



COMMISSION OF THE EUROPEAN COMMUNITIES

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**COMMUNICATION FROM THE COMMISSION
TO THE COUNCIL AND THE EUROPEAN PARLIAMENT**

**A Community strategy to reduce
CO₂ emissions from passenger cars and improve fuel
economy**

I. Introduction:

1. In the context of worldwide efforts to combat climate change and as a party to the United Nations Framework Convention on Climate Change concluded in 1992, the Community committed itself to stabilising CO₂ emissions by the year 2000 at 1990 levels. In the medium term, with a view to the objective set by the Framework Convention to stabilise "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system", reductions of greenhouse gas emissions will be required in the industrialized countries.

The need for greenhouse gas emission reductions was confirmed by the Council with a view to the First Conference of the Parties to the Framework Convention on Climate Change held in Berlin in March/April 1995. The Conference of the Parties agreed to initiate a process aimed at setting quantified greenhouse gas emission limitation and reduction targets for the time after the year 2000. In this light, the Community is committed to implement the necessary measures in order, first, to stabilise the greenhouse gas emissions by the year 2000, and, second, to limit and reduce these emissions beyond 2000. First proposals are contained in the "Commission Working Paper on the EU Climate Change Strategy: A Set of Options"¹ produced in preparation of the Conference. This document also stressed the importance of designing cost-effective strategies. Already the Commission's original proposals for an overall Community strategy to reduce CO₂ emissions focused in particular on the "no-regrets" potential inherent in measures which lead to benefits in other policy areas.²

2. Against this background, developments in CO₂ from transport are a special cause for concern. Current growth trends in this sector jeopardize the Community's CO₂ objectives. CO₂ from passenger cars account for about half of CO₂ emissions from transport, and about 12 per cent of total CO₂ emissions in the European Union. In addition, the growth in CO₂ emissions from passenger cars contributes to the growth in CO₂ emissions from the transport sector. Under a "business-as-usual" scenario, CO₂ emissions from cars are expected to increase by about 20 per cent by the year 2000 and by about 36 per cent by the year 2010 from 1990 levels. In one year, an average medium-size car in the European Union emits some 3 tons of CO₂.³ The road transport sector has stood out in recent years as one of the few sectors in the Union experiencing CO₂ emission growth.

In this context, the Commission views with concern the lack of progress in improving the fuel efficiency of cars in recent years. While there was a clear trend of fuel efficiency improvement until the middle of the 1980s, average fuel consumption per kilometre has remained the same since then. On the other hand, a significant "no-regrets" potential exists for reducing CO₂ emissions from passenger cars by improving fuel economy. Even within the same vehicle category, there is a wide divergence in the fuel economy of different models.

¹ SEC(95)288 final, 1.3.1995.

² SEC(91) 1744 final, 14.10.1991.

³ Assumptions: 12,600 km driven, present average on-road fuel consumption of 9.6 l/100km.

3. It is clear that the observed and predicted growth in CO₂ emissions from car traffic results from a wide range of factors. Economic prosperity has made the private car affordable for the large majority of European citizens. Whereas increased car ownership has in turn brought undoubted benefits to the citizen and to the wider economy, these benefits are partly offset by certain costs to society. Traffic growth has been facilitated by the insufficient internalization of the external costs of transport, and the Commission will table a Green Paper on this issue in the near future. Changes in lifestyles and land-use patterns have increased the dependency on the car, and, in many places, low service levels and a lack of investment in public forms of transport have made the alternatives to the private car unattractive. High traffic levels, in turn, have led to widespread congestion problems with the associated inefficiencies and raised fuel consumption.

4. Against this background, CO₂ emissions from road transport can only be reduced by a package of measures. In principle, these can aim at reducing the use of motor vehicles, influencing driving behaviour (e.g. speed) and achieving a higher vehicle fuel efficiency by a combination of technical and non-technical measures. As regards passenger transport, an encompassing strategy has to include the improvement of public transport within an overall plan for intermodality and the promotion of a modal shift towards public and non-motorised means of transportation, as advocated in a recent Green Paper by the Commission; higher fuel prices to provide an incentive for the more rational use of the car; the application of transport telematics within overall local and regional transport plans to reduce congestion; and more flexibility in working hours and tele-working to reduce commuter traffic. The "information society" could in the longer term make superfluous many transport movements. Indeed, the measures discussed in this communication are not aimed at reducing the mobility of European citizens but at rationalizing their choices in order to reduce transport externalities. Therefore, the different measures are partly contingent on each other. For example, fiscal policies can only be effective in achieving the goal of CO₂ reduction if the consumer has a clear choice between different transport alternatives. In addition, consumers have to be enabled to exercise this choice through transparency and information.

The Commission wishes to stress this need for a global approach to addressing CO₂ emissions from passenger transport which requires decisions to be taken at many levels. A first step in controlling CO₂ emissions should, in particular, include measures which involve the lowest economic costs and which, at the same time, lead to benefits in other policy areas. In this respect, special attention should be paid to the exploitation of cost-effective technical possibilities. Improving the fuel efficiency of cars through the application of available technologies, therefore, is a cornerstone in a strategy to limit CO₂ emissions from transport. At the same time, a programme to improve the energy efficiency of the transport system will have additional benefits beyond that of CO₂ reduction. It will, *inter alia*, reduce emissions into the air other than CO₂ as well as noise, increase energy security and can strengthen industrial competitiveness. It would re-establish the momentum of the various energy conservation efforts which have slowed down since the fall in energy prices in the mid-1980s. It has to be recognised, however, that this communication with its focus on the fuel economy of cars addresses only one solution.

In addition, there are strong arguments, *inter alia*, those relating to questions of cost-effectiveness and competition in favour of developing a Community framework for improving the fuel economy of passenger cars.

5. Both the Council and the European Parliament have called on the Commission to present a proposal for a measure to reduce CO₂ emissions from cars. A commitment to address this issue was contained already in Council Directives 89/458/EEC and 91/441/EEC. The Environment Council in December 1994 more specifically requested the Commission to look into the possibility of substantially lowering the fuel consumption of newly registered cars by 2005. In this context, an average fuel consumption of 5 l/100km for petrol cars and of 4.5 l/100km for Diesel cars (equivalent to 120 g CO₂/km) has been mentioned by twelve Member States and the European Parliament as a target.

The Commission shares the Council's and Parliament's opinion that action to improve the fuel efficiency of cars is required. In its "Working Paper on the EU Climate Change Strategy: A Set of Options"¹ produced in preparation of the Conference, the Commission already pointed to a Community initiative to reduce CO₂ emissions from cars as a particularly promising policy option. The Environment Council in June 1995 invited the Commission to specify its proposals contained in the Working Paper. This communication is both in response to the Council's and Parliament's requests and reflects the Commission's own concern about the growth of CO₂ emissions from cars against the background of the Community's general CO₂ strategy and related international commitments

6. The purpose of this communication is to prepare a discussion in the Council and the European Parliament on the strategy to be taken to improve the fuel efficiency of passenger cars.² The Commission believes that this strategy has to be based on an appropriate combination of mutually reinforcing measures at both Community and Member State level. It has to be consistent and take account of the different policy objectives potentially affected.

To prepare for the deliberations in the Council and Parliament, the communication sets out the costs and benefits of a significant improvement in the fuel efficiency of passenger cars and analyses different policy instruments available to achieve this improvement. The communication then outlines a coherent strategy to significantly improve the average fuel economy of passenger cars in a cost-effective way in the short to medium term. Finally, it identifies the actions which the Commission intends to take in order to further the development of that strategy.

¹ SEC(95) 288 final, 1.3.1995.

² This communication refers to passenger cars as motor vehicles of category M₁ as defined in Annex I to Council Directive 70/156/EEC. In deciding about the scope for the application especially of the fiscal instruments proposed in the present communication, special care will have to be taken so as to include vehicles not formally defined as passenger cars but mainly used for the same purpose (e.g. certain small pick-up trucks, 4-wheel-drive vehicles).

II. Related policy objectives:

7. The attainment of certain fuel economy targets should not counteract other policy objectives, especially with regard to the reduction of noxious emissions from motor vehicles and vehicle safety. An overly ambitious fuel efficiency target combined with a bad choice of policy instruments could compromise these other objectives.

The Community has set progressively more stringent standards for noxious vehicle emissions which will significantly reduce air pollution problems in the European Union over the next few years. Based on the results of a major assessment of remaining air quality problems and the most cost-effective means to attain air quality targets (European Auto-Oil Programme), the Commission will shortly present its proposals for passenger car emission standards and fuel quality specifications to come into force in the year 2000. The control of noxious emissions is already limiting the impact of cars on the global climate as some of the noxious emissions are also greenhouse gases or precursors to greenhouse gases. However, these efforts are largely outweighed by the growth in CO₂ emissions from cars. CO₂ is the main greenhouse gas, and international efforts under the United Nations Climate Change Convention are hence aimed at the limitation of CO₂ emissions.

A conflict between the objectives of enhanced fuel efficiency and the control of noxious emissions could arise if a measure to reduce CO₂ emissions were to slow down the replacement of the vehicle fleet. The achievement of air quality targets in the short to medium term requires the rapid penetration of the vehicle stock with new and less emitting vehicles. An instrument which slows down fleet replacement will make the achievement of air quality targets more difficult.

Diesel cars perform better than petrol cars as far as CO₂ emissions are concerned. Limited improvements to average fuel economy figures could be an effect of changes in the profile of the car fleet in favour of Diesel cars. However, CO₂ emissions from Diesel engines also need to be improved. The Community cannot achieve CO₂ targets just by switching to Diesel vehicles.

8. A major policy objective underlying the Community's rules for vehicle type approval is vehicle safety. The European auto industry has made significant progress in improving the safety of motor vehicles. Passive safety in case of an accident is an important part of overall vehicle safety. The Commission has submitted two directive proposals relating to the side-impact resistance and the frontal impact resistance of motor vehicles.¹ Increased passive safety tends to make cars heavier although other design features are important. Further proposals to be made in the near future include one on "pedestrian-friendly" car fronts.

Any measure to reduce fuel consumption should not be allowed to compromise the goal of safety. The two proposed directives, once adopted, will be an important safeguard in this respect. At the same time, in the light of these proposals, some trade-off between the objectives of safety and fuel economy may be necessary in the short term since the proposed directives may limit the potential to reduce fuel consumption through a reduction in the

¹ COM(94) 519 final, 13.12.1994; COM(94) 520 final, 13.12.1994.

weight of vehicles, although new and lighter materials may offer new opportunities in this respect. A significant improvement of fuel efficiency, however, is possible even within the current fleet composition by encouraging best practice and a shift towards less powerful models in each car category.

Against this background, the Commission believes that after the entry-into-force of new Community standards for vehicle crashworthiness the objectives of vehicle safety and a reduction in fuel consumption and CO₂ emissions can be made mutually compatible. The Commission would point out that, in the future, additional safety features will inevitably be added to vehicles, reflecting the public's concern to have safe vehicles. The challenge to reconcile this objective with the need to improve fuel consumption will be an on-going one.

9. As stated previously by the Commission,¹ the technological challenge to be faced by the auto industry consists in optimising its product simultaneously against the criteria of comfort and reliability, safety, noxious emissions and fuel consumption in order to maintain its social and environmental acceptability. A number of technologies are now available to improve car fuel efficiency without affecting the other criteria. As fuel prices do not presently give a sufficient incentive to consumers to demand less fuel-consuming cars, these technologies have not been applied to current models. A policy is, therefore, needed to ensure that the fuel economy performance of new cars is improved without compromising other policy objectives.

III. Technical feasibility and costs:

10. In line with the requests made by Member States and the European Parliament, the Commission has considered the average fuel economy targets of 5 l/100 km for new petrol cars, respectively 4.5 l/100 km for new Diesel cars for 2005. The experts consulted by the Commission concur that it is possible to reach an average fuel consumption in that range with best available technology. Most of this improvement can be reaped from technical changes and a move towards less powerful vehicles within each market segment while some fuel consumption reduction would come from lighter and/or smaller vehicles ("downsizing").

The technical improvements to reduce fuel consumption need a certain lead time to be integrated into current production models and penetrate the model range. Much depends on the product cycle of individual manufacturers. While significant progress towards the fuel economy targets above can undoubtedly be made by the year 2005, the application of new technologies in the full model range may take longer.

11. Furthermore, the costs of the technical changes involved to meet the 5 l/100km respectively 4.5 l/100km target need to be considered. The additional cost of a more fuel-efficient vehicle to the consumer at the moment of purchase is balanced by fuel savings over the lifetime of the vehicle. At current fuel prices in the European Union, an improvement in

¹ Communication on the European Union Automobile Industry, COM(94) 49 final, 23.2.1994.

the fuel economy in the range mentioned above could yield a lifetime fuel saving of over 3,000 ECU. A preliminary analysis indicates that there is a substantial "no-regrets" potential for fuel economy improvements under which the cost of a more fuel-efficient car to the consumer is recouped by lifetime fuel savings (see the Annex). Only changes beyond the "no-regrets" potential entail additional costs for the motorist. At the same time, the "no-regrets" potential is not an unambiguous guideline as it varies according to fuel prices in the future.

12. In the light of the above considerations, the Commission considers that significant progress towards the average fuel-efficiency targets of 5 l/100km for new petrol cars and 4.5 l/100km for new Diesel cars should be made. This is particularly true if future research and development efforts spurred by a Community measure to reduce CO₂ emissions from passenger cars are taken into account. However, the year 2005 is a rather ambitious target date. By contrast, a time horizon beyond 2005 for the attainment of the above fuel-economy objective will facilitate the renewal of the model range without forcing a major downsizing of the vehicle fleet. In the meantime, the Community and the Member States should take the necessary measures to move the vehicle fleet in that direction.

IV. Criteria for the assessment of policy instruments:

13. The Commission has considered a range of different policy instruments which could be used in principle to reduce CO₂ emissions from passenger cars by improved fuel efficiency. Each instrument has different advantages and drawbacks. Its effectiveness in terms of CO₂ reduction also depends on the intensity with which it is applied. In order to clarify the measures which would have to be imposed, the Commission has taken the objective of 5 respectively 4.5 l/100km new car fuel consumption by 2005 as a reference point for the analysis of different policy instruments (see below).

In order to allow for a fully informed discussion in the Council and the European Parliament on the options for a strategy to improve the fuel efficiency of passenger cars, the Commission wishes to lay out these instruments in the present communication, before outlining its own proposal for a strategy. The intrinsic merits and demerits of the various instruments will be assessed against the following criteria:

* The measure should be cost-effective. (It should be noted that the comments made in this communication in this respect are based on a qualitative evaluation rather than a quantitative analysis.)

* The measure should recognize the importance of cars in today's society and not exclude certain groups from the ownership and use of a car (equity considerations). Consideration has to be given to how negative effects of any measure on the needs of e.g. elderly and handicapped persons can be avoided.

V. Fiscal options:

14. The tax treatment of cars varies enormously from one Member States to another, not just in terms of burden of tax but also in terms of mix of tax type. Member States typically apply a mixture of some or all of acquisition taxes (e.g. VAT, registration taxes), ownership taxes (e.g. road or circulation taxes, insurance taxes) and use taxes (e.g. fuel taxes, road tolls). Furthermore, the factors which influence fiscal policy for cars also can vary significantly between Member States, often drawing on traditional, social and cultural elements in addition to the more obvious economic, industrial and fiscal concerns. The Commission services have launched an in-depth review of the vehicle tax systems applied by Member States with a view to identifying the consequences of such differing systems on the proper functioning of the internal market. This exercise will also consider the scope for using vehicle taxation to advance other Community policies, including environmental concerns.

Notwithstanding the integrated nature of Member States' vehicle taxation policies, a number of possible means of introducing a fiscal measure aimed at reducing CO₂ emissions and promoting greater fuel economy are put forward for reflection in this section. In principle, fiscal instruments can be used to differentiate the financial burden on the consumer associated with the purchase or ownership of a car as a function of the specific CO₂ emissions respectively fuel consumption of the vehicle. This differentiation will increase the demand from consumers for more fuel-efficient vehicles. Such incentives/disincentives can be integrated into purchase/registration and annual circulation taxes or applied as fiscal incentives in combination with a CO₂ reference standard.

The realisation of any of the fiscal options presented in this communication would be an important step in internalising one of the external costs of transport and broadening the application of economic instruments in achieving environmental objectives. The Commission intends to launch a broader debate on this subject by presenting a Green Paper in the near future.

1. Differentiation of purchase/registration taxes:

15. A strong incentive could be given to consumers to demand more fuel-efficient cars, and consequently to the industry to bring them onto the market, by differentiating the price of the car to the consumer according to fuel economy. This can be achieved through purchase or registration taxes differentiated according to fuel efficiency. Several Member States presently apply a purchase or registration tax. One Member State (Austria) already has a purchase tax related to fuel consumption.

In order to ensure the effectiveness of differentiated purchase/registration taxes in terms of reducing CO₂ emissions from passenger cars, a Community framework would have to

- * set a CO₂ emission baseline value which would be lowered in steps under a specified timetable;
- * set guidelines for the differentiation of tax rates according to CO₂ emissions;
- * set the bands within which Member States could vary the relationship between the tax scale and the CO₂ emission baseline value.

Estimates done for the Commission by the Motor Vehicle Emissions Group (MVEG) and by an independent consultant suggest that the fiscal differential required to achieve the fuel efficiency target of 5 l/100km for petrol cars and 4.5 l/100km for Diesel cars by 2005 would be in the order of 45 ECU per additional 1 g of CO₂ per 1 km (= 1050 ECU per additional 1 l of fuel consumed per 100 km for petrol cars and 1180 ECU per additional 1 l of fuel consumed per 100 km for Diesel cars).

16. Cost-effectiveness: As CO₂-based purchase or registration taxes modify the initial cost of the new car to the consumer, they are expected to have a significant direct effect on the purchase decision. A fiscal instrument targeting the purchase decisions remedies the fact that the consumer does not fully take into account potential future fuel savings at the moment of vehicle purchase, and is, therefore, likely to be of low cost. It would then also pay for the manufacturer to apply certain technologies to reduce fuel consumption as the costs of these technologies would be balanced by lower taxes at the moment of car sale. The actual effectiveness of the instrument depends on the magnitude of the fiscal differential. The common CO₂ emission baseline value for each year under a Community framework ensures that a strong signal about the fuel economy improvement aimed at is given to the auto industry and consumers.

As the instrument increases the cost of new cars at least above a certain level of fuel consumption, however, it could induce an overall slowing-down of the replacement of the car fleet. This would be unwelcome both from the point of view of CO₂ reduction and the control of noxious emissions, as older, more polluting and less fuel-efficient cars remain longer part of the vehicle stock. Differentiated purchase/registration taxes introduced in a revenue-neutral manner can potentially overcome this effect because, on average, car prices will not increase and the impact on the fleet renewal is likely to be neutral. If this option were pursued, it will have a variable impact in Member States reflecting the different structure of each country's industry and its motor vehicle fleet.

17. Equity considerations: The social acceptability of this instrument depends largely on the tax rates involved. The instrument allows for fuel-efficient cars to be wholly or partly exempted from additional fiscal charges which improves its social acceptability. Even if a tax is imposed on all new cars, consumers have the possibility to reduce additional costs by opting for a more fuel-efficient model.

2. Differentiation of annual circulation taxes on the basis of CO₂ emissions:

18. Annual circulation taxes are levied in all Member States. The criteria on which their calculation is based differ, with fiscal horsepower, cylinder capacity, vehicle mass and vehicle age being frequently used. Tax structures, tax rates, tax progression and the treatment of Diesel cars also vary between Member States. As vehicle fuel consumption is partly determined by engine capacity, engine power and vehicle weight, most existing annual circulation taxes are already to a greater or lesser degree related to CO₂ emissions. However, the present differentiation of annual circulation taxes is too small to have any significant impact on CO₂ emissions.

An instrument to reduce the CO₂ emissions of passenger cars by improved fuel efficiency could be based on annual circulation taxes. In this case, CO₂ emissions would become an important basis for calculating annual circulation taxes.

As for the purchase/registration tax option above and for the same reasons, a Community framework would have to

- * set a CO₂ emission baseline value which would be lowered in steps under a specified timetable;
- * set guidelines for the differentiation of tax rates according to CO₂ emissions;
- * set the bands within which Member States could vary the relationship between the tax scale and the CO₂ emission baseline value.

The basis for calculating the fiscal differential required for a CO₂-based annual circulation tax to achieve the fuel efficiency target of 5 l/100km for petrol cars and 4.5 l/100km for Diesel cars is the fiscal differential identified for a CO₂-based purchase or registration tax (see above). The conversion of this differential into a fiscal differential for annual circulation taxes depends on the assessment of the extent to which consumers take account of future costs. Under the assumption that consumers are sensitive to future costs,¹ a differentiation of annual circulation taxes in the order of 6 ECU per additional 1 g of CO₂ per 1 km (= 140 ECU per additional 1 l of fuel consumed per 100 km per year for petrol cars and 160 ECU per additional 1 l of fuel consumed per 100 km per year for Diesel cars) would be needed to achieve the above fuel efficiency targets. Under the assumption that consumers are sensitive only to costs incurred during e.g. the first 4 years after vehicle purchase, the fiscal differential would have to be in the order of 12 ECU per additional 1 g of CO₂ per 1 km (= 280 ECU per additional 1 l of fuel consumed per 100 km per year for petrol cars and 315 ECU per additional 1 l of fuel consumed per 100 km per year for Diesel cars).

19. Cost-effectiveness: Experience in some Member States shows that annual circulation taxes have some impact on the characteristics of the vehicle fleet. As the levels of annual circulation taxes are in most cases rather low, the significance of their impact is difficult to gauge.

Different factors affect the effectiveness of CO₂ emission-based annual circulation taxes. If it is true that consumers do not fully take account of lifetime costs at the moment of vehicle purchase, the total fiscal charge over the lifetime of the vehicle has to be higher for a similar incentive effect as compared to a fiscal charge applied at the moment of car purchase (see above). On the other hand, the re-sale value of a car depends among other things on the fiscal charges associated with the vehicle. If consumers take into account the re-sale value of their car at the moment of vehicle purchase, they are sensitive to future standing fiscal charges including the annual circulation tax. Overall it is clear, though, that annual circulation taxes are a less direct instrument to modify the initial purchase decisions of consumers than purchase or registration taxes.

¹ Assumptions: a vehicle lifetime of 10 years and a discount rate of 8 per cent.

In the short term, a CO₂ emission-based circulation tax could slow down the replacement of the existing vehicle fleet if the tax applied only to new cars in order to not penalize the owners of existing cars (although the tax could be applied to the whole vehicle fleet from the outset). At such time as the CO₂ emission-based annual circulation tax would apply to the entire vehicle fleet, it would then provide a continuous incentive to improve its fuel efficiency through the scrapping of less fuel-efficient cars.

20. Equity considerations: The raising of tax rates required to influence a consumer decision in favour of a fuel-efficient car at the moment of vehicle purchase would increase the ownership costs of less fuel-efficient cars. The actual social acceptability of a CO₂ emission-based annual circulation tax depends on its characteristics in terms of the relationship between the tax scale to the CO₂ emission baseline value. In any case, consumers have the possibility to avoid additional costs by opting for a more fuel-efficient car.

3. CO₂ reference standards and a framework for fiscal incentives:

21. The basis for such a measure would be a CO₂ reference standard incorporated into the vehicle type-approval procedures. This standard would be related to vehicle mass, cylinder capacity or horsepower. Fiscal incentives would then be given to vehicles the CO₂ emissions of which are below the reference standard. The standard would be lowered in steps under a specified timetable, with a stronger lowering for bigger vehicles. Fiscal incentives could be applied in the framework of annual circulation, purchase or registration taxes.

In contrast to purchase/registration and annual circulation taxes, passenger car type-approval procedures are already harmonized under Community legislation.¹ The development of a harmonized Community framework for fiscal incentives for the reduction of CO₂ emissions from passenger cars would simply require the incorporation of a CO₂ reference standard under the present type-approval certification procedure. In practice, this would involve

- * setting a CO₂ reference standard to be lowered in steps under a specified timetable;
- * establishing a framework for fiscal incentives, including a maximum amount of fiscal incentives, given to vehicles the CO₂ emissions of which are below the reference standard in the framework of annual circulation, purchase or registration taxes.

The reference standard should be set in a way which ensures that a clear signal is given to consumers and the auto industry about the fuel-efficiency improvements aimed at.

An inherent disadvantage of standards related to certain vehicle characteristics (mass, cylinder capacity, horsepower) in the context of CO₂ reduction is the possibility of so-called "paradox effects." A car in a higher vehicle category could meet the reference standard and be favoured by a fiscal incentive while a car in a lower vehicle category could not meet its (more stringent) standard and not receive a fiscal incentive even though it emits less CO₂.

¹ Council Directive 70/220/EEC, as amended for the last time by Directive 94/12/EC.

22. Cost-effectiveness: The effectiveness of a standards-based instrument depends on the reference standards set for each year and the fiscal incentives applied. The reference standards should be set on the basis of the fuel economy achieved by the most fuel-efficient cars in each category and lowered according to expectations about future technical improvements.

As compared to an economic instrument, the welfare costs of a standards-based instrument are expected to be higher as it restricts the potential for flexible adjustment by manufacturers and consumers.

23. Equity considerations: No additional fiscal charges would be imposed on consumers under this instrument. Instead, through the fiscal incentives, the ownership of more fuel-efficient cars would be made cheaper.

24. Within an overall strategy, Member States might be given the choice to opt for one or the other or a combination of the above fiscal instruments to promote the introduction into the market of more fuel-efficient cars. This would allow for solutions better adapted to the specific circumstances in each Member State. Further, a Community framework would offer different possibilities for Member States to decide about the details of a fiscal instrument, including the tax differential respectively the amount of the fiscal incentives.

4. Excise duties on motor fuels:

25. Fuel prices have an effect on CO₂ emissions both by influencing the use of motor vehicles and by providing an incentive for higher fuel efficiency. Actual fuel prices are at present strongly influenced by excise duties on mineral oil. Council Directive 92/82/EEC sets minimum rates for excise duties on petrol and Diesel. Member States are free to apply higher rates, and most Member States have done so. The use of excise duties as an instrument to improve the fuel efficiency of motor vehicles could be based on an upward revision of the present Community minimum rates. In addition, carbon/energy taxes along the lines of the Commission's proposal aim at providing an incentive for reducing CO₂ emissions and improving energy efficiency across different sectors, although their impact in the transport sector would be limited due to already high levels of mineral oil taxation.¹

It is clear that the other instruments put forward in this communication will have to be accompanied by a strategy to raise fuel prices to prevent a decrease in motoring costs associated with better fuel economy which would give an incentive for higher car usage.

Work done for the Commission by an independent consultant suggests that if fuel excise duties were the sole instrument applied to improve the fuel economy of passenger cars the final price of fuel to the consumer would have to be gradually increased in real terms by about 110 % for petrol and by about 150 % for Diesel between 1996 and 2005 to achieve an average fuel efficiency of new vehicles of 5 l/100km for petrol cars and 4.5 l/100km for

¹ COM(95) 172 final, 10.5.1995.

Diesel cars.

26. Cost-effectiveness: Excise duties on mineral oil are a cost-effective instrument to reduce CO₂ emissions from road transport. However, their effect is more limited when they are aimed at improving the fuel efficiency of passenger cars. In particular, the fact that potential future fuel savings are not fully taken into account by the consumer at the moment of vehicle purchase makes for a sub-optimal demand for fuel efficiency in cars on the basis of fuel prices alone. All fuel consumption is charged with an additional financial burden although the purpose of the measure is to target the less fuel-efficient vehicles. Even drivers of the most fuel-efficient vehicles would be charged.

27. Equity considerations: A measure based only on fuel prices and with the fuel price increases mentioned above could have a clear impact especially on the less well-off members of society. Relatedly, local differences in the availability of alternatives to private car use would risk to impose a differential burden on citizens in different regions. However, the overall distributional impact of an increase in fuel excise duties depends to a large extent on the use of the associated tax revenues.

VI. Non-fiscal options:

28. Other, non-fiscal instruments can be envisaged to improve the fuel economy of passenger cars.

1. An agreement with the auto industry:

29. An agreement could be concluded with the auto industry on a reduction of the fuel consumption of new cars sold. This agreement would contain the commitment by vehicle manufacturers to reduce the average CO₂ emissions of all new cars sold gradually over a fixed period of time to achieve a specified target.

In 1991, the European car manufacturers already committed themselves to reducing the CO₂ emissions of new vehicles by 10 per cent between 1993 and 2005. In March 1995, the German manufacturers made a commitment for a 25 per cent reduction in the average fuel consumption of their cars produced and sold in Germany between 1990 and 2005. These commitments confirm the industry's interest in working together with public authorities towards reducing CO₂ emissions from the transport sector in the spirit of shared responsibility.

It is clear, however, that current fuel prices do not favour the application of technologies to reduce fuel consumption but associated with additional costs to the consumer at least in the short term. Any more ambitious fuel-efficiency objective to be attained by the industry would, therefore, risk to fail in the marketplace as consumers are unwilling to bear the associated costs, even if they can recoup some or all of those costs through future fuel savings. Therefore, measures to influence consumer behaviour will be required to support an agreement with the industry. An agreement with the industry and incentives to consumers

inseparably complement each other. (The Commission intends to present a communication on a Community framework for negotiated agreements in 1996.)

2. Research and development:

30. A major breakthrough in fuel economy can be hoped for from radically new technologies and light-weight materials in a longer term perspective. To focus and better coordinate R&D efforts in the Community in the area of vehicle technology, the Commission has established a *Task Force on the Car of Tomorrow*. The strategic goal is to achieve a technological breakthrough, *inter alia* in the area of propulsion systems with radically lower emissions, including battery and fuel-cell-based systems as well as hybrid solutions in which the performance of internal combustion engines is optimised. For certain of the new technologies, of course, the CO₂ advantage depends significantly on the source of primary energy.

The research targetted by the *Task Force on the Car of Tomorrow* is aimed at a quantum leap in reducing the fuel consumption and CO₂ emissions from motor vehicles at a longer-term horizon. The Action Plan of the Task Force aims at the demonstration of prototype technologies at the year 2000 to 2005 horizon. It will make use of existing specific RTD programmes such as JOULE and BRITE-EURAM. However, there is a potential for a significant step forward in the short term on the basis of existing technical possibilities available for introduction into manufacturers' model ranges even before that time. The objective of the strategy outlined in this communication is to suggest a course of action aimed at capitalising from the technological potential that exists.

In addition, other programmes under the Community's Fourth R&D Framework Programme, such as the SAVE II Programme, as well as the THERMIE Programme offer opportunities to enhance the energy efficiency of the transport sector through the development and demonstration of technologies for the intelligent management of traffic and public transport and the reduction of transport demand through advanced communications systems ("information society").

3. Fuel-economy labelling as a complementary measure:

31. To support any of the instruments discussed in this communication, certain complementary measures could be taken. In this context, the Commission considers a CO₂ emission labelling as particularly useful. The provision of information to consumers about the fuel economy respectively the CO₂ emissions of different car models would enhance the effectiveness of the fiscal incentives. While the fuel consumption of cars is usually advertised by car manufacturers, the effectiveness of this information could be enhanced by the publication of a standardised lifetime fuel cost of a specific car model. A Community measure should, therefore, provide for the amendment of Directive 93/116/EC relating to the fuel consumption of motor vehicles by a corresponding provision. The Commission will make the necessary legislative proposals.

32. Relatedly, the Commission notes the significant potential for fuel consumption reduction which is offered by a more fuel-efficient driving behaviour. It, therefore, encourages in particular the auto industry and motoring associations to promote more fuel-efficient driving through awareness raising and driver training campaigns.

VII. Towards a Community strategy to improve the fuel efficiency of passenger cars:

33. On the basis of the analysis in the first part of this communication, the Commission believes that an overall Community strategy to reduce the CO₂ emissions from passenger cars through improved fuel economy should be based on the following elements:

- * an agreement between the Community and the auto industry involving clear objectives and provisions for monitoring;
- * the promotion of the fuel efficiency of passenger cars to be incorporated as one of the objectives in a future Community initiative on vehicle taxation arising from the ongoing review of that area;
- * a complementary measure with regard to fuel-economy labelling;
- * an ambitious RTD effort to improve the performance of motor vehicles in line with the Action Plan of the *Task Force on the Car of Tomorrow*, and to promote attractive alternatives to road transport as aimed at by the *Task Forces on Intermodality and Trains and Railway Systems of the Future*.

The first three of these elements are the subject of this communication.

34. An agreement would be concluded by the Commission on the basis of the discussions on this communication in the Council and the European Parliament with the European auto industry and car importers.¹ In the case of the auto industry in the European Union, an umbrella agreement with the European Automobile Manufacturers Association (ACEA) will have to contain a commitment by the industry to reduce the average CO₂ emissions of its new cars sold in the European Union to achieve a specified target in a specific year. Separately, similar agreements would be concluded by the Commission with the importers of cars into the European Union. The Commission considers that a 25% reduction in the average CO₂ emissions of new cars sold in the European Union by 2005 as compared to 1990 is a reasonable reference point for a commitment to be included in an agreement with the industry. This percentage reduction could, of course, be translated into a Europe-wide average fuel economy target value (in litres/100km). The burden-sharing of this objective between different manufacturers under which a larger reduction may be possible in some market segments than in others depending on the fuel efficiencies already achieved by different models is left to the industry. The *Task Force on the Car of Tomorrow* will help the Commission and the industry in identifying the technological possibilities to achieve certain

¹ In including car imports into the European Union under the agreement, the special position of car importers with respect to the composition of their vehicle imports will have to be taken into account.

fuel economy objectives. The agreement will have to be made compatible with the Community's competition rules and be concluded in a sufficiently transparent manner so as to satisfy GATT/WTO rules in this respect.

In order to ensure transparency and allow for a strengthening of the strategy if this should be needed, a set of indicative intermediate targets and a system of monitoring of those targets will be laid down in the agreement. Progress against these targets and the overall CO₂ emission objective by the industry as a whole and each manufacturer will be monitored jointly by the Commission and industry. The Commission will periodically inform the Council and the European Parliament of progress made. The CO₂ emissions will be measured according to Directive 93/116/EC relating to the fuel consumption of motor vehicles,¹ and the Member States will have to communicate to the Commission the corresponding type-approval figures and the numbers of newly registered vehicles of each model in each year. The Commission will make a proposal for the setting-up of this data exchange system.

35. The Commission recognises that, under current Community law, Member States have considerable freedom with regard to motor vehicle taxation. The Commission nevertheless believes that benefits could be derived from the development of a Community framework for fiscal measures to assist in the reduction of CO₂ emissions from cars and the promotion of greater fuel economy. However, the Commission also recognises that any such framework must itself be developed in the context of the evolution of an overall approach to vehicle taxation in the Community, in the interests of the proper functioning of the internal market and with a view to supporting other policy objectives.

Concern about its effectiveness and political acceptability, however, has led the Commission to exclude the option of relying exclusively on excise duties on transport fuels as a policy measure. The equity considerations raised by the tax rates which would be needed to have a significant impact on vehicle fuel efficiency seriously limit the political acceptability of this option. Higher fuel prices will nevertheless be needed to complement any other of the measures put forward in this communication in order to prevent a decrease in motoring costs associated with lower fuel consumption, which would undermine the overall policy objective of reducing CO₂ emissions. Higher fuel prices may also be needed more generally to contribute to the full internalisation of the external costs of transport.

The attainment of any CO₂ emissions objective will crucially depend on incentives given to consumers to purchase more fuel-efficient cars on the one hand, and on the efforts made by industry itself in producing and marketing more fuel-efficient vehicles on the other. An agreement with the industry and fiscal incentives to influence consumers are closely linked.

36. The Commission is of the opinion that the strategy put forward in this communication will pave the way to a considerable improvement of the average fuel efficiency of passenger cars in the short to medium term. Thus, the strategy corresponds to the Council's and Parliament's call for a Community measure to reduce CO₂ emissions from passenger cars.

¹ OJ No L 329, 30.12.1993, p. 39.

VIII. Conclusions:

37. The Commission believes that the appropriate approach for Community action to reduce CO₂ emissions from passenger cars by improved fuel efficiency consists in a combination of an agreement with the European auto industry and the importers of cars into the European Union involving an industry commitment to attain a specific CO₂ emission target for new cars sold within a certain timeframe; the incorporation of fiscal measures to promote fuel-efficient passenger cars within an overall Community initiative on vehicle taxation; and a special RTD effort to promote the development of low and zero CO₂-emitting motor vehicles in line with the Action Plan of the *Task Force on the Car of Tomorrow*. Enhanced consumer information by a CO₂ emission labelling will complement this strategy.

The Commission underlines the importance which it attaches to a specific measure to reduce CO₂ emissions from passenger cars. Such a measure is needed to allow for reductions of total CO₂ emissions in the European Union in the medium term. In further developing the strategy proposed in this communication, the Commission will undertake further consultations with the appropriate business organisations and other interested parties. With a view to expediting the decisions to be taken, the Commission invites the Council and the European Parliament

- * to consider the proposals contained in the present communication;
- * to confirm the general strategy put forward under paragraph 33 above;
- * to note the further initiatives which the Commission is undertaking, in particular with regard to (1) a comprehensive review of vehicle-related taxation in the Member States with a view to defining, *inter alia*, a fiscal framework under which Member States would apply vehicle-related fiscal instruments to promote the introduction into the vehicle fleet of more fuel-efficient cars, and (2) legislative proposals for an amendment of Directive 93/116/EC with respect to the fuel economy labelling of passenger cars;
- * to collaborate with the Commission in the realisation of these future initiatives.

Annex

Preliminary assessment of the costs and benefits of technical measures to reduce CO₂ emissions from cars

A preliminary analysis has been undertaken by the Commission services on the costs and benefits of technical measures to reduce CO₂ emissions from cars by improved fuel efficiency. These figures should not be considered as definitive but as giving an indication of the orders of magnitude involved.

Technological potential and costs :

On the basis of figures by the US National Research Council, adapted, where necessary, to the characteristics of the car fleet in the European Union, on the specific technologies available to reduce passenger car fuel consumption, the following can be stated :

Improvements in engine and transmission technologies, rolling resistance, aerodynamics as well as a vehicle weight reduction by 10 per cent through the use of new materials together can improve the fuel efficiency for petrol cars by about 40 per cent using mid-range estimates. The technologies considered are already commercial or at an advanced stage of design. This reinforces the estimate by the Commission's Motor Vehicle Emissions Group (MVEG).

On the basis of the same study, it is expected that the total costs of a fuel economy improvement of 40 per cent is between about 940 ECU and 2,270 ECU per vehicle.

Benefits :

The Commission expects that a gradual improvement of the average fuel efficiency of new passenger cars by 40 per cent between 1996 and 2005 would reduce total end-of-pipe CO₂ emissions from passenger cars in the European Union by 17.5 per cent as compared to current trends in 2005 and by 30.1 per cent as compared to current trends in 2010. Due to the growth in the vehicle fleet and mileages, however, total end-of-pipe CO₂ emissions from passenger cars would increase by 4.9 per cent by 2005 as compared to 1990. They would decrease by 6.9 per cent by 2010 as compared to 1990.

"No-regrets" potential :

The lifetime fuel saving to the motorist of a 40 per cent improvement in fuel efficiency is estimated at about 5,800 litres¹. At a fuel price of 0.827 ECU/l, corresponding to the weighted premium gasoline price in the European Union in September 1994, and a discount rate of 8 per cent this translates into a cost saving over the lifetime of the vehicle of 3,257.22 ECU (3,724.43 ECU for a discount rate of 5 per cent). The lifetime fuel saving thus could

¹Assumptions : Present average on-road fuel consumption (petrol and Diesel cars) of 9.6 l/100km ; annual mileage 12,600 km ; vehicle lifetime 12 years.

exceed the costs of the fuel efficiency improvement by a considerable margin if some or all of these can be delivered at the more favourable end of the cost-benefit range.

A bottom-up analysis of the cost/benefit ratios of individual technical improvements has been provided to the Commission services by the UK Department of Transport. This suggests that at current fuel prices in the UK (0.64 ECU/l), improvements of between 14 and 32 per cent in the fuel consumption of petrol cars might be achieved at a cost that would be recovered over the lifetime of the vehicle (using a discount rate of 8%). At a payback period of no greater than three years, the cost of technical improvements to achieve savings of between 5 and 28 per cent might be recovered. At a higher fuel price of 0.85 ECU/l (which might be achieved by 2000 if the UK Government continued its strategy of increasing fuel duty by a minimum of 5% real per annum), the corresponding figures for a lifetime payback would be between 19 and 36 per cent, and for a three-year payback between 11 and 28 per cent.

It should be noted that these analyses depend greatly on the real cost of delivering technical gains and are of a purely indicative nature. Results can also vary considerably with the assumptions made (e.g. fuel prices, payback period, discount rate). In addition, it is unclear whether the cost estimates include wider costs, such as higher maintenance costs, costs of retooling and design, or costs to consumers such as reduced comfort. It is nevertheless clear that a least a significant part of the measures needed to improve fuel economy by 40 per cent is of a "no-regrets" nature.

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