost charging approach at Community level might well not suffice to avoid significant distortions in infrastructure provision. This is because some Member States, perhaps to secure purported local benefits, would invest more than is desirable from the point of view of the transport system as a whole. Such investments could lead to competing excessive investments in neighbouring Member States in order to keep up their market share. At a Community level, the net result is an over provision of infrastructure leading to a waste of scarce resources.

21. For major, competing terminals therefore, the marginal cost charging principle also needs to be complemented to permit higher cost recovery, reflecting the level of the investment. Such an option would not, however, exclude the possibility of the creation of over capacity. Additional policy instruments are therefore required and this is discussed in section 5(h).

Conclusion

22. The co-ordination of transport charging and the development of efficient charging levels is expected to provide significant net benefits for the whole of society. It should lead directly to improved technological, operational, and organisational efficiency; produce a small desirable change in modal balance, and a small reduction in the growth of demand for mobility.¹⁰ Commission studies also suggest that introducing a policy of marginal social cost charging at EU level would lead to overall welfare benefits of the order of at least 30-80 billion ECU per year (see section 6a).

23. The charging system outlined here would directly address most of the problems discussed in Chapter 2. It would promote fair competition within modes by linking charges exclusively to the costs imposed by transport operators, independent of their nationality or business location. When externalities and other costs are properly charged for, the operators who invest in cleaner or less damaging vehicles or ships are rewarded by reduced charges. Such investments would then pay off rather than harm businesses' capacity to compete. The proposed charging principles would also lead to a fairer competition within and across modes as a result of which transport choices would be influenced by fair competition rather than distortions in charging systems. When the same basic principle are applied in all Member States, operators equitable conditions of competition would result and artificial relocations of transport businesses to States with favourable tax regimes would be avoided. When charging schemes are harmonised and implemented in a transparent manner, the administrative costs for transport operators would be reduced and the ease with which the costs of different transport options can be compared would be greatly enhanced. The current disadvantages resulting from complicated and non-transparent rail charges constitute would be removed.

24. Marginal cost charges would also raise considerable revenue. In many cases this would need to be offset by reductions in transport-related charges. At the same time the new charging system would lead to a more efficient use of the infrastructure and thereby, to some extent, reduce the need for new investment.

25. For certain projects an exemption would allow charges above marginal cost when this is needed to finance important and socio-economically beneficial infrastructure projects.

26. The link between charges and costs would prevent some terminals profiting from local, monopolistic market conditions, while at the same time steps can be taken to prevent unfair competition in infrastructure provision leading to wasteful over capacity. A further detailed examination of the impact of these proposals is contained in chapter six.

¹⁰ ECMT 1998.

4 A STEP-BY-STEP APPROACH TO IMPLEMENTATION

1. The proposed charging approach will have to be introduced gradually and progressively. This is because it must take into account the different starting points of the various modes of transport in respect of existing European transport legislation, the complex issues involved in developing new charges, and other constraints, such as revenue raising requirements. Sometimes current charges may serve as a reasonable proxy for particular marginal costs, and so no immediate change may be necessary. For example, the current Directive on charging of HGVs and the planned Directive on airport charges have already established the base for developing charges. In other modes, however, no such foundations have been laid. Moreover, decisions on the design and the coverage of new charging systems, both in terms of infrastructure networks and categories of means of transport, will have to take full account of the costs of operation and implementation (“transaction costs”).

2. The Commission proposes a three phase approach. In phase one, the charging framework should be established. In phase two, the Commission and Member States would begin to adapt charging regimes to implement the framework. In phase three, the transition would be completed, and all modes of transport would be subject to marginal cost charging. The key characteristics of each phase are summarised immediately below, greater detail of the priority actions being set out in chapter five.

4(a) Phase One: 1998-2000

3. During the first preparatory phase, agreement should be sought on methodologies for measuring marginal costs and to promote the idea of charging at point of use. In line with current legislation, charges up to average costs would generally be accepted.

4. In order to pave the way for the implementation of marginal cost charging principles, common methods to estimate marginal costs including external costs have to be developed, for all modes of transport. The Commission, will, therefore, propose to set up a Committee of Governments experts on charging for the use of infrastructure” and this Committee should be given an effective advisory role. The terms of reference for the work will be to develop and advise the Commission on Community guidance on methods to estimate the marginal costs of transport; develop practices to promote transparency of accounts; promote the development of “transport accounts” at Member State level; and to advise the Commission on statistical and research needs and priorities. The Committee will be supported by the use of independent experts and other stakeholders, involving transport operators, users, industry, consumers, transport workers and other interested parties. Obviously, it will be for the Commission to come forward with the necessary legal proposals, in the drawing up of which it will take full account of the work of the Committee.

5. The 1998 proposal for railway infrastructure charging would need to be adopted as soon as possible to ensure that a Community framework exists for the two main modes of inland transport.¹¹ The Commission’s proposal for a Council Directive on airport charges should be implemented and a framework for port charges should also be developed. Finally, a proposal for the revision of Regulation 1107/70 on State aids in inland transport will be made later in 1998 and consideration given to the need for further refinement of State aid rules and

¹¹ Road transport is covered already in Dir. 93/89/EEC.

guidelines for other modes. As well as developing infrastructure cost based charges, the Commission would encourage the development of charges based on external costs for all modes provided that this does not lead to charges higher than average infrastructure costs. Such charges are already under discussion in the Council in the context of its deliberations on the modification of the existing Directive on heavy goods vehicle charges and should be permitted under the new proposal on rail infrastructure charges.

6. The Commission believes this first phase should run until the end of 2000. This should allow the second phase to begin in 2001 with broadly compatible, basic charging systems being put in place for **road, rail, ports** and **airports** as well as the above State aids provisions.

4(b) Phase Two: 2001-2004

7. Having established the charging framework and methodological approaches, the second phase would involve adapting particular charges better to reflect the new approach and to harmonise charging systems between modes. In this phase, it is proposed that charges should in general be set at total social marginal costs, that is marginal infrastructure and external costs. Charging levels for externalities having a Community dimension should be set at Community level, probably at an agreed low rate to begin with. The revenues would obviously accrue to Member States. Other charges by Member States for congestion and other local externalities would be encouraged and should, when introduced, be based on an agreed Community framework methodology, to be developed in the Committee. As well as continuing to examine charging methodologies, the Committee should begin reviewing charging practices with potentially significant cross border impacts.

8. Changing to charges reflecting the use made of the infrastructure should lead to a higher degree of cost recovery directly from users. However, Member States would be free to levy supplementary charges to reach an even higher degree of infrastructure cost recovery for new infrastructure projects if they so wish. These additional charges should ideally be flat rate (subscription type – two part tariffs). Revenues from charges imposed to cover external cost charges can also be used to finance further investment. However charging levels in different modes should, under no circumstances, exceed the sum of average infrastructure costs and external costs.

9. The introduction of new transport charges would not only need to be part of a restructuring of the existing tax and charges structure in the transport sector but would also have to be consistent with the development of the general tax policy. Such an approach would permit further reforms to be implemented in a budget neutral way as regards the economy as a whole¹².

4(c) Phase Three: beyond 2004

10. Whilst lessons would be drawn from experiences during the first and second stages, in general, the third phase would be to further implement harmonised charging principles, both in terms of the marginal cost basis and the consistency of cost estimation. The level of Community wide charges for externalities should also be reviewed. Consideration could also

¹² The Commission has already proposed the relevant provisions regarding fuel taxes in COM(97) 30 final. This issue is discussed further in section 5 (g).

be given to requiring *mandatory* charging structures, but not levels, for local externalities. Such an approach would alleviate pressure on Member States to reduce local charges because of international competition.

Overview of charging rules			
	First phase	Second phase	Third phase
Maximum	Varies by mode, but generally, average infrastructure costs ⁴	marginal infrastructure plus local and Community wide external costs ^{1,2,3}	Marginal social cost charging ^{1,2,3}
Minimum	Varies by mode, between zero and average infrastructure costs ⁴	marginal infrastructure plus Community wide external costs ^{1,2,3}	
External costs	Differentiation allowed ¹		
¹ on the basis of agreed parameters/methodologies ² supplementary charges for new projects allowed subject to a maximum of average infrastructure and external costs ³ balanced by reductions in existing taxes and charges. ⁴ This reflects the existing minimum and maximum levels in different modes of transport			

5 IMPLEMENTATION, PRIORITY ACTIONS AND MODAL IMPLICATIONS

1. This chapter focuses on priority actions during the first two phases of the implementation process. Separate descriptions are provided for the different modes.

5(a) Development of consistent costing and accounting practices

2. To implement the charging principles outlined, a number of issues concerning cost estimation must to be analysed. There is a need to develop practical cost estimation methodologies, and there is much to be gained by co-ordinating the work on this matter of the Commission and Member States. To address these questions and assist the Commission in its work in connection with infrastructure charging the “Committee of Government experts on charging for the use of transport” (“the Committee”) should begin to work effectively, and would be chaired by the Commission.

3. The terms of reference for the Committee should be updated. It would be made clear that the Committee covers all modes and five specific purposes would be identified.

(1) Develop Community guidelines on methods to estimate the marginal costs of transport.

The recent discussions in Council on the Alpine dimension of the Eurovignette regime have demonstrated that there is an unacceptably wide variety of approaches to calculating and charging for the costs of road infrastructure. There are a number of potential methods available to estimate the different marginal costs of transport infrastructure use and a lot of research has been completed in this field. The Committee need not necessarily seek to identify one single method to measure a certain cost category, but define how different cost estimation or valuation methods can be properly applied. Whilst the ideal outcome would be an intermodal approach to methodology development, differences between modes may well justify some mode specific variations. The estimation of infrastructure damage costs and congestion costs should be given first priority, but the Committee should also consider the

valuation of environmental impacts and accident risks. As to fixed costs, a Community-wide approach to estimating capital costs, including depreciation methods, also needs to be developed.

(2) Develop practices to promote transparency of accounts and develop “transport accounts” at Member State level.

To facilitate the implementation and the enforcement of charging and State aid rules, particularly for terminals, transparent accounting practices must be developed. On this point, the Committee’s work should be to identify best practice on cost accounting. The forthcoming inventory of current charging principles for sea ports should be a starting-point for the assessment.

The Committee should also advise on methods for determining the level of cost recovery at modal and transport sector level and promote the establishment of transport cost and revenue accounts at the level of single Member States. The Committee should advise the Commission on a possible revision of Regulation 1108/70 on introducing an accounting system for expenditure on infrastructure in respect of all modes of transport.

(3) Review charging practices

When Member States begin to implement charges based on the principles explained in this paper, the Committee has an important role to play in reviewing charging practices and advising the Commission on issues related to compliance with the charging principles set out in this paper. It should assess whether marginal cost charges are based on appropriate cost estimates, given the national or local context; whether a proposed two part tariff (levied to achieve cost recovery) is reasonably non-distortive; and whether charges are non-discriminatory and sufficiently transparent.

(4) Advice on statistical and research needs and priorities.

The estimation of marginal costs and the development of transport accounts should be supported by further research. The Committee would therefore ensure that full use is made of existing Community funded research on transport charging and advise on issues related to future research within the 5th framework programme of the European Community for research, technology development and demonstration activities. Special attention would be paid to the CAPRI-project, a concerted action on transport pricing research including guidance on best charging practices. In addition research would also concentrate on existing gaps in the theory and on the appropriate allocation of responsibilities between different levels of Governments (local, regional, Member State, Community).

In order to estimate marginal costs and develop transport accounts, improved transport statistics are needed. Efforts to improve statistics should be co-ordinated with the Commission’s current activities on the improvement of data sources on the costs and other economic and social data of the transport sector. Together with Eurostat, the Commission has already identified some areas where data improvement is necessary, including investment in the transport sector.

4. The Committee of Government experts on the charging of transport infrastructure should be flanked by a wider forum consisting of independent experts and representatives from relevant organisations. Based on recommendations from the Committee and the wider forum, the Commission should develop guidelines and legislative proposals when appropriate.

ACTION:

- Make effective use of the Committee of governments experts on charging for the use of transport infrastructure to assist the Commission in the development of methods to estimate marginal costs of transport; promote the development of transport accounts at Member State level; develop accounting practices to safeguard cost recovery for terminals; advise on statistics and research needs and priorities and review charging practices.
- Launch research within the 5th framework program concerning estimation of marginal costs, measurement and valuation principles regarding transport accounts and charging regimes in order to fully recover infrastructure costs.
- Develop a comprehensive approach to common transport statistics. Consider revision of Regulation (EEC) No 1108/70 on an accounting system for expenditure on infrastructure in respect of *all* modes of transport.

5(b) Road

5. The main long term objective is to improve the efficient use of the European road network, promote sustainable road transport, and encourage appropriate investment in Trans European Networks. To achieve this, the Commission intends to develop a comprehensive road charging scheme for HGVs and commercial passenger transport that would aim to be compatible with urban road pricing schemes.

6. In the first phase, the Committee should review cost methodologies to determine an agreed basis for setting charges based on infrastructure and congestion costs. This would include the development of common accounting and costing methodologies. Those measures should be flanked by efforts to develop standards for charging technologies. Member States would then be encouraged to harmonise or adopt interoperable systems for road pricing for HGVs either through existing toll or Eurovignette systems or, preferably, through the development of more cost related electronic kilometre charges. The Commission expects that this would be considered by many Member States as an attractive alternative to systems having no use-related charges at all or only time based user charges. It would also lead to a much greater degree of distance related charging across the Community. The Commission will also develop a proposal for the environmental classification of HGVs to facilitate the development of charges that can better reflect the different costs of environmental impacts due to vehicle use. Finally, Member States are encouraged to develop urban road pricing schemes to deal with the external costs, including congestion costs, of urban transport. It is not appropriate that such schemes be organised at Community level, though the Commission will continue to fund research and demonstration projects related to urban road pricing. Any Community legislation that may harm the implementation should be reviewed with the ambition to remove such obstacles.

7. In the second phase, distance related charges should be extended to include external costs in addition to infrastructure costs. Such charges would apply also to new road concessions, allowing cost recovery charging where new investments are anticipated. Efforts should also be made to further promote the implementation of urban road pricing schemes which are interoperable with HGV charging.

8. In the third phase, the common scheme should become mandatory. Thus, harmonised marginal cost based charges for HGVs and commercial passenger transport should replace existing charging schemes on the basis of a variety of instruments including tolls and user charges.

Electronic charging¹³

9. It is now technologically possible and economically feasible to implement electronic road charges that can reflect with reasonable accuracy the marginal costs of road use. The main technologies are microwave technology where an on board unit communicates with road side equipment and satellite positioning and navigation systems and GSM where the on board unit communicates with a satellite and mobile telephony is used to collect payment. A number of microwave based systems have been introduced on specific routes, and although CEN pre-standards have been adopted further effort is needed to establish European standards for these technologies. Compared to microwave based systems, GPS and GNSS have the advantage that they demand no road side equipment and in the long run might prove less costly. Indeed technology that makes it possible to implement highly differentiated charges is already being deployed for other purposes such as fleet management and will soon be introduced in new vehicles as the electronic tachograph (to monitor driving and rest times) becomes mandatory under Community law..

10. The charging system for HGVs is a particular priority for the European Commission as the sector is distinctly international and such traffic is very important for the development of the single market. A developed Community scheme for charging of HGVs would be an important step for implementing charging principles. The system should be developed so that it would dovetail with schemes being developed by cities and regions for urban road pricing. Indeed an electronic charging scheme for trucks is emerging as the natural successor to the current Eurovignette system. To promote such a development the option of standard electronic charging should be added to the relevant Community legislation. However, this would require further analysis of technical aspects, harmonisation and administrative issues.

Other measures

11. In the meantime, the Commission would encourage Member States to develop and implement electronic fee collection systems in a harmonised manner. The way forward will be presented in a Communication on Interoperable Electronic Fee Collection in Europe. Based on the findings of this Communication every consideration will be given to the technological and administrative interoperability of the systems to ensure unconstrained mobility across the Community. Building on this the Commission will also put forward a proposal on electronic fee collection convergence.

¹³ These issues will be further developed in a Commission Communication on Interoperable Electronic Fee Collection in Europe.

Possible kilometre charge for heavy goods vehicles

HGVs impose a range of costs which they often do not currently directly pay for. These include road damage, noise and air pollution, all of which vary with the size, weight, engine, and type of vehicle. Imposing a charge based on these costs, at point of use, according to vehicle type, would therefore give a clear signal to hauliers, and the costs would be paid for. Secondly, as road haulage is an international industry, it is important to charge the vehicle at the point of use so that the principle of territoriality is respected.

A range of technical options, both electronic and non electronic, are available for Member States to charge for road use. **Digital, electronic tachographs** which measure kilometres travelled will be required in new vehicles within two years from now and on board **global positioning systems** (for example GPS) have been developed so distance, time, location, vehicle class, and road type can all be detected and recorded electronically. Such systems are already being used for fleet management purposes.

The cost of the more sophisticated electronic on board units is roughly 500 ECU per vehicle and the experience of Sweden suggests that administration costs for a similar scheme are quite low, at about 2.6% of revenues. The **level of charge** per kilometre could be based initially on the marginal infrastructure costs per km and marginal inter urban congestion costs. A recent study for the Commission has roughly estimated the costs of HGVs for all roads in different Member States. The marginal infrastructure cost estimates range from 0.02 ECU per km in Spain to 0.08 ECU in Germany, and the congestion costs range from 0.02 ECU to 0.3 ECU depending on the density of traffic and differ largely as a result of different values for time. The charges would clearly need to differ with vehicle classes, road types and Member State, to reflect the different costs. However charging on a consistent basis would remove distortions to the current European road haulage market.

For vehicles without the equipment making occasional journeys, a simple time based or route specific (**paper**) **permit** system is possible. Such a permit could be bought in advance, and could contain information on location, vehicle type and category, and the distance or route of travel permitted. The system should however only be used for a limited number of vehicles mainly from countries not yet deploying an electronic system.

The **impact of km charges** has also been studied. The charge could lead to more efficient use of HGV capacity and a positive net government budgetary effect allowing the revenues to be used to reduce other, less efficient charges or taxes.

12. The European Commission also has a role to play in funding road pricing related research, development and demonstration projects. Social issues, including “user acceptance” should be given a high priority, and resources for this purpose will be reserved within the Fifth framework research programme.

13. The Commission will continue to promote the exchange of best practice for road charging across the Community, and also supports urban road charging demonstration projects. In order to facilitate the implementation of such schemes the Commission plans to co-operate with cross-national groups of urban or regional authorities that are seriously considering implementing road pricing. It will offer a co-ordinated approach to ensure that these groups can take full advantage of the Commission’s research and technical work in this area, including the experience accumulated to date.

14. One important step in the development of charging schemes is the creation of harmonised cost accounting methods for determining road infrastructure costs. As noted above, this is an area the Commission feels early joint discussions could contribute to agreed methodologies for potential application across the EU.

15. A further initiative that the Commission supports is analysis of the treatment of road accident costs in charging for transport use. The costs of traffic accidents is a complicated area

in theory, empirically, and ethically. To some extent the costs are met directly by the individual or through the insurance system. However some costs are still “external”, and not faced by transport users. Ensuring that prices better reflect accident costs would give infrastructure managers and transport users incentives to improve safety which would drive down accident costs. The Commission proposes that further work be carried out examining the scope for better internalising the cost and risk of accidents through insurance schemes, and the need for government action in this area. To consider this issue and develop best practice guidance, the Commission proposes establishing a group of experts drawn from the insurance industry, academia and consumer interest groups to advise on best practice on motor liability insurance.

16. Regulation 1107/70 on State aid will be revised in line with the charging principles outlined in this paper. The new State aid rules would contribute to the establishment of fair competition.

ACTION:

- Communication on interoperable electronic fee collection systems in Europe.
- Proposal on electronic fee collection convergence and standards.
- Further develop a proposal on charging for HGVs and commercial passenger transport.
- Set up groups of urban and regional authorities seriously considering implementation of road pricing.
- Set up an advisory group to develop a best practice on motor liability insurance schemes and internalisation of road traffic accident risks.
- Revision of regulation 1107/70 on State aid in inland transport.

5(c) Rail

17. The need to promote efficient use of railway infrastructure, fears of distortions to intermodal competition particularly from road transport and the need to fund new investment are the main problems for the rail sector. Charging the use of railway infrastructure according to marginal costs would send appropriate price signals to railway undertakings about the actual cost of each journey. Future charging regimes should be based on marginal costs and if necessary to extend charges for new infrastructure in a way that least distorts these price signals.

18. To ensure that the two principal modes of land transport are on a similar footing, the Commission is putting forward a proposal for a Directive on railway infrastructure charging, basing charges on marginal infrastructure costs. This should be adopted in phase one. In the proposal, cost recovery charges are permitted when the operation of the infrastructure would not otherwise be viable. Such charges should be implemented in a non distorting manner, for instance, by achieving a higher degree of cost recovery from less price sensitive passenger services. Differentiation of charges to take account of external costs would also be permitted, as rail transport has lower external costs than some other modes.

19. A more efficient solution would require charging for the marginal external costs. Therefore as part of phase two and the development of charges for externalities, the Commission will investigate implementing noise related environmental charges for the railways in parallel with charges for other external costs in other modes.

20. Demand for particular routes, lines, sections of lines, and stations, varies with the time of day, the nature of the traffic, and the scope for alternative routes. In principle therefore, railway undertakings should pay differing amounts for different routes and times to reflect the scarcity of capacity and to ensure that allocation is more efficient. Charges of this nature are put forward in the Commission proposal.

21. In phase three, consideration would be given to rendering the allocation of rail infrastructure capacity more efficiently. However further research is needed for this and a project is being funded under the Fourth framework programme of the European Community for research, technology development and demonstration activities.

ACTION:

- Proposal for a Council Directive on rail infrastructure charging and capacity allocation.
- Revision of regulation 1107/70 on State aid on inland transport.

5(d) Inland waterways

22. The Commission supports the development of more transparent and consistent charging principles in all modes of transport. So in inland waterways as in other modes, objectives include the development of common standards for charging, and common accounting and costing methodologies for determining the cost of infrastructure. The marginal costs of inland navigation are very low, and transportation is only one of the several uses of the inland waterways, others largely relating to water management and supply, so any calculation of inland waterway charges should reflect this. Moreover both the financial and the environmental costs of inland waterway traffic are amongst the lowest of all modes.

23. Given the low level of costs, and the absence of evidence that current charging policies are producing any significant distortion of competition, the Commission is of the view that reform of inland waterway navigation charges should be considered by the Committee, and changes developed for proposal for the third phase.

ACTION:

- Revision of regulation 1107/70 in state aid.

5(e) Aviation

Air Traffic Services (ATS)

24. Current charges for the use of Air Traffic comprise mainly en route charges which are levied according to aircraft weight and flight distance; when terminal area control charges are levied they do not include the distance factor. They are used to recover total costs, not just variable costs, and do not consider fully environmental or congestion costs. Principles governing ATS charges are established by international organisations, such as ICAO and Eurocontrol. Within the latter, a multilateral agreement has been signed by 27 European States (including all EU Member States but Finland) to adopt a common policy in respect of the calculation of the charges, of their cost base and of their collection. By that, revenues are collected by Eurocontrol, using a so called “unit rate” calculated by dividing the total costs for ATS by traffic volume.

25. Given the comparatively high degree of harmonisation and differentiation of current charges, and since as present charging mechanisms reflect the actual infrastructure costs, and partly the congestion ones, this is not an area in need of immediate action by the Commission. To develop more efficient charges based on the principles of user pays and polluter pays, charging structures should expand to also reflect:

- engine/fuel type (to reflect emissions, and noise costs, which vary with engine size) and
- time of travel (as peak times raise sector operating costs).

26. If charges can reflect these different costs in a significant way, so that airspace users pay for the services they use and the costs they impose, and no more, then such users can respond by changing routes, times, aircraft, fuel, engines, and so on.

27. The Committee would be invited to consider the possibility of greater cost relatedness of charges, particularly to reflect the emission costs of air transport. When charges reflect infrastructure, external and congestion costs, it is expected that air traffic services will achieve full cost recovery, and so further enable their ongoing commercialisation.

28. The current Commission position on the taxation of aviation fuel is that such taxation should be introduced as and when the international legal situation allows the Community to levy such a tax on all carriers including those from third countries. This policy was adopted following a review and subsequent report on the existing obligatory exemption. In order to provide more information on the effects of this policy and in response to a request from the Council, the Commission has launched a comprehensive study on the effects of such taxation. The results will be available in autumn 1998. This study will be used as the basis for further discussion in the Council of the European Union and the European Parliament in the context of the Commission Proposal for the taxation of energy products.

ACTION:

- Communication on air transport and environment.
- Follow up to the study on taxation of aviation fuel.
- Analyse possibilities to link ATC charges to pollution levels rather than develop a separate scheme for the purpose.
- Green paper on financing of air traffic management infrastructure.

Airports

29. To improve the use made of airports, and reduce the possibility for excessive charging, the Commission's proposal for a Council Directive on airport charges proposes applying the principle of "cost-relatedness". This implies that airport charges should be based on the costs of facilities and services provided by the airport, allowing for a reasonable return on capital, the proper depreciation of assets, as well as the efficient management of capacity. The proposed Directive also proposes developing the transparency of airport accounts, establishing mandatory consultation procedures. In addition, the proposal, if adopted, would include the options of implementing congestion (peak/off-peak) charging, possibilities for modulating airport charges in terms of the environment (e.g. noise) as well as provisions for monitoring airport efficiency.

30. Complementing this approach, consideration will have to be given to improving the slot allocation process. The Commission therefore intends to revise the current Regulation on slot allocation. In the longer term a further alignment with the general charging principles set out in this White Paper would be desirable.

ACTION:

- Adoption of Council Directive on airport charges.
- Communication on air transport and environment.
- Communication on air transport market.
- Communication on airport capacity and airport cost developments in the EU (inc. policy options to relieve congestion).

5(f) Maritime

Maritime shipping

31. Maritime shipping has comparatively low infrastructure and external costs, although emissions of sulphur dioxide and nitrogen oxides are significant and give rise to concern. Preparatory actions in the first phase should therefore include consideration of emissions from shipping in the context of ongoing international discussions on the matter. At present Community legislation provides for a mandatory tax exemption for fuel used in ships. In the second phase, consideration would be given to the introduction of minimum standards for fuel quality and the Commission should consider the possibilities for levying environmental fuel charges that vary in respect of emissions. Alternatively, fairway charges could be introduced that would be differentiated on the same basis. Again, however, all such changes would have to be compatible with international agreements in this area. Discussions on adjusting standards and charges will therefore also take place in international forums such as MARPOL.

Ports and maritime infrastructure

32. As set out in the Commission's Green paper on Ports and Maritime Infrastructure, the Community's ports policy should aim at creating equitable conditions of competition across ports in the EU whilst maximising the efficiency of the use of the ports sector as a whole. A Community framework for port charging can make an important contribution to the achievement of this objective. In line with the general principles set out in this White Paper, the Commission, therefore, considers that port users should pay for the costs they impose. However, it is recognised that marginal cost charging would not always suffice to fully recover infrastructure costs from users. Higher charges should, therefore, be allowed, provided they are non-distortive. The Community framework in this field would, therefore, require cost-related charging with marginal costs as the minimum.

33. The debate on the green paper has shown that there is a broad consensus on the need for improved transparency of port financing. Accordingly, as a first step, an inventory of the systems under which the community's main ports are financed needs to be established showing how public and private sources of finance are used. The Commission should take the necessary steps for the establishment of such an inventory as a priority matter, including any modification of accounting and reporting requirements that may be needed. Considerable interest has also been shown in the possibility of further clarification of the extent to which the Treaty rules on State aid impact on investment decisions in the ports sector. This possibility should also be pursued in parallel to the establishment of the inventory. Both

exercises would be pursued in close contact with the organisations representative of the ports sector whose close co-operation can make a decisive contribution to this early realisation.

34. For reasons explained further below, State aid rules would not provide a complete solution to the problems of the sector since by their nature they apply only to payments that favour particular enterprises, not to the provision of public infrastructure to which all have equal access. Accordingly, it would also be necessary to continue work on a framework for port charges as part of the more general approach to co-ordination of investment in infrastructure described in section 5(h). The provision of maritime infrastructure outside the port would also be addressed in that context.

ACTION:

- Inventory of port finances and transparency of accounting practices.
- Evaluation of need for further clarification of State aid guidelines in ports sector.
- Development of a framework for port charging.

5(g) Transport related tax policy

35. Clearly, the introduction of the infrastructure charging framework would have to dovetail with the development of existing frameworks at Community level for VAT and fuel excise duties.

36. VAT is governed by a Community wide regime under the Sixth VAT Directive (77/388/EEC). It is constructed as a general consumption tax for revenue raising purposes and it is therefore not an appropriate or particularly effective instrument for pursuing non-fiscal goals such as environment protection or transport policy. However, there are significant differences in the way that passenger transport is taxed by different Member States and also some significant differences in the way that different modes of transport are taxed within Member States. In some cases, the differences in VAT treatment create distortions between competing modes of transport.

37. Recognising this problem, the Commission launched a study on the VAT regime and its effects on competition in the field of passenger transport. Later this year the Commission will issue a formal consultation paper that will present options for change. The options will need to ensure that EU based transport operators are not disadvantaged in comparison with non-EU based operators and also that, as far as possible, different modes of transport are not disadvantaged in comparison with their competitors. Proposals for change arising from the consultation procedure will need to be prepared and considered in the light of the development of the future common VAT system. Moreover, VAT should not impede the development of public transport services. Clearly, the development and phasing in of Community rules and guidelines on taxation as applying to transport and the phasing in of the proposed transport charging approach should fully respect this and lead to the creation of a truly balanced pricing system for all modes of transport.

38. There exists Community legislation that lays down minimum rates of excise duty on motor fuels. Member States are free to apply rates above these minima and most do. On 12 March 1997, the Commission adopted a proposal for a Council Directive restructuring the Community framework for the taxation of energy products (COM (97)30). The broad thrust of the new proposal is to extend the scope of the existing Community-wide system beyond mineral oils to other competing fuels. Under the new proposal the Community minimum

levels of taxation on, inter alia, motor fuels (agreed in 1992 and therefore in many cases substantially below the rates applied by Member States) are updated. The proposed increases in minimum rates are spread out over a period of four years. It is proposed that in the first step the minimum tax level on unleaded petrol should be increased by 45%. A corresponding increase of 27% is proposed for diesel. Today most Member States apply tax rates far above EU minimum rates. Therefore, the effect on most national tax rates of the proposal would be limited. The new framework would provide Member States with greater freedom to differentiate duty rates above the minima. It would also allow Member States who introduce new direct road pricing instruments, under specific conditions, to reduce the level of taxation that they apply to motor fuels, even if this leads to levels of taxation that are lower than those contained in the new Directive. Adoption of this Commission proposal would improve the situation with regard to differences in tax rates on diesel fuel.

39. In the field of vehicle taxation the Commission has carried out a major review of current situation in the European Union and intends to – based on the findings of this review - address the problem in this field during 1999.

5(h) Efficient provision of infrastructure

40. To develop efficient levels of infrastructure investment, rigorous cost benefit analysis is required, that considers all costs, including capital costs, in making investment decisions. New infrastructure that is built should then be charged in accordance with the marginal cost charging principle, unless higher charges are needed to recoup capital costs for the building of the infrastructure to be possible. This provision should allow a greater degree of private financing of infrastructure or even public funding which is required to earn a return.

41. A lack of co-ordination in the assessment of prospective investments can lead to major distortions. For example, the non-inclusion of some benefits to non-national EU citizens may lead to the underestimation of total benefits of viable projects and to the under provision of TENs transport infrastructure. This is one of the justifications for the TENs budget line and intervention at Community level. Conversely, when Member States do not include the costs of new infrastructure projects to other Member States an over provision of infrastructure is likely to occur. These costs can result from a substitution from existing facilities to the new project; a development which is especially likely to occur when prices in the new facility are low. This is particularly relevant to internationally competing transport terminals, notably ports and combined transport terminals.

42. State aid rules can have application in the field of investment in infrastructure and so eliminate distortions where the provision of public finance favours certain undertakings or the production of certain goods. For example, where public finance is used to provide infrastructure for a particular transport operator, giving it an unfair advantage over its competitors, the State aid rules apply.¹⁴ Likewise recent years have seen increasing involvement of private capital and/or management in infrastructure projects. In these cases the view has been taken that there is a potential advantage to the undertaking concerned if compensation provided by the State is greater than necessary to achieve the purpose concerned. A non-discriminatory tender is one clear way to ensure the compensation is no

¹⁴ Aviation State aid guidelines, OJ No C 350, 10.12.94, p. 5, paragraph 12 (2).

greater than necessary¹⁵. In the absence of such a tender this has to be ensured through extra-careful scrutiny of the financial arrangements by the Commission.

43. On the other hand, where transport infrastructure is directly financed and managed by public authorities and is open to all users, actual and potential, on equal terms and in conformity with applicable Community legislation, no particular enterprise or production may be readily shown to be favoured over others in a way which distorts competition and affects trade between Member States within the meaning of Article 92(1) EC. For this reason, investment in transport infrastructure has traditionally been viewed as a general measure of economic policy normally not falling within the State aid rules.

44. However, State aid rules have an increasing role to play as the Member States turn more to private undertakings for the purpose of developing and managing transport infrastructure. It is, therefore, necessary to define comprehensively where public finance for infrastructure favours particular enterprises in a way which distorts competition and affects trade between Member States. The Commission intends to clarify and update its approach to State Aid for infrastructure in inland transport by revising Regulation 1107/70, implementing Article 77 of the Treaty. It will also evaluate the need for further clarification of State Aid guidelines, particularly as regards ports and other terminals. But other means are needed to ensure that public investments, particularly large ones, do not lead to inefficient over capacity and unfair competition with others. The Commission considers that in the first instance a voluntary investment co-ordination initiative at Community level, possibly based on Article 129c, par. 2,16 could make a major contribution to meeting this objective. The need for further measures of a binding nature in the area of investment co-ordination would be assessed in the light of the results of these developments.

45. The voluntary investment co-ordination initiative will need to build on two elements: some convergence of methodologies for social cost benefit analysis, so that co-ordination has a reliable foundation, together with procedures for co-ordination. Since the nature of the cost benefit analysis for this purpose is very much in line with that required to identify the trans European benefits of TENs projects, work on methodologies will need to be taken forward in the context of preparations for the forthcoming review of the TENs Transport Guidelines, which will be addressing the issue of trans European benefits.

ACTION:

- Voluntary investment co-ordination initiative (Article 129c, par. 2.)
- Evaluation of need to clarify State aid guidelines, particularly as regards ports and other terminals.
- Revision of Regulation 1107/70 on State aids in inland transport.

¹⁵ See COM(97) 453 final, section 2.2

¹⁶ Member States shall, in liaison with the Commission, co-ordinate amongst themselves the policies pursued at national level which may have a significant impact on the achievement of the objectives referred to in Article 129b. The Commission may, in close co-operation with the Member State, take any useful initiative to promote such co-ordination.

Summary: Community rules (and actions •) on infrastructure charging in transport

	First (current) stage (1998-2000): define and establish detailed charging approach.	Second Stage (2001-2004): consolidate consistent charging basis for road, rail, airports and ports.	Third Stage: complete transition. All modes of transport subject to the same charging principles.
Committee of Experts	<ul style="list-style-type: none"> • Make effective use of the Committee of Governments experts on charging for the use of transport infrastructure to assist the Commission in the development of methods to estimate marginal costs of transport, promote the development of transport accounts at Member State level, develop accounting practices to safeguard cost recovery for terminals, advice on statistics and research needs and priorities. 	As for phase one plus the review of charging practices.	Operate
Roads	<p>Promote road pricing. Specifically, allow differentiation of charges on commercial transports (e.g. vehicle type, marginal cost related), but limited to average infr. Costs. Communication on Interoperable electronic fee collection systems in Europe.</p> <ul style="list-style-type: none"> • Set up an advisory group to develop a best practice on motor liability insurance schemes. • Urban road pricing R&D. • Demonstration projects, city road pricing. • Facilitate the introduction of km charging for HGVs. 	<p>Promotion of harmonised electronic charging schemes (e.g. EFC schemes) Charge <i>limit</i> raised to average infr. Costs and external costs. (structure based on marginal infr. and external costs).</p> <ul style="list-style-type: none"> • Further develop possible schemes, standards and convergence proposals for electronic charging for HGVs. • Follow up to liability advisory group. • Examine options for reductions in transport related charges and other taxes. 	Cost related charges for commercial operators mandatory.
Railways	<ul style="list-style-type: none"> • Proposal for a Council Directive based on distance related charging for marginal costs, optional additional charges for passenger services (maximum level: average costs), and compensatory payments for uncovered external costs of competing modes. 	<ul style="list-style-type: none"> • Investigate possible noise charges. 	<ul style="list-style-type: none"> • Update, and propose extension of marginal cost charging regime to passenger rail operators covering infrastructure costs and externalities.
Inland Waterways			Infrastructure charging directive covering infrastructure costs and externalities.

	First (current) stage (1998-2000): define and establish detailed charging approach.	Second stage: consolidate consistent charging basis for road, rail, airports and ports.	Third Stage: complete transition. all modes of transport subject to the same charging principles.
Air traffic services	<p>Current charges are (roughly) cost based and use related.</p> <ul style="list-style-type: none"> • Communication on air transport and environment. • Communication on air transport market. • Follow up to the study on taxation of aviation fuel. • Analyse possibilities to link en route charges to pollution levels rather than develop a separate scheme for the purpose. • Green Paper on financing of air traffic management infrastructure. 	Charging directive allowing charges for infr. Costs and externalities (although external costs also proxied by airport charges)	Update
Airports	<p>Infrastructure charging Directive making charges cost related.</p> <ul style="list-style-type: none"> • Adoption of Council Directive on airport charges. • Communication on air transport and environment. • Communication on air transport market. • Communication on airport capacity and airport cost developments in the EU (inc. policy options to relieve congestion). 	Charging for external costs becomes mandatory (e.g. Swedish landing charges).	Update
Maritime shipping	<ul style="list-style-type: none"> • Examination of options for reducing fuel emissions. 	<ul style="list-style-type: none"> • Improve international standards. • Community instrument to implement standards. 	Update
Ports and maritime infrastructure	<ul style="list-style-type: none"> • Inventory of public funding and charging practices in ports. 	<p>Infrastructure charging Directive, making charges cost related, with marginal costs related to both infr. and external costs.</p> <ul style="list-style-type: none"> • Implement port infrastructure charging directive. 	Update
State Aid	<p>Clarify and up date State aid rules permitting co-ordination of inland transport under Article 77. Exemptions, inter alia, for compensatory payments for uncovered external costs of competing modes.</p> <ul style="list-style-type: none"> • Modification of Regulation 1107/70 State aid guidelines. • Voluntary investment co-ordination initiative. • Evaluation of need to clarify State aid guidelines. 	<p>Consider extension of structure to all modes of transport.</p> <ul style="list-style-type: none"> • Develop state aid guidelines for ports and airports. 	Update
Energy taxation/VAT	<ul style="list-style-type: none"> • Taxation should not distort transport decisions or inhibit development of efficient transport charges. Adoption of energy taxation proposal • Consultation paper, possibly followed by a proposal for a Directive on VAT in transport 	Further harmonisation.	Further harmonisation.

6 SOCIO-ECONOMIC EVALUATION OF THE STRATEGY

6(a) General economic effects

1. The development of a Community approach to transport charging based on efficient charging levels is expected to provide significant net benefits for the whole of society. It should lead directly to improved technological, operational, and organisational efficiency; produce a small desirable change in modal balance, and a small reduction in the growth of demand for mobility.¹⁷ The Commission has carried out numerous studies (for it) into the effects of such charging systems on the economy, on industry, consumers and on cohesion and peripheral regions¹⁸. The basic conclusions of such analyses is that efficient charging frameworks would generally lead to benefits in terms of all these policy objectives, provided revenues are put to efficient use.

2. From a general economic perspective, the long term effect of the policy is expected to have little or no direct effect on GDP growth, but it permits secondary benefit through the recycling of revenues. Moreover, since common charging rules would reduce potentially harmful tax competition the restructuring of tax systems in order to reduce distortive taxes and charges would be facilitated. Partly depending on related tax reforms a new charging system would have a positive effect on employment when some revenues are redistributed as lower labour taxes. Finally, by switching from taxes to charges, it should provide a clearer transport revenue base, improving conditions for private investment and operation of infrastructure.

3. More specifically, the internalisation of environmental costs would increase efficiency from an environmental perspective: when charges reflect the marginal costs of emissions, the level of emissions should fall to the point where the cost of further abatement equals the marginal benefit. Moreover by implementing more direct and distance related charges, each trip is more likely to be assessed according to its own costs and benefits. As all costs would be considered, each trip should provide a net benefit. So from a social perspective, welfare, not the number of trips, is maximised.

4. From a financial perspective, the more efficient use of the transport system should reduce the need for government expenditure on infrastructure, healthcare, and the environment (although direct financial benefits should ideally be recycled via lower taxes). The net effect on the commercial sector should be positive, as the direct effect of higher transport charges are countered by reductions in costs associated with congestion and accidents, and from any possible tax cuts made by governments. There may be some shrinkage of transport intensive industries, but this would be small, as the overall price increase in transport would be modest, and as firms would first adjust their logistics and operations¹⁹.

5. For each mode, the relative price changes would differ from country to country depending on cost structures as well as on the initial tax and charge structures. A Swedish

¹⁷ ECMT 1998.

¹⁸ See for example the analysis presented in the Green Paper on Fair and Efficient pricing (notably Chapter 8) and the analysis presented in the explanatory memorandum of the Commission's proposal on a modification of the "Eurovignette" Directive (93/89/EC).

¹⁹ ECMT 1998.

study²⁰ has estimated the effects of the internalisation of marginal social costs of accident, environmental, and infrastructure costs on the different modes of transport, given that existing transport taxes are phased out. (Although importantly, the study does not consider congestion costs and noise.) The study showed that when the marginal costs in question are internalised and balanced by tax reductions, charges on petrol, cars and cargo vessel, would fall, and on other modes should rise. The study concludes that the main effect would be to improve the competitive position of shipping. The study also indicates that final transport prices would be influenced less than the charges, as businesses would respond to the new charges by modifying transport patterns and vehicle fleets – by reducing their costs, rather than passing all the charge on to consumers.

6. To understand the impacts of the more obvious and likely changes to transport charges, the Commission has undertaken a great deal of analysis through a number of studies and research projects. The “TRENEN” project exams the implementation of efficient charging regimes in four urban settings (Amsterdam, Brussels, Dublin and London) and two inter urban settings (Belgium and Ireland). And the project “EUNET” studies the impacts of different charging policies in London and the south east England, the Helsinki, Naples, and Basque regions. The general finding of these studies is that net welfare improves for the consumers in all four cities and in the two regions examined when efficient charging is implemented. This happens because the benefits of the reduction in congestion and pollution achieved, combined with the reimbursement of tax payments, outweighs the “loss” resulting from the price increase of certain transport services.

7. In the urban studies, the price changes were found to induce positive technological improvements, urban peak time traffic volumes fell by between 19% and 33%, and external costs fell by between 13% and 35%. In the inter urban models, private car use decreases and public transport use increases in London and south east England, and in the Basque region. The number of traffic accidents falls by 20%, and the average time spent in a car in peak periods falls by 16%. The EUNET and TRENEN studies indicate that introducing a policy of marginal social cost charging at EU level could lead to overall welfare benefits of the order of at least 30-80 billion ECU per year.

8. A further study of the Commission examines the introduction of one of the first possible measures and priorities: a road freight tax across Europe. The study models the introduction of charges based on the tonne-kilometres of HGVs throughout the European Union²¹. In the model, the charges are introduced gradually to reflect the average external costs of road freight, excluding congestion, and the revenues from the charge are returned to the economy as reductions in labour taxes. The key results of the study reflect the impact of the charge on a base line scenario for 2010:

- GDP increases by 0.3% and industrial production by 0.21%
- Employment increases by 0.5%
- Road freight traffic declines by 6.6%

²⁰ Per Kageson, 1998.

²¹ Barker, T and Köhler, J. The EU is defined as the 12 EU countries of 1995 excluding Greece.

9. By returning the charge revenues to the economy as reductions in labour taxes, production, employment, and economic growth are all encouraged, and these effects outweigh the impact of higher road transport costs.

6(b) Distributional effects

10. The aim of changes to transport charges is to improve the efficiency of the transport sector. *If* this leads to an undesirable distributional effect, then there is a need to offer a compensating policy. In general however, “consumption” of transport is generally progressive, that is, richer households spend more of their income on transport. Consequently, a rise in transport charges may have a progressive, rather than regressive distributional effect²². The final distributive effect however, would very much depend on which sectors or types of transport face increased costs, and what type of compensatory package is offered by the Member State. Finally, the above-mentioned study on effects of the introduction of a road freight tax suggests that such a charging scheme would have positive effects for all income groups. The real personal disposable income would rise for every socio-economic group.

6(c) Cohesion and peripheral regions

11. The effect of changes in transport prices on peripheral or less developed areas also needs to be examined. Such charges would be differentiated so that regions with less congestion and pollution would be less affected. Where there is little infrastructure and congestion in rural or peripheral regions, charges reflecting these costs would, therefore, be low, so there is no reason to believe that, as a general rule, peripheral and less developed regions would be adversely affected by the application of a marginal cost charging scheme. Moreover, as highlighted above, the system is likely to generate significant overall benefits which would also accrue to economically less developed regions.

12. In those instances where there *is* some concern that certain higher transport user charges could impede the economic development of peripheral or economically less developed regions or , there may be a case for flexible and very gradual implementation of price reforms, provided it does not result in distortion of competition. This may particularly be the case where certain facilities are the only link to the rest of the Union and/or constitute a significant centre of activity for the local economy. On the other hand, where the level of transport infrastructure is relatively poor, and sizeable investment is needed to improve accessibility and/or meet forecast increases in traffic, there may be a need for charging strategies that lead to a higher degree of cost-recovery.

13. Differentiated pricing systems will result in a shift in the pattern and distribution of transport costs. By improving efficiency, it will lead to reduced transport costs for the whole of society. It will also lead to reduced direct costs for some producers. However, for those producers that are not able to adjust sufficiently their behaviour in response to the new pricing systems, transport costs may rise. As already mentioned, transport costs are in general a small proportion of overall production costs. However, at least in the short term, such producers could be particularly affected if they are located in peripheral areas, dependent on a single mode of transport, and selling over long distances to the major markets at the centre in competition with local producers. This may justify the introduction in the Community framework of specific provisions aimed at addressing this problem. In addition to that, whilst

²² (partly depending on the type of increase), R Iten et al. 1998.

respecting State Aid rules, some peripheral regions may therefore wish to take steps to promote the competitive position of such producers in central markets, for example, by helping them to adapt production structures in favour of products with higher value to weight ratios and by improving the quality and diversity of major transport systems, supported where appropriate by the Structural Funds and Cohesion Fund.

7 CONCLUSION

1. The Commission's proposed three phase approach to fair and efficient charging in transport would ensure that an efficient, cost related approach is taken to charging for infrastructure use, in all Member States, and across modes. Using a "Committee of government experts", the Commission would develop detailed and practical guidance on best practice for charging for infrastructure use, congestion, and external costs, and new or amended legislation (outlined in 4.1) would ensure that this consistent approach is adopted (by 2004 for priority modes, and shortly thereafter for all modes). By ensuring that charges are based on specific and agreed costs, the Commission expects that a general understanding of the need to link charging for use to cost would become accepted, and the efficiency of the European transport sector would improve as a consequence.

References

- Barker, T and Köhler, J, Charging for road freight in the EU, Cambridge Econometrics, May 1998.
- CERTE, CES, SESO, What do the Trenen II case studies tell us about the reform of European transport pricing? Document for Workshop March 25 1998.
- DIW, INFRAS, Dr Herry, NERA, Infrastructure capital, maintenance and road damage costs for different heavy goods vehicles in the EU, 1998.
- ECMT, Efficient Transport for Europe - Policies for the internalisation of external costs, 1998.
- ESPO, Report of an enquiry into the current situation in the major Community sea ports, 1996.
- EUNET, Socio-economic and spatial impacts of transport. Working paper 1998.
- European Commission, The future development of the common transport policy - A global approach to the construction of a Community framework for sustainable mobility, Bulletin of the European Communities, Supplement 3/93, COM(92) 494 final.
- European Commission, Towards fair and efficient pricing in transport - Policy options for internalising the external costs of transports in the European union, Green Paper, COM(95) 691 final.
- European Commission, Proposal for a Council directive on the charging of heavy goods vehicles for the use of certain infrastructures, COM(96) 331 final.
- European Commission, Proposal for a Council directive on Restructuring the Community Framework for the taxation of energy products, COM(97) 30 final.
- European Commission, Proposal for a Council directive on airport charges, COM(97) 154 final.
- European Commission, Green paper on sea ports and maritime infrastructure, COM(97) 678 final.
- European Commission, DGXXI, Vehicle taxation in the EU 1997, Background paper, 1997.
- High level group on Public-Private Partnership, Report of the High level group on Public-Private Partnership Financing of Trans-European Networks Transport Projects, European Commission, DGVII/321/97.
- High level group on transport infrastructure charging, Report of the High level group on Transport infrastructure charging, European Commission, June 1998.
- Iten R, Banfi S, Köhler J, Social and Regional Distributive Impacts of Ecotax proposals", working paper 4 June 1998, EFR, European Commission, DGXII.
- Jansson J O, Lindberg G, Summary of transport pricing principles, PETS Project, March 1998.
- Kågeson P, Konkurrensen mellan transportslagen efter en internalisering av de externa kostnaderna, 1998.
- Matas A, Asensio J, Rendeiro R, Direct user charges for transport infrastructures in the European Union, 1997
- NERA, An examination of rail infrastructure charges, 1998.

Newbery, Road user charges in Britain, *Economic Journal* (Conference Papers) 90, pp. 161-176, 1988.

Roy R, Infrastructure cost recovery under allocatively efficient pricing, March 1998.

Winston C, Conceptual developments in the economics of transportation: an interpretive survey, *Journal of Economic Literature*, 23, 1985.

Glossary

Average costs	Average costs consist of the total costs of infrastructure divided by a measure of output, such as vehicle-kms or flight hours. They therefore show the costs of road provision per unit of traffic. They are particularly relevant for cost-recovery, since prices which are set equal to average costs will ensure that total costs are recovered (because total costs include both fixed and variable costs).
Capital costs	Capital costs comprise the consumption of fixed capital and interest payments, and often represent a high share of total infrastructure costs. They are different from annual capital expenditure, which may or may not cover all the costs. (If expenditure is less than the costs, the quality and value of the infrastructure will deteriorate).
Congestion	Congestion arises when traffic exceeds infrastructure capacity and the speed of traffic declines. It can be defined as a situation where traffic is slower than it would be if traffic flows were at low levels. The definition of these “low levels” (reference level) is complicated and varies from country to country.
Congestion costs	Congestion costs comprise direct costs (time costs, operating costs) and indirect costs (the opportunity cost of the time lost, costs occurred to third parties due to delayed deliveries of goods, environmental costs).
Cost approach	The cost-based approach to measuring infrastructure finances is to determine values for the capital (using depreciation methods) and operational structures. (The alternative is an expenditure based approach).
Cost recovery	This is an approach to infrastructure charging whereby the costs of infrastructure (fixed and variable) are recovered in full or partially, through infrastructure charges. Such an approach is usually based on costs and helps raise revenue for the investment and provision of infrastructure.
Cost relatedness	This is a term developed in Article 4 of the proposal for a Council Directive on airport charges, and applies generally to terminals. It means that charges should as a minimum recover marginal costs, and the operator should be able to demonstrate that charges are related to marginal costs. It also relates to cost recovery, as it implies that operators may add additional non-distorting charges in order to achieve (up to) full cost recovery.
Depreciation	Depreciation is an accounting charge for the decline in value of an asset spread over its economic life (life expectancy). The depreciation is a part of deriving capital costs from existing road capital values.
Expenditure approach	Some Member States assess infrastructure values on the basis of their annual expenditure on infrastructure. This will often include both annual investment (for new infrastructure and for enlargement and replacement of assets, and not capitalised) and running costs (for maintenance, operation and administration). For assessing transport finances, a cost approach is preferable.
External costs	External costs are those costs which the user of a good or service (such as infrastructure) does not pay for. they include infrastructure use where use is free, damage, pollution, noise, health costs associated with transport use and accidents. Failure to acknowledge such costs results in excessive use of the good or service.
Fixed costs	Fixed costs are those costs which are independent of the flow of traffic. (Including infrastructure building, lighting).
Flat rate charge	A charge for the use of infrastructure, often used in conjunction with variable charges, which does not vary with use. Annual license fees, entrance fees or access charges are all examples of flat rate charges. (Synonymous with fixed rate charge.)
Harmonisation.	The co-ordination and possible merging between states of regulations, codes of conduct, methods of estimating costs, vehicle classifications, sign posting etc.
Internal costs	Internal costs are those which the user pays for.

Interest	Interest charges are a part of the capital costs of infrastructure. They reflect the opportunity cost of capital (if not invested in infrastructure the funds could be invested elsewhere in the country). The interest rate is usually comparable with the refinancing cost for governmental loans.
Investment expenditure	This reflects yearly expenditure for infrastructure with durable characteristics - with a lifetime of more than one year (for example new construction of infrastructure). Such expenditure has to be “capitalised” with a depreciation rate and an interest rate reflecting the opportunity cost for the capital invested.
Maintenance	Maintenance costs reflect the costs which are necessary to maintain existing infrastructure. One can distinguish between ordinary maintenance, for example cleaning and winter maintenance which is independent of use, and maintenance which is dependent on traffic volume (e.g. surface dressing). Being both variable and traffic dependent, these latter maintenance costs are marginal costs.
Marginal costs	Marginal costs are specific variable costs relating to the use of existing infrastructure (without considering a capacity increase). They reflect the additional costs of an additional vehicle or other transport unit, and include use related infrastructure maintenance and operating costs. When the marginal cost term is used in this paper it refers to social short run marginal costs, which are specific variable costs relating to the use of existing infrastructure (without considering a capacity increase). Long run marginal costs additionally include the costs of future increases in capacity. They are, however, very difficult to measure in transport. Moreover, linking charges to long run marginal costs would lead to significant inefficiencies in transport use during periods where capacity increases are not considered. This is why most economists agree that short run marginal cost pricing is more appropriate for transport.
Operating costs or expenditure	These are expenditures which are necessary to operate existing infrastructure (administration, police, traffic signals, cleaning). These costs are running costs and thus do not have to be capitalised.
Purchase costs	The costs of buying a good or service.
Replacement value/ cost	The cost of replacing a particular asset of a particular quality with an asset of equivalent quality. Replacement cost may exceed the original purchase cost because of changes in the prices of the assets.
Running costs	The costs necessary to keep a particular asset in operation, but which do not enhance the value of the asset. For infrastructure, running cost expenditures will be those annual expenditures necessary to ensure that the infrastructure provides an acceptable quality of service (including operating costs), but do not maintain that quality beyond a limited period of time. They include items such as: sweeping and cleaning; cutting of grass verges; winter maintenance (snow clearing and gritting); lighting; and policing.
Standardisation	Fixing of uniform technical approaches, technologies and standards amongst Member States.
Structural maintenance	Maintenance of a capital nature. A good example of structural maintenance is the reconstruction of road pavements and resurfacing. The benefits of this expenditure are received over a number of years, rather than just in the year in which the road pavement is improved.
sunk costs	The cost of assets which have exceeded their official lifetime and so have no formal capital or re-sale value left is said to be zero.
total costs	The sum of fixed costs and variable costs, or of capital costs and running costs. Total costs therefore give the total annual cost of providing the infrastructure.
Variable costs	Those costs which vary with traffic levels. Examples of variable costs include wear-and-tear to infrastructure, congestion costs.

Annex I : Different infrastructure charging approaches

Marginal cost charging

Marginal costs are specific variable costs relating to the use of existing infrastructure (without considering a capacity increase). They reflect the additional costs of an additional vehicle or other transport unit, and include use related infrastructure maintenance and operating costs.

In the long term (e.g. 50 years) all costs (even investment and capital costs) become variable, and so marginal costs tend to converge with average costs (because the distinction between fixed and variable costs is abolished). When the policy focus is efficient use of existing infrastructure however, it is the short run version of marginal costs which is important.

Whilst MC charging will lead to efficient use of infrastructure, for sectors with economies of scale (such as railways) it will not recover all costs. Second, other objectives such as development, safety and mobility may lead to investments above the theoretical optimum and so marginal cost charging may again, not cover all costs. Third, stepped, rather than finely graded charges are all that is feasible at the moment, so marginal costs may not be perfectly reflected. (See charge discrimination.) Fourth, imperfect markets elsewhere, may call for the implementation of an adjusted marginal cost scheme.

Average cost charging

Average costs consist of the total costs of infrastructure divided by a measure of output, such as vehicle-kms or flight hours. They therefore show the costs of road provision per unit of traffic. They are particularly relevant for cost-recovery, since prices which are set equal to average costs will ensure that total costs are recovered (because total costs include both fixed and variable costs).

Whilst average cost charging is a good simple approach, it can lead to significant inefficiency, with some transport users paying too much (when their *marginal* costs are low, such as small passenger cars), and some too little.

Ramsey pricing

This theory suggests that the degree to which a firm raises prices above marginal costs should depend on the sensitivity of demand to changes in price (its elasticity). It is better to raise the price of a product where demand is insensitive to either its price or the price of other goods, than to impose the increase on a good, demand for which will change significantly with the price change. For infrastructure, demand for passenger transport is less elastic than for freight. So Ramsey pricing implies that passenger transport prices should be higher and a producer can cover more of his costs and limit the efficiency losses. Such analysis however presupposes market segmentation is possible and acceptable, and does not take account of income distribution or wider welfare effects.

Price discrimination

According to this strategy users are charged differently depending on their willingness to pay. Users with marginal benefits considerably higher than the marginal cost are also charged more, while users with a low valuation are charged for their marginal cost. In practice however it is very hard to design such schemes. One problem is that users have no reason to reveal their real willingness to pay. Charge schemes based on negotiation is a theoretical possibility but may conflict with the principle of transparent charges. It may also be questioned whether such approaches are fair.

Two part tariffs

In a two part tariff scheme marginal cost charging can be combined with a flat rate charge such as those commonly in use (e.g. registration fees), to help cover costs. Decisions about individual journeys are taken according to marginal costs, a flat rate charge has the potential to raise extra revenues without distorting efficiencies. However if the charge does affect decisions, by lowering incomes or changing perceptions of the cost of transport, it will also distort the market.

Annex II: Existing approaches to infrastructure charging

The following table indicates the disparity in the size of charges between modes for fuel taxation charges:

Table 1. Fuel excise duties in the EU, across modes, January 1997, ECU.

Mode	Leaded petrol kilolitres (kl)	Unleaded petrol kl	Diesel kl	LPG/ tonne	CNG/methane tonne
Motor fuel, lowest	396	349	252	0	0
Motor fuel highest	617	576	501	776	776
Aviation fuel	0 for international flights				
Rail (mineral oil)	varies across Member States*				
Shipping	0	0	0	0	0
Inland waterways	0 on the Rhine (where over 70% of European traffic takes place)				

*A, D, G, L: Motor fuel rate; P, S, DK, I: exempt; UK, Ire: heating fuel rate

Source: DGXXI

Road

Community legislation adopted in 1992²³, fixed minimum rates for excise duties levied on road fuel throughout the Community. A year later²⁴ the 93/89/EEC Directive set a framework of rules concerning vehicle taxes and road specific charges (such as tolls and user charges) levied on HGVs.

The taxation of road traffic differs considerably between Member States, as the following tables show. As illustrated in table 2 a few Member States tax diesel fuel only slightly above this level (Luxembourg; Greece; and Spain). The table illustrates considerable differences among Member States.

Table 2: Excise duties on diesel fuel, as of January 1998, ECU.

Member State	1000 l
EC MINIMUM	245
LOWEST TAX RATE	248
HIGHEST TAX RATE	585
DIFFERENCE	333

Table 3 illustrates the types of vehicle tax structures across the EU. Whilst there is some commonality of *structure* across Member States, tax *levels* differ by very large margins.

²³ Council Directive 92/82/EEC, O.J. L 316/19 of 31.10.1992

²⁴ Council Directive 93/89/EEC, O.J. L 279/32 of 12.11.1993

Table 3: HGV taxes in Member States as of 1 January 1998.

Member State	Annual taxes	Taxes on motoring		
	Vehicle tax	Excise duty on motor fuels + VAT	Tolls on roads or bridges	User charges (Eurovignette etc.)
Belgium	*	*		*
Germany	*	*		*
Denmark	*	*	*	*
Spain	*	*	*	
Greece	*	*	*	
France	*	*	*	
Italy	*	*	*	
Ireland	*	*	* ¹	
Luxembourg	*	*		*
Netherlands	*	*		*
Austria	*	*	*	
Portugal	*	*	*	
Finland	*	*		
Sweden	*	*	*	*
United Kingdom	*	*	*	

1) Tolls applied so far are private charges rather than taxes.

Table 4 covers HGVs as well as passenger cars and indicates the different emphasis placed on different forms of charge. Some of this variation may not distort, and merely reflects differences in costs. However it is unlikely that the variations discussed above are deliberate, or that they reflect different cost structures.

Table 4: Comparison of taxes levied on all road transport¹ (1993,1995, or 1996) %.

Country	Fuel	Vehicle	Tolls
Austria	62%	32%	6%
Finland	55%	45%	-
Germany	83%	17%	-
Italy	67%	32%	1%
Portugal	73%	21%	6%
Spain	83%	8.5%	8.5%
UK	80%	20%	-

¹ All road vehicles. Proportion of taxes collected, excluding revenues from the Eurovignette user charge. Fuel taxes exclude VAT; vehicle taxes comprise annual vehicle taxes and purchase taxes. Source: DGVII 1998.

Rail

Council Directive 95/19/EC contains broad rules which set the Community framework governing the charging of railway infrastructure fees. There are substantial differences between the approaches to rail infrastructure charging adopted so far by individual Member States. Systems vary from a tariff matrix, two part tariffs, social marginal cost charging, elements of negotiation, to zero charges. The systems reflect significant differences between the market structures and the nature of the rail network in each Member State, and also clear

differences between government policies in relation to public transport and the availability of public funds. Nevertheless, most of the existing charging frameworks can be assigned to one of two broad approaches:

- the “Scandinavian” approach, which features a relatively simple charging system, based on SRMC, but adjusted to take account of more general transport policy priorities;
- the “Adjusted Average Cost” approach, which seeks to raise a target amount of revenue, mainly through variable charges. Although these variable charges may be adjusted to reflect a number of cost and market factors, and a small proportion of revenues may be raised through flat rate charges, this approach often leads to variable charges which are substantially higher than SRMCs, depending also on the level of state contributions (if any) available.

A key difference between these two approaches is the direction of the causal relationship between state contributions to rail infrastructure and the level of infrastructure charges. Under the Scandinavian approach, the level of infrastructure charges (and hence the total income from these charges) is determined mainly by cost conditions and comparisons with other modes of transport, so that the level of state contributions required is then determined by the difference between total rail infrastructure costs and the revenue raised from infrastructure charges. In contrast, under the Adjusted Average Cost approach, the amount of state contribution (if any) to rail infrastructure is generally determined in relation to wider decisions on public spending priorities, and infrastructure charges therefore need to generate sufficient revenues to cover the difference between state contributions and total infrastructure costs.

The approach adopted in Great Britain does not fit easily into either of these categories. It combines the focus on SRMCs of the Scandinavian approach with the high degree of cost recovery more typical of the Adjusted Average Cost approach. Alone among the Member States, some access charges in Great Britain are determined by negotiation between train operators and the infrastructure manager, and the charging framework in Great Britain also appears to be significantly more complex than those applied in many other Member States.

The following tables roughly summarises the differing financial situation of railways in Member States, and the different charging approaches applied by Member States:

Table 5. Rail transport costs and subsidies 1989 (£M, 1989).

Country	Total cost of railways	Total government subsidy	Ratio of “revenues” ¹ to cost
GB	3,591	636	82%
France	6,201	3,194	48%
W Germany	8,763	3,611	59%
Italy	7,226	6,059	16%
Belgium	1,309	761	42%
Holland	834	377	55%

¹ revenues=costs-subsidy.

Source: OEIL 1997

Table 6. Indicative railway charges in various Member States (ECU, 1997).

Country	Annual Charge	Distance Charge	Weight Charge	Cost coverage
Austria	9,700-18,900/km	0.73 /train km	0.001/tkm	26%
Belgium		•		
Denmark	200-400/km ¹	2.7-3/trainkm		20-25%
Finland			0.0015-0.0017/gross tkm	15%
France	38-1,680/km	0.13-15/trainkm ²		
Germany		2.5-12.6/trainkm ³		
Sweden	•	0.0027-0.1 /train km		
UK	•	•		

1 From 1999 2 varying with time of travel 3 varying with route

Source: NERA 1998

(In remaining Member States, railway infrastructure charges are not yet developed.)

Inland waterways

Roughly 7.6% of European transport occurs using inland waterways. Of this, over 70% of traffic occurs on the Rhine, where, under the Mannheim Convention, charges are prohibited. For most other waterways, Member States levy charges on a variety of principles.

In contrast to the Mannheim Convention, several Member States (Luxembourg, France, Germany (under the Mosel convention), Belgium, Finland, the UK (largely for leisure craft) and The Netherlands), apply quite sophisticated charges, levied according to type and size of vessel, type and volume of cargo, number of passengers, frequency of travel, and time of day (each country has its own particular approach). The charges contribute to a variety of maintenance, operating, and capital costs, but demand appears to be quite sensitive to changes in the charge, and so charges are difficult to raise.

In Germany, fewer charges are levied, with no navigation charges applied on the Rhine, the Elbe, the Oder or the Danube. On other waterways (with considerably less than 20% of all traffic) charges are levied (for example, under the Mosel convention) similar to those described above. Such charges recover up to 25% of the operating and maintenance costs of the waterways.

Some countries (particularly France and the UK) charge other users of the canal networks (non transport users such as water companies, industrial and agricultural users). These organisations make more use of the canal than transport (the split is roughly 80/20) and in these countries, contribute significantly to the costs of the infrastructure. By and large, charges for the use of inland waterways in Member States contribute to but do not cover variable infrastructure costs. Government subsidies are still required to some extent in all Member States.

The following table summarises the different approaches applied in different Member states:

Table 7. Inland waterway costs and cost recovery, 1998.

Country	Type of charge	Recovery of costs	Note
Belgium	variable ¹	7.5% of investment	It should be borne in mind that only 20% of the use of inland water ways is thought to be attributable to navigation.
France	Variable	10% of receipts	
Germany	Variable for 20% of traffic	13% of running costs	
UK	Variable	8.75% of maintenance costs	
Finland	Variable	21% of maintenance and development costs	

¹ variable charges tend to change according to weight, distance, boat type, type of travel **Source: DGVII Questionnaire.**

Airports

Airport charging systems cover a wide variety of charges related to different airport facilities and services. These include landing, lighting, parking, refuelling and storage facilities as well as aircraft, passenger and freight services. As there is no standard use for the different airport charges, they do not always cover identical facilities or services. Airport charges are based on a number of criteria, which vary from one charging system to another. Some criteria, however, are in common use. These include:

- the origin or destination of the flight, with frequent distinction between domestic and international flights for landing, passenger and lighting charges;
- the mass of the aircraft, often the maximum take-off weight, for landing and parking charges;
- the noise category of the aircraft for the noise charge or, if no such charge exists, for the landing charge when modulated according to the noise emissions of the aircraft;
- the parking time, sometimes modulated in accordance with the flight schedule, for the parking charge;
- the number of passengers, their age and sometimes the distance flown for the passenger charge;
- the freight tonnage loaded or unloaded for the freight charge.

The level of airport charges varies significantly from one Member State to another and often even from one airport to another within a single Member State.

Air traffic services

The overall EUROCONTROL charge exacted by a State equates to the sum of individual charges for flights which have entered the airspace of that State. The individual charge for a flight is calculated by multiplying the national unit rate of charge by the number of "service units" of that flight. For each country, the national unit rate of charge is fixed each year by dividing the national en-route facility "cost-base" by the total number of "service units" in that country's airspace in that year. The calculation of "service units" is a function of the distance flown by an aircraft (expressed in terms of one hundredths of the great circle distance between

the point of entry into the country's airspace and the point of exit from it) multiplied by the weight factor of the aircraft (expressed as the square root of its maximum certified take-off weight). "Unit rates of charge" for a year are fixed at the end of the previous year, on the basis of actual costs. There is a mechanism that allows any consequent disparities to be adjusted subsequently. Finally, these values must refer only to chargeable flights. (Some flights are usually exempted - such as those by aircraft under 2 tons, State aircraft, search and rescue flights, military flights, training flights, and navaid check flights.)

The calculation of the "cost-base" is made in accordance with generally accepted accounting principles for investment expenditure and operating costs. Investment expenditure, on equipment and buildings, is taken into account by amortising its final cost on the basis of its expected operating life. The two components of this cost are depreciation (the amount of capital actually in service); and interest (which is related to the net value, in terms of cost - depreciation, of the capital invested). Operating costs are those for air traffic services, communications, meteorological services, aeronautical information services, each classified in terms of maintenance, operations, training, research and administration. All charges are levied by EUROCONTROL and redistributed to the Member States according to traffic volumes.

The present approach reflects the reality of production costs and enables their full recovery.

Sea ports

The sea ports sector often functions on commercial lines, and has a high degree of competition: sea ports both within one Member State and in different Member States compete strongly for customers. There is a discernible trend towards even greater private participation in port activities, particularly those of a predominantly commercial nature such as cargo handling. As a result, financing of port facilities for such purposes is increasingly becoming the responsibility of the private sector, while the port authorities tend to restrict themselves more and more to their "landlord" role and the financing and operation of those facilities which are essential to the safe and efficient operation of the port as a whole.

Charging systems in the Community differ considerably between European sea ports. They nevertheless include certain basic elements such as a description of the port facility and services covered by each type of port charge, the basis of the individual charges and the method of calculation. In general, three types of payment can be distinguished²⁵ - those related to the provision of services and facilities to enable a ship to enter safely and use the port; payments for specific services or supplies rendered; and rents or charges for the use of land or equipment owned by the port.

Most sea ports charge for goods loaded and unloaded and some also charge for vehicles and passengers using the port. Revenue is earned by renting out equipment, buildings and land to port operators and from the direct provision of services. In most countries, port dues and charges are still subject to approval by the Government or Municipal Authorities. However, the general aim for most sea ports, both public and private, is to ensure that sea ports cover their costs.

²⁵ ESPO, 1996.

Maritime shipping

There are no charges for operating ships on the open sea, however some Member States charge for fairway use. From 1 January 1998 Sweden has introduced environmentally differentiated fairway charges.

Annex III: Marginal Social Cost Charging and Recovery of Capital Costs

Marginal costs charges are not directly related to fixed infrastructure costs. However, when the provision of infrastructure is efficient, then, provided a number of conditions are met, fixed costs can be covered by the congestion or scarcity component of the marginal social cost charges.

From an efficiency perspective and on the basis of a social cost/benefit evaluation of infrastructure projects, it is seldom justified to build capacity to provide free flow conditions (available capacity) also during peak-hours. Indeed capacity should be geared towards normal demand levels. The incremental benefits of avoiding congestion at all moments of the day/year would, typically, be lower than the additional costs of the required infrastructure investments. In other words, the efficient provision of infrastructure normally implies some scarcity and congestion during certain periods.

The proposed charging approach would comprise a congestion/scarcity element. Since these charging components do not reflect any out of pocket spending for infrastructure operators, they can be used to finance fixed costs. Congestion charges would generally make up for fixed infrastructure costs in such an optimal system if there are constant returns to scale (implying that average costs would equal marginal costs and that marginal cost based charges would fully recover fixed costs). However, the existence of economies of scale and indivisibilities may complicate the situation.

Economies of scale imply that the unit costs of providing capacity decrease the more capacity is provided, implying that the marginal costs are below the average costs. Indivisibilities, on the other hand, mean that there is a limited flexibility to chose capacity levels. For example, the options are to build a single or a double rail track, but there are no possibilities to choose intermediary capacity levels. Due to conditions of this kind an efficiently designed infrastructure may be characterised by capacity levels where there is no scope for congestion or scarcity charging to fully recover fixed costs. On the contrary, decreasing returns to scale (marginal costs above average costs), which are typically found in densely populated areas, physical limits on expanding capacity or situations where indivisibilities lead to relatively low levels of capacity would imply congestion charges that are relatively high and typically recover more than full cost.

The different transport modes cannot be easily classified on the basis of the different cases discussed above and there is a significant variation between projects. However, in very general terms, it can be concluded that large parts of the road infrastructure, larger airports and air traffic services often tend to face constant returns to scale, whilst rail infrastructure and inland waterways are characterised by economies of scale. This is one reason for expecting lower levels of cost recovery from rail and inland waterways than from roads and aviation.

All in all it is clear that marginal infrastructure cost charging (including a congestion/scarcity element, but excluding external costs) will not always imply cost recovery for all parts of the network in question, but under-recovery for some parts would generally balance over-recovery for others. This balance is particularly obvious concerning roads. Research funded by the Commission for instance suggests that marginal cost charges would demand price increases in the order of 200 per cent on some urban roads in Belgium and cover far more than the total costs of these roads. At the same time it is clear that marginal cost charging would lead to very limited contributions to fixed costs in sparsely populated rural areas.

This paper indicates that revenues from the scarcity component of marginal social cost charging could be used to cross-finance infrastructure through infrastructure funds at modal, regional or national levels. Moreover, it has also been pointed out that evidence suggests that marginal infrastructure cost charging is likely to lead to high levels of cost recovery at the level of the transport sector as a whole. From an infrastructure financing point of view, this represents an important improvement over the existing situation.

The charging components for other externalities would lead to additional revenues. As indicated in the main text, seen from an equity perspective, it may be desirable to use the money to compensate individuals who are affected or to finance measures to limit future impacts. But, of course, if these funds were instead allocated for general infrastructure purposes even higher rates of cost recovery would be achieved. The analysis presented in Roy (1998) suggests that total revenues for the transport system as a whole would outstrip infrastructure costs.