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Report

drawn up on behalf of the Committee on Transport

on ways and means of effecting energy savings in the transport sector

Rapporteur: Mr W. ALBERS

English Edition PE 72.602/fin.

On 15 November 1979 the Bureau of the European Parliament authorized the Committee on Transport to draw up an own-initiative report on ways and means of effecting energy savings in the transport sector. At the same time the Committee on Energy and Research was authorized to deliver an opinion on this subject. On 31 October 1979 the Committee on Transport appointed Mr Albers rapporteur.

On 27 and 28 November 1980 the Committee on Transport held a public hearing in Brussels on the subject of energy savings in the transport sector.

The Committee on Transport considered the draft report at its meetings of 22 and 23 April and 14 and 15 May 1981 and on the last of these dates adopted the motion for a resolution and explanatory statement by 8 votes to none with 3 abstentions.

Present : Miss Roberts, acting chairman; Mr de Keersmaeker, vice-chairman; Mr Carossino, vice-chairman; Mr Albers, rapporteur; Mrs von Alemann, Mr Baudis, Mr Bonaccini (deputizing for Mr Cardia), Lord Harmar-Nicholls, Mr Moorhouse, Mr Moreland and Mr Voyadzis.

The opinion of the Committee on Energy and Research is attached to the present report.

C O N T E N T S

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The Committee on Transport hereby submits to the European Parliament the following motion for a resolution, together with explanatory statement:

MOTION FOR A RESOLUTION

on ways and means of effecting energy savings in the transport sector

The European Parliament,

- having regard to the report of the Committee on Transport and the opinion of the Committee on Energy and Research (Doc. 1-249/81),

- having regard to the material collected during the hearing on this subject organized by the Committee on Transport on 27/28 November 1980 and the written contributions sent in by qualified organizations,

- having regard to its numerous reports and resolutions on the supply and consumption of energy in the Community and the action which needs to be taken to achieve savings,

- having regard to the Council resolution of 9 June 1980 concerning new lines of action in the field of energy saving[1],

- conscious that world consumption of oil exceeds the rate at which new reserves are being discovered and brought to production, and that the world's oil reserves may be exhausted in a timescale of up to sixty years,

- pointing out that the transport sector relies to a very great extent on oil to cover its energy needs,

- very seriously concerned about the Community's present energy supply situation and possible future developments, particularly with regard to oil, and the effect these will have on the operation of Community transport,

- wishing at the same time to make a contribution towards reducing the Community's dependence on imported oil products,

- taking account of the fact that in many respects the efficiency with which oil is used as a source of energy for transport is open to improvement,

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[1] OJ No. C 149, 18.6.1980, p.3

1. Maintains that all possible efforts must be made to cut oil consumption in the transport sector by a substantial amount and that a reduction over 10 years of 20 to 30% is both advisable and feasible;

2. Is firmly convinced that a number of measures can be taken to this end without any significant cost arising to the Community;

3. Urges the Commission to take greater account than in the past of the possible repercussions of all its proposals in this field on oil consumption in the transport sector and states its intention to judge future transport proposals systematically by this yardstick;

4. Notes with regret that current research into energy saving in the various sectors of transport, despite some successes, must in general be regarded as inadequate;

5. Also regrets that the measures taken so far to effect energy savings in transport have failed to produce any notable results and, with one or two exceptions, the savings made bear no relation to the exigencies of the present and future energy requirements;

6. Considers it extremely desirable in the first instance and at the earliest possible date to make better use of the existing modes of transport by:

   - making technical adjustments and improvements to these modes of transport,

   - channelling traffic flows in a more efficient manner,

   - increasing the load factor of vehicles in both public and private transport;

7. Emphasizes the need to take measures in favour of public transport to make it more attractive particularly in towns and conurbations and thereby encourage more selective use of the private car;

8. Wishes therefore to see the service provided by public transport improved by:

   - modernizing existing buses, underground transport and other public means of transport,

   - better adjusting supply to demand and providing more frequent services,

- providing new routes and extending networks,
- staggering working hours and holidays,
- granting or extending special fares,
- integrating the various public transport services in towns,
- building car parks at the most important approach roads into towns,
- general introduction of reserved lanes for buses and taxis,

as well as organizing publicity campaigns to stimulate the use of public transport;

9. Considers that the development of telecommunications could help to reduce the number of journeys per person;

10. Also considers it desirable to take measures in favour of combined road/rail transport and road/inland waterway/sea transport so that greater use can be made of them in future particularly for transporting goods over long distances;

11. Is of the opinion that priority should be given to the more economical means of transporting goods; points out, however, that any measures aiming to transfer goods transport from road to rail or inland waterway must be well thought out and must take account of a number of factors such as consumers' legitimate interests, the overloading of some stretches of railway track and the capacity of transport infrastructures;

12. Considers it necessary, if transfers are to be made within transport as a whole from one mode to another, that account should be taken of their effect on employment and that this matter should be discussed at an early stage with employers' and workers' organizations and counter-measures taken on the labour market, for example in the form of public works contracts in the public transport sector;

13. Requests the Commission to draw up an emergency plan without delay to deal with a serious energy crisis in order to ensure, on the basis of Community criteria, the fairest distribution of scarce fuels between the various transport sectors taking into account the demands of industry, trade and transport;

14. Requests the Commission to draw up proposals for goods transport directed towards the use of those modes of transport which use less energy and are, if possible, less dependent on oil and its derived products;

15. Calls for the introduction of recommended Community fuel consumption standards for road vehicles, particularly passenger vehicles;

16. Believes that the maintenance and correct tuning of private and commercial vehicle engines does make a valuable contribution to energy saving, consequently urges Member States governments' to publicize the advantages of proper maintenance and tuning and to encourage vehicle users to retrofit their vehicles with computer actuated engine management systems as a means of reducing the need for regular maintenance and tuning;

17. Recommends the introduction of road speed limits after careful consideration and harmonization at Community level since this is a measure which can considerably improve the efficiency with which fuel is used; nevertheless cautions against speed limits which might hinder the easy movement of traffic which in turn might lead to a wastage of fuel;

18. Recommends further that drivers of road transport vehicles should be urged to adopt better driving techniques to reduce fuel consumption by supplying them with information on their vehicle's energy consumption and providing adequate instruction and training courses for the drivers of commercial vehicles;

19. Recalls its previous remarks on the considerable wastage of fuel in aviation as a result of inadequate control systems in the European airspace and a lack of cooperation between national air traffic authorities[1] which cause aircraft to be held up in airports, circle aimlessly above them and fly considerably longer distances than necessary;

20. Considers it therefore desirable to introduce an integrated European system to regulate air traffic flows which will be concerned to produce a route structure compatible with an efficient use of fuel;

21. Believes that reform of the existing structure of air transport in the Community, including moves towards greater competition, can contribute to greater efficiency in the use of aircraft and, consequently, energy saving, in addition to meeting the needs of airline users;

22. Urges greater attention by Member States and shipping organizations to energy saving opportunities in shipping and, in particular, to the replacement of oil by coal or nuclear power, where practicable, as major energy sources for ship movement;

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[1] Report by Mr Janssen van Raay, Doc. 1-274/80, OJ No. C 197, 4.8.1980, p. 44

23. Appeals to urban authorities to take measures to prevent wastage of fuel in town centres and conurbations, including:

- appropriate general traffic planning,
- an integrated system of public transport,
- increased synchronization of traffic lights,
- clear signposting,
- the construction of ring roads,
- diversion of traffic from busy town centres;

24. Is firmly convinced that energy consumption could be tangibly reduced by the construction of an improved and integrated Community transport infrastructure network and the elimination of numerous bottlenecks and refers in this connection to its resolution on the role of the Community in the development of transport infrastructure[1];

25. Is of the opinion that additional efforts are required to improve cross-frontier transport within the Community and transport in its peripheral regions;

26. Requests the Commission to draw up practical proposals for the financing of energy-saving programmes in this field;

27. Considers that the Commission should incorporate in its proposals for tax harmonization measures which will encourage the use of energy-saving means of transport but which will not cause distortions of competition or produce difficulties in the labour market;

28. Is of the opinion that at the same time inquiries should be made to ascertain to what extent tax-free allowances and tax relief on travel expenses could be replaced by the provision of public transport vouchers;

29. Urges the Commission to undertake research into possible alternative energy sources and means of propulsion for the transport sector;

30. Invites the Commission to consider that areas for further Community-sponsored research should include :

(a) the potential for electric power-based road vehicles,
(b) the use of methanol, ethanol and hydrogen for road vehicles,
(c) the use of lighter vehicles with a better aerodynamic design,
(d) the energy savings potential of lighter airframes, more aerodynamic fuselage and wing shapes through the establishment of a cyrogenic transonic wind tunnel,

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[1] Report by Mr Klinkenborg, Doc. 1-601/80

(e) the potential for coal-burning locomotives, inland and maritime vessels using fluidized bed boilers,

(f) coal liquefaction,

(g) the development of very high-speed trains,

(h) improved utilization of shipboard computer systems for fuel purposes at sea,

(i) a Community research and development programme for the European aerospace industry,

(j) new methods of oil analysis and specification;

31. Draws attention to the need for there to be, as part of a common policy on industry, consultations, exchanges of information and, where possible coordination between the Community and third countries on the research and development of new conventional or non-conventional energy-saving technologies;

32. Invites the Commission at its earliest opportunity to draw up a memorandum on the subject of energy savings in transport which will take up the recommendations and suggestions made here and set out an action programme with specific priorities, taking account of the ideas developed in the explanatory statement attached to this resolution;

33. States its firm opinion that, in view of the difficult enery supply situa the institutions and Member States of the Community must make greater efforts within the framework of the Treaties to give fresh impetus to the common transport policy;

34. Requests its President to forward this resolution and the accompanying report to the Council and Commission and to the committees responsible for transport matters in the national parliaments of the Member States.

B

EXPLANATORY STATEMENT

I. INTRODUCTION

1. The Committee on Transport is fully aware of the present excessive use of energy in the transport sector, of the Community's energy supply difficulties and of the danger that an energy crisis could represent for a properly functioning transport market in view of the great dependence of this sector on energy and in particular on oil.

2. At its very first meeting after direct elections, on 7 September 1979, the committee made this problem one of its priorities[1] and also agreed unanimously that it should draw up an own-initiative report on ways and means of effecting energy savings in the transport sector.

3. At the same time the committee believed that it was desirable, in preparation for this report and in order to formulate realistic and feasible proposals and recommendations, to invite the relevant international and European organizations to a public hearing.

4. This public hearing was held, after thorough consultation and preparation, in Brussels on 27 and 28 November 1980.

Of crucial importance in the preparation of this hearing was the selection of the organizations to be invited to represent the sector and the drafting of a carefully considered questionnaire which was sent to participants on 18 June 1980[2].

Unfortunately, lack of time made it impossible to invite many organizations. However, the committee believed that a large number of questions had to be answered come what may and that this would be impossible if the number of participants was not restricted.

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[1] See the list of priorities of the Committee on Transport, PE 59,680

[2] Your rapporteur's questionnaire (PE 63.132 of 17 April 1980) is attached to this report as Annex 1.

Your rapporteur would like to offer his apologies for this at this point and thank those organizations which nevertheless sent in written contributions.

He would also like to address special thanks to all the experts and representatives of organizations who took part in this public hearing[1], answered the questionnaire and/or submitted written comments[2].

It goes without saying that your rapporteur gave careful consideration to all this factual material and drew conclusions which are embodied in the present report.

5. From the outset the Committee on Transport had decided to involve the Committee on Energy and Research closely in its activities. Many consultations took place between your rapporteur and the draftsman for the Committee on Energy and Research, Mr Beazley, and a certain demarcation of tasks was agreed in order to avoid pointless duplication of work and contradictions. Your rapporteur would like to thank Mr Beazley warmly for his cooperation and efforts.

6. Finally, your rapporteur would like to thank the various members of staff of the Commission who provided him with advice and in particular Mr Ventrella who was kind enough to act as coordinator between the various Commission Directorates-General concerned.

7. It would be an endless task to give detailed consideration in the present report to all aspects of the very complex question of energy saving in the field of transport, on which many studies have been carried out in the past few years and a large number of articles published.

Your rapporteur would therefore like to restrict himself to the main lines of this problem and to presenting cogent arguments for the recommendations and suggestions which are included in the motion for a resolution.

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[1] For a full account of the public hearing, see Doc. PE 69.952

[2] Annex II contains a list of participants and Annex III a list of all the written contributions received with references.

II. THE PRESENT ENERGY SITUATION AND ENERGY CONSUMPTION IN THE TRANSPORT SECTOR WITHIN THE COMMUNITY

8. We all know that the Community has been faced since 1973 with the problem of increasingly expensive and scarce supplies of the energy which is of crucial importance for the proper functioning of trade and transport.

9. The Community is highly dependent in its considerable and moreover continuously increasing consumption of energy on imports, particularly in the case of oil products which account for more than half of the Community's energy consumption.

The consequence of this situation is that the Community has very little control, if any, over the prices of imported energy: both the quantity and quality of supplies depend on the goodwill of third countries and there is also the ever-present risk that political incidents may result in serious energy shortages with all the consequences this would have for the economic situation of the Community. Apart from this, oil imports are also a heavy burden on the balance of payments positions of the Member States.

10. At the present time transport accounts for approximately one fifth of total Community energy consumption and virtually 30% of the consumption of oil[1].

The dependence of the transport sector on imported oil products is especially great and amounts at the present time to over 90%.

Energy consumption by transport is of course not equally high in all the Member States. The proportion of energy consumed by the transport sector varies from country to country between 16 and 23%.

Road transport leads the way in energy consumption with 23% of total Community oil consumption (1978 figures).

11. If we remember at the same time that oil reserves are dwindling and may well not meet requirements in a few decades, it is clear that every attempt must be made as quickly as possibly to achieve substantial energy savings in the transport sector.

Consequently in each country and in the Community as a whole the necessary extra effort must be made to reduce oil consumption in the transport sector by 20 to 30% over a ten-year period.

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[1] In 1978 the transport sector in the United Kingdom accounted for 34% of total oil consumption.

12. These target figures, which are regarded by experts as realistic and feasible, will only surprise those who disregard the fact that the way in which oil is used in the transport sector is in many ways wasteful.

Indeed, your rapporteur is convinced that oil consumption in the transport sector is inefficient and open to a number of improvements if we are prepared to work for a significant increase in fuel productivity.

13. The following chapters examine the measures which can and should be taken to achieve these improvements in practice and to bring about the energy improvements mentioned above.

14. It is noticeable that a number of improvements in the energy consumption pattern in the transport sector such as energy-conscious driving habits, properly tuned engines, etc., can be achieved without considerable financial expenditure.

15. In order to realize the objectives the Committee on Transport considers that it is of the greatest importance that all future proposals for Community action in the transport sector should be orientated more than has been the case in the past towards energy conservation.

The Committee on Transport warns the Commission at the same time that from now on its opinions on relevant draft directives, decisions or regulations systematically and carefully look into the implications of the proposed measures as regards energy consumption.

16. To conclude this chapter, your rapporteur would also like to draw attention to the fact that during the public hearing and in the written contributions from the organizations it emerged that the research undertaken so far and the measures already implemented to conserve energy are unfortunately, apart from a few exceptions, inadequate and fall short of requirements in this field.

Many of the participants in the hearing expressed the wish that the Community should make available finance for scientific studies and research[1] and that these actions should be coordinated in view of the fact that research in Europe at present is too fragmented.

Furthermore political volition is required to translate the results of research into practice. Here too the present situation is unsatisfactory

[1] By virtue of the Council's decision of 11 September 1979, 105 million EUA was set aside for a period of 4 years (from 1 July 1979) to finance a research and development programme in the energy sector up to 1983. See OJ No. L 231, 13.9.1979, p. 30.

and the Community has a task to fulfil. As regards research it is most desirable that there should be consultation, exchanges of information and, as far as possible, far-reaching coordination between the Community and other countries.

III. THE URGENT NEED FOR IMPROVEMENTS IN THE USE OF EXISTING TRANSPORT MODES AND TECHNOLOGIES

17. The energy yield in the transport sector can and must be increased in the short term by the optimalization of the use of existing modes and technologies of transport.

18. The proper use of existing modes of transport could be brought about by influencing the separate components of the transport system, i.e. the driver, mode of transport and infrastructure and the transport system in general.

As the International Road Federation has rightly pointed out, the separate components influence each other and as a result of this interaction uncoordinated measures for the separate components are incapable of producing satisfactory results[1].

A. Measures to increase the fuel yield for separate components of the transport system

(i) The driver

19. It is an indisputable fact that a large number of drivers are at present careless in the way they use fuel and this includes drivers of private vehicles and, perhaps to a lesser extent, bus and lorry drivers. Each one of us can see every day that there is too much unnecessary braking, fast acceleration and driving at irresponsibly high speeds.

Better driving can save 20% of fuel.

20. Possible measures in this area are of two kinds:

- drivers can be encouraged to be more energy-conscious, by appropriate publicity drives and better information about the pattern of energy consumption and the best speed for their vehicle[2] and by emphasis on energy conservation when driving licences are issued,

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[1] See the written contribution from the IRF (PE 72.249, P.1).

[2] Information and publicity drives were expressly mentioned in the annex to the Council's resolution of 9 June 1980 concerning new lines of action by the Community in the field of energy saving, OJ No. C 149, 18.6.1980, p. 5.

- professional drivers can be made more aware in their training, schooling or practical preparation of the potential of more economic driving habits;

The driver will have a better idea of the energy consumption of his particular vehicle if:

- the manufacturer provides a handbook which deals with energy consumption;
- he is given an idea of the most economic speed range for each gear on the speedometer or revolution counter;
- the vehicle is equipped with apparatus (econometers) which give a precise indication of energy consumption while driving.

These measures were included in the Council's recommendation of 4 May 1976. However it is to be regretted that the Council went no further than making recommendations instead of passing binding rules[1].

21. It would also seem a good thing for national or Community rules to be formulated to ensure better maintenance of vehicles and in particular correct tuning of engines (ignition, carburettors, air filters, etc.).

Such provisions would naturally have little effect if they were not at the same time accompanied by monitoring of compliance with these rules and if necessary penalties for non-compliance.

22. It is also important for drivers to be given truthful information on the energy consumption of each type of vehicle when they are buying a particular vehicle. In this connection misleading or false publicity must be banned as a matter of urgency.

Finally press campaigns should perhaps be recommended to make future buyers aware of fuel economies when selecting a car. The car clubs in the various Member States could make a positive contribution here.

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[1] Council recommendation 76/494 on the rational use, through better driving habits, of energy consumed by motor vehicles.
OJ No. L 140, 28 May 1976, p. 14.

23. Your rapporteur is fully aware that better driving habits could result in considerable energy economies, but that it is anything but easy to persuade the car driver that this is true in practice[1].

(ii) The mode of transport

24. By improving the construction and equipment of transport vehicles considerable energy economies can be attained. This also applies to a greater or lesser degree to all branches of transport[2].

25. In this connection it would seem desirable for the manufacturers of motor vehicles to give greater attention to[3].

- energy regulators[4]
- more economic engines (ignition and combustion systems)
- the efficiency of transmission systems
- better streamlining (aerodynamics)
- a better payload : deadweight ratio
- reduction of the weight of vehicles (mainly for aircraft and also for inland navigation vessels)

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[1] In 1979 a large-scale publicity campaign was conducted in France under the slogan 'Chasse au Gaspi' (banish waste) the results of which have been good and which can therefore serve as a model. See the contribution from the European Bureau of Consumers' Unions (EBCU), PE 69,242, pages 5-7.

[2] The EAAEM (European Association of Aerospace Manufacturers) pointed out that economies of up to 30% could be attained in the short term by technological improvements in aircraft (PE 68.344)

[3] IATA recently published a comprehensive handbook containing technical advice on the increasing of fuel yield (PE 69.815)

[4] An energy regulator has been invented in France which enables savings of 5-8% in towns and in heavy traffic. Mr Glinne advocated its generalized use in a written question. OJ No. C 282, 12.11.1979, p. 12.

- tyres and brakes
- fuel injection systems
- electronic apparatus
- the coefficient of friction
- the installation of computers in aircraft
- non-metallic materials (in aviation)
- regenerative energy from braking (for railway transport)
- rudder installations (inland shipping)

With an eye to the greatest possible saving of energy in connection with lorries, vehicle manufacturers and hauliers' associations advocate an increase in the permitted maximum weight, as in Italy. However, in the discussion of this problem, the Committee on Transport pointed out that other factors also had to be taken into consideration such as environment management and traffic infrastructure potential. For further details, see the report on this subject by Mr Carossino (Doc. 1-865/80).

26. Two years ago all the major motor vehicle manufacturers in the EEC voluntarily promised their respective governments that they would reduce the fuel consumption of their vehicles by at least 10% by 1985[1].

The question now is whether this figure is adequate and whether there should not be legal provisions at Community level on the model of the Corporate Average Fuel Economy Act in the United States.

27. So if for the present the introduction of maximum consumption criteria is not immediately required, the possibility of doing this must be left open so that they can be applied if certain adverse developments on the oil market make them necessary. Meanwhile the Committee on Transport advocates the formulation of recommendations in this respect.

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[1] See the answers to the questionnaire given by LCAI (Liaison Committee of the Automobile Industry), PE 67.908, p. 2

28. Although priority must be given to the improvement of existing transport techniques, research into new conventional or unconventional technologies should not be put aside. It must not be overlooked that the time required for research, studies, experiments and introduction of new transport techniques is generally particularly long.

29. A more efficient use of existing modes of transport, with a view to more rational use of energy, can also be fostered by increasing the number of passengers in passenger transport (public and private) or the load factor in goods transport.

Here special encouragement should be given to experimental schemes in private car transport, such as car and van pools and taxi stop schemes. If facilities are pooled with neighbours or colleagues, threequarters of the fuel used in commuter traffic could theoretically be saved, since most fuel is frittered away in this kind of transport with one person occupying a car built for four[1].

30. Studies have shown conclusively that energy consumption increases rapidly at higher speeds. Consequently, and also for safety reasons, all the Member States of the Commuinity have introduced legal speed limits for road transport. The only exception here is on motorways in the Federal Republic of Germany. However, the speed limits in the various Member States are very different[2].

31. In respect of road traffic the Committee on Transport considers that:
- the existing speed limits should be maintained,
- efforts should be made to harmonize speed limits throughout the Community,
- there should be stricter and more frequent speed checks.

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1 Source: 'Spectator', 23 February 1980, page 39.

2 The speed limit on French motorways, for example, is 130 kph as against 100 kph on Danish motorways

It is also important that:

- speed limits should not be so low as to slow down traffic, and thus lead to wastage of fuel,
- the speed limit for commercial vehicles should not be too low since this could prejudice the productivity of such vehicles,
- the speed limits themselves should be seen to be reasonable if they are to be generally respected,
- it is also important to bear in mind that further reductions in speed will probably not bring significant savings.

To put it briefly, speed limits must be encouraged for road traffic, since they can produce savings of between 2 and 5 per cent. However, it is important that these speed limits should be well-considered if they are not to have the opposite effect.

32. As regards other modes of transport, the situation is somewhat different:

a) railway transport: speed limits would reduce the attractiveness of this kind of transport, since passengers would tend to use their private cars instead of the train, and would thus have the opposite effect to that desired.

b) inland navigation: here too, speed limits are not to be recommended.

c) maritime shipping: too little is known about the impact of speed limits on fuel consumption to give a proper judgement. This question should be studied further.

d) aviation: the desirability of speed limits for aircraft should also be studied further. According to the EAAEM (European Association of Aerospace Manufacturers) speed limits for aviation would be 'pointless and indeed detrimental. Every aircraft must be operated under optimum conditions, which vary depending on the aircraft itself, the meteorological situation and the flight phase'[1].

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[1] See the contribution from the EAAEM, PE. 68.344, page 3

(iii) Infrastructure

33. This heading includes both the improvement of existing communications and the construction of new communications for transport by road, rail and inland waterway, and also possible improvements in the sphere of traffic control, mainly for road traffic and aviation.

34. Before looking at the question of infrastructure in the light of possible energy economies, your rapporteur would recall that the Committee on Transport gives high priority to the question of transport infrastructure for the implementation of a common transport policy.

In his report on the Commission's memorandum on the role of the Community in the development of transport infrastructure (Doc. 1-601/80) Mr Klinkenborg set out clearly the basic principles and objectives, as seen by the Committee on Transport. In the present report this complex question can thus be reduced to the aspects of transport infrastructure which are directly connected with the energy situation.

35. To attain the desired energy economies in transport, measures should be taken with regard to transport infrastructure and traffic control, orientated towards the removal of traffic bottlenecks, where large amounts of fuel are consumed to no purpose every day. According to the IRU (International Road Transport Union) 'bottlenecks cause excessive energy consumption' in road transport[1].

This objective therefore means that at both national and Community level efforts must be made to create infrastructure facilities which enable traffic to flow easily at constant speeds and thus more efficiently[2].

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[1] Replies from the IRU to the questionnaire, PE 66.969, page 5

[2] The specific problems of urban centres and conurbations are dealt with in a later chapter.

36. Despite the many expensive road construction programmes and infrastructure facilities for other modes of transport[1], the communications network in the Community is still hampered by a number of obstacles and hindrances. So much so that the Commission presented a report on this matter last year to the Council. Mr Moorhouse is to draw up an opinion on this document (COM (80) 323 fin.) shortly.

37. The removal of bottlenecks in the existing infrastructure network implies the following requirements:

a) <u>for road transport</u>:

- where necessary the construction of new roads and motorways,
- trans-frontier links between national motorways,
- the reorganization of road sections where traffic regularly becomes congested,
- the improvement of road surfaces,
- the building of bridges and tunnels,
- the construction of bypasses round towns and villages,
- the construction of special lanes for slow traffic and overtaking bays,

b) <u>rail transport</u>:

- the construction of new links for fast inter-city passenger trains,
- the improvement of certain routes (gradients and bends),
- double tracks where traffic is too intense,
- further electrification in view of the fact that the oil required by railways is in inverse proportion to the degree of electrification.

c) <u>inland navigation</u>:

- the completion of important links, and particularly the Rhine-Main-Danube canal and the Rhine-Rhone canal,
- the construction of new locks,
- the widening and deepening of certain rivers and canals to make them navigable for larger ships.

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[1] With the exception, however, of railway transport, where the authorities are not very generous when it comes to constructing infrastructure facilities.

38. The Committee on Transport believes that in peripheral areas and backward and less-favoured regions of the Community, extra efforts must be made with regard to the construction of new transport links and public works, since in these areas often long distances have to be travelled between two points in the absence of direct transport communications, and this also increases oil consumption.

39. With regard to infrastructure, attention must also be drawn to the construction of pipelines and the modernization and expansion of airports and seaports.

40. It goes without saying that the construction of new transport infrastructure facilities and the improvement of existing ones require considerable investments at a time when the available financial resources are becoming ever scarcer. On the matter of financing for infrastructure programmes, reference is made to the Klinkenborg report, but your rapporteur would like to point out that in the planning of new transport infrastructure facilities the energy aspect is, of course, not the only aspect and priorities must be worked out on the basis of cost/benefit analyses.

41. The Committee on Transport believes in this respect that it is high time that the Council should, without delay, adopt the Commission's proposal made in 1971 on the introduction of a system of levies for the use of traffic infrastructure[1] to which the European Parliament has given its approval[2].

42. Apart from the availability of more suitable transport infrastructure facilities, a more efficient use of energy could be achieved with existing modes of transport by improving the control of traffic flow. This mainly applies to road and air transport.

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[1] OJ No.C 62, 22.6.1971, p. 19

[2] Report by Mr Kollwelter (Doc. 195/73)

(a) Road transport

43. A better flow of traffic on roads can be achieved by:

- proper road signs and markings,
- generalized use of radio traffic information services,
- computer-controlled traffic systems,
- electronic speed indicators on the roadside,
- staggering of holidays and working hours,

(b) Aviation

44. In his report on the development of a coordinated European air traffic control system (doc. 1-274/80) Mr Janssen van Raay has already shown that poor management of air traffic flows and inefficient use of air traffic control capacity cause pointless wastage of expensive kerosene fuel, since:

- routes are longer than actual distances[1],
- aircraft are kept grounded at airports,
- aircraft are only too often obliged to circle round airports.

45. A more rational and efficient management and control of air traffic and closer European coordination in respect of airspace could undeniably bring considerable energy economies. Measures to promote competition should also be introduced to help improve the structure of air transport.

B. Energy economy measures affecting the transport system

46. The target figures mentioned above for energy conservation in the transport sector can naturally not be attained if the measures regarding drivers, modes of transport and infrastructure are not accompanied by other measures regarding the organization of the transport system as such.

47. This latter category includes such measures as:

(i) the promotion of public transport,

(ii) the promotion of modes of transport which consume less energy,

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[1] In a written contribution IATA pointed out that on average in Europe the distance flown is 15 per cent longer than the direct route; in one particular case the figure was even 47 per cent. See PE 69.815, page 2.

(iii) the regulation of traffic in urban centres and conurbations,

(iv) the introduction of alternative energy sources and means of propulsion.

48. Before going further into these aspects, which will be dealt with in separate chapters in view of their importance and complexity, your rapporteur would like to conclude this chapter by emphasising two kinds of action.

49. The first kind, although peripheral to the transport system, concerns the possibility of reducing the number of journeys which have to be made by a more purposeful application of electronic innovations in the field of telecommunications.

It is an obvious fact that the present potential of the electronics industry, including such facilities as tele-conference systems, will make a number of journeys unnecessary. There is, however, a regrettable discrepancy between the potential and the effective use of these facilities. In this connection, your rapporteur endorses what Mr Beazley has to say on this point in his opinion.

The Committee on Transport therefore requests the Commission to investigate how the number of journeys can in practice be reduced by better use of existing electronic telecommunications facilities.

50. A second set of urgently required measures concerns the promotion of intra-Community trans-frontier traffic.

It is incredible that 23 years after the establishment of the European Community trans-frontier traffic within the Community is still

hampered by a number of divergent national legislative and administrative provisions and practices. This situation leads, in practice, only too often to hold-ups and queues at border posts[1].

In this connection, your rapporteur refers to the own-initiative report by Mr Schyns on the difficulties encountered at the Community's internal frontiers in the transport of passengers and goods by road (Doc. 678/78)[2] in which an account is given of the difficulties at the Community's internal borders and numerous recommendations and suggestions are made as to how they can be removed.

IV. MEASURES TO ENCOURAGE THE USE OF PUBLIC TRANSPORT

51. As private cars in the Community account for about half of the oil consumption in the transport sector, it is very evident that the greatest energy economies can be made by ensuring that cars are used on a more selective basis or, in other words, that the use of public transport is encouraged[3].

(i) Possible measures to stimulate the use of public transport

52. There follows a non-exhaustive list of measures which would encourage the use of public transport:

- better matching of supply to demand by introducing new services, extending the network of scheduled services, increasing the frequency of services and ensuring that timetables are adhered to,

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1 Some 12 million lorries cross the internal Community borders every year.

2 OJ No.C 140, 5.6.1979, p. 166.

3 The example of the present situation in the United Kingdom where 80 per cent of the total passenger-miles are accounted for by private cars as against 18 per cent by buses and trains gives an idea of the potential economies which could be made by encouraging public transport.

- making public transport more attractive by reducing journey times/ increasing speeds, especially on inter-city routes, and increasing comfort by using modern vehicles and being punctual,
- providing greater coordination between the various kinds of public transport and the general use of rail/road tickets and season tickets,
- recognition by the authorities of facilities such as reserved lanes for buses and coaches and reduced taxes,
- simplification of the fare structure, more fare reductions and special tickets or season tickets,
- publicity drives to promote public transport.

(ii) Possible measures to reduce the use of private cars

53. As studies and surveys have shown that by far most drivers are not in practice convinced of the need to save energy or at least despite the measures mentioned above are not intending to take the bus, tram or train, the deterioration in the energy situation could make it desirable to pass measures to discourage or even partially ban the use of private cars.

54. The use of private cars could be discouraged or reduced by:

- financial and fiscal measures such as a more or less considerable increase in fuel prices, motor vehicle purchase taxes, road taxes and parking charges,
- further speed limits on inter-city roads and motorways,
- more pedestrian streets and precints in towns,
- the introduction of car free days (Sundays),
- the closure of filling stations on certain days,
- the rationing of fuel per car.

55. It is clear that the second kind of measure should not be introduced without much thought. These measures must be considered separately and in the light of the seriousness of the energy situation and the requirements of the time.

Furthermore such measures must be looked at with regard to the repercussions on the European car industry and employment which as we know is particularly high in this sector.

56. The Commission should examine together with the sectors concerned what measures could be taken in periods when oil supplies are normal and what measures seem advisable in the event of a serious oil crisis.

The Committee on Transport also considers it desirable that the effect of the measures listed above on energy consumption should be thoroughly investigated by the Commission[1].

57. Finally the Commission is requested to examine how, to what extent, and in what practical ways tax-free allocations and tax facilities for travelling expenses can be replaced by the provision of tickets for public transport (train tickets and bus tickets).

V. POSSIBLE MEASURES TO ENCOURAGE THE USE OF MORE ECONOMIC MODES OF TRANSPORT

58. The previous chapter looked at possible ways of encouraging consumers to switch from private cars to public transport and this chapter looks at possible ways of transferring goods traffic from roads to railways or inland waterways which, it has been proved, require less fuel.

59. It cannot be denied that the energy consumption per unit in inland navigation and rail transport is markedly lower than the equivalent for road transport.

In its reply to the Committee on Transport's questionnaire the group of railway companies of the (then) nine countries of the Community mentioned the study carried out in the Federal Republic of Germany which produced the following figures for goods traffic on the assumption of 50% load factors[2]:

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[1] The Commission has set up a special working party to study the influence of fiscal measures on fuel consumption by private cars. At the end of last year a provisional report was drawn up on this subject. It must be possible for the Commission to submit concrete proposals to the Council at an early date on the basis of this report.

[2] Notice to Members : PE 67.472, page 7

- train: 1
- inland waterway vessel: 1.7
- lorry: 4

Furthermore 84.1% of oil consumption in transport in the Community is accounted for by road transport (goods, passengers and car transport), as against 3.8% by inland navigation and 2.7% by railways[1].

An additional factor is that the railways are making increasing use of electric power which saves foreign currency reserves for the Community and makes the Community less dependent on the import of oil products.

Finally, considerable amounts of fuel are wasted in own-account goods transport, since often long return journeys have to be made without a load. At the meeting of the Committee on Transport on 22 and 23 April several members of the Committee stressed this phenomenon.

60. The transfer problem is looked at in two different sets of conditions, the first given normal energy supplies and the second in the event of an energy crisis.

A. Normal oil supplies

61. On the basis of the figures given above it is of course very tempting to advocate drastic measures to encourage the transfer of goods transport from roads to railways or inland waterways.

62. However the written answers received and the comments made in the hearing pointed out that this path would meet with a number of difficulties connected inter alia with the following:
- free choice of customer and shipper,
- the limited infrastructural facilities, especially for railways (for example as regards North-South connections) if large quantities of freight are to be taken over from road transport[2],
- the duration of the journey is greater for railways and inland waterways than for road transport,
- the fact that neither rail transport nor inland waterway transport can guarantee door-to-door service, which means transshipment on to lorries,

[1] 1975 figures, Source: a study carried out by the IFO(Institut für Wirtschaftsforschung) for the Commission and taken from the opinion of the Advisory Committee on Transport: doc. VII/93/79 of January 1981.

[2] The railway companies answer this by saying that special night trains could be introduced.

- the fact that short-distance goods transport is more fuel-efficient, in view of transshipment and the longer train and inland waterway routes, if carried by road,
- the adverse effects on employment in the road transport sector.

63. With regard to possible measures to encourage the transfer to other forms of transport, your committee noted that the views of the experts at the hearing were often diametrically opposed. Professional hauliers and undertakings operating transport on their own account were 'categorically opposed to a policy favouring transport by rail and inland waterway[1]. The Liaison Committee of the Automobile Industry (LCAI), UNICE and the International Road Federation take the same view. The Railway Union and the Central Commission for the Navigation of the Rhine on the other hand believe that their position should be strengthened by the adoption of appropriate measures in this field.

The various organizations manage to put forward figures and statistics to back their respective standpoints.

64. The Committee on Transport requests the Commission to look into this important problem further so that the problem can be solved and realistic measures implemented.

65. At all events the Committee on Transport believes that greater coordination between the various modes of transport is particularly important as the basis for an intra-modal transport system in which costly duplication could be avoided and the most inexpensive combination of traffic, from the point of view of energy, could be used, taking into consideration the specific characteristics of each type of transport.

66. In this connection the Commission is asked to draw up proposals to encourage more economic modes of freight transport.

67. In the opinion of your rapporteur consultations must take place at an early stage with employers' and employees' organizations on the social implications of shifts from one transport sector to another.

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[1] Replies by the IRU, PE 66.969, page 5

68. It is in this context that Community efforts to promote <u>combined rail/road transport and inland waterway/road/sea transport</u> are to be seen.

At the Council meeting of 12 June 1978 the Ministers of Transport established that this kind of transport system offered advantages over long distances to all parties concerned.

'- to the railways in that it enabled them to secure a greater share of any long-distance traffic;
- to road hauliers in that it brought advantages of safety, regularity and speed of carriage over long distances;
- to users in that it combined the advantages of door-to-door road haulage with rail carriage;
- and lastly to the community at large, in that it brought a reduction in road traffic and, thereby, an increase in safety while at the same time making a contribution towards protection of the environment'[1].

69. There is a large measure of agreement on the need to increase combined transport over long distances in order to save energy. The Railway Union notes that in France it is estimated that a saving of 20 - 30% can be attained in comparison with equivalent road transport[2].

The energy saving is so much higher since long-distance transport can use off-peak electric power.

70. However a large increase in combined transport of this kind would run the risk of meeting infrastructural difficulties, especially in the form of overloaded railway routes and the lack of the necessary terminal facilities.

71. The Committee on Transport calls for a policy of encouragement for the combined transport system and the provision of the requisite infrastructural facilities. For further particulars reference is made to the report on this subject by Mr Gabert.

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[1] See the Damseaux Report on the proposal for a directive on the establishment of common rules for certain types of combined road/rail carriage of goods between Member States (Doc. 425/78, page 7, point 7).

[2] PE 67.472, page 6

B. In the event of a serious energy crisis

72. In view of the prevailing uncertainty about future oil supplies, the Committee on Transport stresses that a crisis plan must be worked out as soon as possible, including an optimal scheme of distribution of scarce fuels between the various branches of transport, based on Community priorities.

Such an emergency plan should also take account of the requirements of economic life, trade and transport, with special provisions on transport for the handicapped, and other specific categories.

73. It is clear that such an eventuality cannot be overlooked if we are to avoid any serious disruption of economy and trade, and complete confusion in the Community transport sector. This can only be done on the basis of an action plan worked out by the public authorities under which oil reserves are distributed on the basis of strict criteria.

It goes without saying that in a serious oil shortage, voluntary concessions can no longer be contemplated and binding statutory measures are required. The main sacrifice here would have to come from the private car driver, with rationing depending on the seriousness of the crisis.

74. Your rapporteur was pleased to hear at the meeting of 22 April 1981 that the Commission has started on an emergency plan and hopes that the activities in this connection can be completed as soon as possible.

VI. ENERGY-SAVING MEASURES IN URBAN TRANSPORT

75. When considering transport problems in urban centres and conurbations it must be remembered that urban traffic now mainly comes under the municipal authorities and the traffic situation varies from town to town.

The consequence is that the Community has little or no power at municipal level and there are no general rules for urban transport, although a number of traffic characteristics are common to most towns.

76. From the point of view of fuel consumption the following must be taken into account:

- the difficulty of access to many (older) city centres,
- the lack of suitable access roads,
- frequent hold-ups during rush hours,
- heavy intensity of traffic and slowness of traffic flows in cities and towns.

All these characteristics of course help to push up fuel consumption.

77. In Chapter IV on the encouragement of the use of public transport, paragraphs 52 and 54 listed a number of possible measures which could also contribute to the saving of energy in towns and which are thus not repeated here.

78. Of crucial importance for the efficient use of fuel are the measures to encourage the use of public transport.

In this field there are many towns that have already taken a number of useful steps and several experiments have been carried out successfully.

79. Some of these measures are:

- the construction of large parking spaces on the edges of towns supplemented by park-and-ride facilities, shorter parking and fewer parking facilities in the centre of towns and increases in parking charges,
- the diversion of through traffic and the construction of ring roads,
- the construction of cycle paths,
- the easing of the traffic flow by well-thought-out markings and, particularly, better coordination of traffic lights which are switched off at certain times, and infrastructural facilities (including tunnels and bridges)[1],
- the relief of busy city centres,
- general traffic planning based on requirements.

80. These laudable initiatives do not however change the fact that the curbing of fuel-guzzling private cars in towns is in practice a particularly difficult task. In this connection Mr Veronesi quoted at the committee meeting of 23 April 1981 the example of an Italian town where the number of vehicles had not been reduced despite a free public transport system. Mr Doublet also pointed out that it was difficult to persuade drivers of private cars to leave their vehicles at home despite improved public transport facilities.

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[1] For further details please see the comments by the UITP (International Public Transport Union) which is available from the secretariat.

81. The Committee on Transport therefore believes that simple recommendations or marginal measures will not suffice to bring about significant fuel savings. It therefore appeals to the municipal authorities to step up their efforts immediately. At the same time it requests the Commission to make a useful contribution in this respect by examining in consultation with the authorities concerned and the public transport services what measures can be implemented at Community level.

VII. THE DEVELOPMENT OF ALTERNATIVE ENERGY SOURCES AND MEANS OF PROPULSION

82. In the medium and long term it will be necessary to make extensive use of alternative energy for petrol and diesel oil, and of other propulsion techniques with a view to achieving the targets set for fuel savings in the transport sector. For the Community it is indeed of the greatest importance to reduce dependence on imported energy products.

83. As one can see from the many documents published by the Commission and the reports of the Committee on Energy and Research, much useful work is being done at Community level in the area of research into alternative energy sources.

84. However, the development of alternative energy for transport seems to be more difficult than for other sectors since the efficiency, safety and environmental qualities of mineral oils used at present can only be replaced by energy sources of similar quality and composition. Moreover, there must be sufficient amounts available and prices must be roughly comparable.

85. In a number of countries, unfortunately mainly outside the Community, research and experiments are at present being carried out on alternative energies, particularly alcohol (pure or mixed with petrol), ethanol and methanol, synthetic petrol based on coal, liquid petroleum gas etc.

However useful these products may be - and they certainly deserve support - it must not be overlooked that practically no spectacular results are to be expected in the short term, at least not within the Community.

In Brazil, for example, more than 100,000 vehicles are already running on alcohol fuel made from cane sugar. It is however clear that this would be difficult to accomplish on a large scale in Europe because

of the required amount of cane sugar and other agricultural products and the attendant costs.

86. Research into alternative fuel is urgently required particularly with respect to road transport, not only because this sector has by far the highest consumption but also because the practical application of alternative energies in shipping and especially aviation can only come in the distant future.

As for railways it must be noted that all available primary energy sources can be used for the electric traction of trains. For this reason the further electrification of the Community railway network must be given priority. The possibility of replacing oil by coal or nuclear energy in maritime shipping must be examined.

87. In the field of alternative energy sources, the Commission is requested to continue supporting research and development taking account of the recommendations formulated in this respect by Mr Beazley in his opinion for the Committee on Energy and Research, which are incorporated in paragraph 30 of the resolution.

88. With respect to alternative means of propulsion, there are a number of research activities under way. Here too, however, no miracles must be expected in the short term, and research is too fragmented.

In this context, the Liaison Committee of the Automobile Industry notes that: 'Regarding the development of alternative means of propulsion based on traditional fuels, some alternative engines are under examination. There is, however, at present no suggestion that they will be significantly more fuel-efficient than engines currently in use. There are also some experimental vehicles with hybrid engines, or equipped with devices for the recuperation of energy, but they, too, are far from being ready for mass production. However, all alternative propulsion systems known today require more energy than those systems employed at present[1].

89. One interesting factor is, however, the marketing of electrically-driven private cars, delivery vans and buses, which will help to reduce oil consumption in cities. Your rapporteur hopes that the sales of these vehicles will increase quickly in the future.

90. To conclude this chapter, the Committee on Transport urges the Commission to undertake a thorough study or to have a thorough study

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[1] Contributions from the LCAI, PE 67.908, p. 6

undertaken (at its expense) on the time required for the practical realisation of alternative solutions, their energy yield, the expected cost and the extent and conditions of financial support from the Community.

VIII. CONCLUDING REMARKS

91. Starting with the imperatives of the present energy situation which is characterised by uncertainty both as regards the Community's supplies and as regards prices, your rapporteur has tried to summarise the main lines of a policy which would make substantial energy savings and particularly oil savings, possible in the transport sector. In doing this he based his report on the results of the public hearing of 27 and 28 November 1980, numerous written contributions from international and European organizations representative of the sector, several talks with experts and comprehensive documentation on the subject. In view of the complexity of the subject, which embraces to a smaller or greater extent all branches of transport, and the many aspects involved, the present report is bound to have gaps. This document should therefore be seen as a first step towards the formulation and implementation of a coherent Community policy on more efficient energy use in the transport sector.

92. However, the implementation of a Community policy of this kind is not sufficient in itself and extra efforts must be made at the same time at all levels, especially at national, regional and local authority level, to substantially reduce energy consumption. Moreover, the ultimate results of these combined activities are largely dependent on individual contributions by drivers of vehicles.

93. It goes without saying that the measures to achieve the target of 20 - 30% savings in transport must be supplemented by equally vigorous measures in the other sectors, such as industry and domestic use, which account for a larger proportion of overall energy consumption in the Community.

94. The Committee on Transport requests the Commission to submit a memorandum as soon as possible on measures for energy saving in the transport sector, taking account of the suggestions and recommendations incorporated in the resolution, and the ideas set out in this explanatory statement and the opinion by Mr Beazley on behalf of the Committee on Energy and Research.

95. The Committee on Transport also believes that such a memorandum should include clear proposals for practical measures in the short,

medium and long term, including an evaluation of expected results and the financial implications of these measures.

96. It is also desirable that this memorandum should contain a chapter devoted to possibilities for Community participation in the financing of certain energy-saving programmes, for example in the field of scientific research.

97. The Committee on Transport, which has repeatedly denounced the lack of a common transport policy and continually reminded the Council of Ministers of Transport of its responsibility, is convinced that the implementation of a genuine Community transport policy will doubtless be stimulated by the adoption of a complete package of Community rules designed to increase the energy efficiency of transport.

98. Finally, your rapporteur would like to point out that there were three choices in the drafting of his report, viz: gradual measures, drastic measures or a progressive approach supplemented by far-reaching, binding measures in the event of a serious energy crisis. After considerable consultation and contemplation, the last formula has been chosen. The requirements of economic and social life, of trade, and of the proper functioning of the traffic market make it absolutely necessary to have an emergency plan for the distribution of the Community's scarce energy resources.

Conservation plays an essential part in ensuring that the use of energy resources does not place undue strain on the availability of such resources. In the field of transport much devotion to energy saving will be required in the future - particularly as transport is a significant user of the energy source which is likely to be most restricted in supply in the future - namely oil.

Consequently we welcome discussion by the Parliament on energy saving in transport and hope that it will lead to further action by Member States and the Community and an increased awareness by the public of the importance and value of paying particular attention to energy saving in transport.

Energy saving can be achieved through the following variety of policies:

- pricing
- taxation
- publicity
- educational measures
- imposed restraints
- research and development
- improved traffic management
- more efficient used of transport modes

The resolution relates to most of the above policies (although in a somewhat ad hoc manner). In particular we welcome the recommendations for research and the emphasis on the value of a Community infrastructure programme to energy saving in transport.

Nevertheless however much the Community may devote to research and development, however much the Community improves transport infrastructure, however much all levels of government improve transport management, pressure on available energy resources will still exist unless the public applies restraint in its use of transport and discriminates in favour of these modes which are most energy efficient. In a totalitarian society such restraint can be imposed (although the experience of such restraints is that any benefits are outweighed by bureaucratic inefficiencies). In a free society, such as the the Community, such restraint can be exercised partly by educational measures but mainly by ensuring that the cost of the use of the transport mode reflects the scarcity value of the energy resource employed. In short, the price of travel must be such as to moderate use of transport that absorbs energy resources that are likely to be in short supply.

The view that the pricing of energy sources must reflect long run marginal cost has been consistently supported in recent years by the Commission, the Council and the Parliament. (For example see resolutions passed by the Parliament following the Fuchs Report on the 1990 energy objectives and the Linde Report on onservation).

Objectives for 1990 and Member States' Investment Programmes." (COM(81)64 final) the Commission stated (paragraph 34) "All member states are now convinced that the Consumer prices of energy must reflect the long term cost of energy supply since:

- realistic pricing is the best instrument for encouraging saving,
- it is essential to protect the investment in substitutes which is indispensable for our future supplies,
- subsidising energy prices from public funds is no longer financially tolerable".

Not only should the relative scarcity of energy resources be reflected in the cost of energy to transport undertakings but, in turn, the costs should be reflected in the charges imposed on the public for the use of transport. We question the extent to which this situation exists. We believe it to be aggravated by the lack of adequate competition both within and between transport modes with the consequence that there is insufficient pressure on transport operations to be more efficient, to look for savings in energy, and to operate pricing policies conducive to energy saving.

We regret that pricing policy in transport does not take a central part in the resolution. Vague phrases about the benefits of transferring from road to rail or increasing use of public transport are no substitute for a pricing policy which encourages the public to moderate its use of the most energy-greedy of transport modes.

We regret this lack of attention to pricing. There are many valuable points in the resolution which reflect the care and attention of the rapporteur whose work, as we have come to expect from him, has been admirable. But we believe that there are some unnecessary points in the resolution and that more prominence should be given to pricing policy and to the extent that the transport structure of the Community is in itself wasteful of energy. We hope this situation will be rectified by the Parliament.

OPINION OF THE COMMITTEE ON ENERGY AND RESEARCH

Draftsman : Mr P. BEAZLEY

On 22 January 1980 the Committee on Energy and Research appointed Mr Peter BEAZLEY draftsman of its opinion.

The committee considered the draft opinion at its meeting of 24 April 1981 and adopted it unanimously the same day.

Present: Mrs Walz, chairman; Mr Gallagher, Mr Normanton, Mr Ippolito, vice-chairmen; Mr Beazley, draftsman; Mr Adam, Mr Calvez (deputizing for Mr Galland), Mr Croux, Mr Fuchs, Mr Ghergo, Mr Herman (deputizing for Mr Rinsche), Mr Kellett-Bowman (deputizing for Mr Seligman), Mr Linkohr, Mrs Lizin, Mr Moreland, Mr Paisley, Mr Petersen, Mr Price, Mr Purvis, Mr Sälzer, Mr Sassano, Mr Turcat, Mr Veronesi.

Introduction

1. This opinion reviews possible developments in energy saving in the field of transport. Many of these which are desirable will occur automatically in response to rising prices and market pressures; some may require prompting, be it at Community, Member State or industry, level.

2. The topic is immensely complex. To avoid adding unnecessarily to the documentation which exists, this opinion concentrates on the broad outlines of technical developments only; space does not allow reference to every item of interest or mentioned in committee. Matters affecting the administration and regulation of the transport market are covered in the main report by the Committee on Transport. Several important issues have had to be left aside :

   - general economic policy: transport and the production of vehicles are significant parts of our economy and investment in transport could be a stimulus,
   - energy is used in producing vehicles and infrastructure: material costs reflect this if energy prices are rational, but energy accounts make it easier to get an overall long-term view,
   - pollution: anti-pollution measures can increase energy consumption; (not always: electric cars would cut pollution and consumption). Trade-offs have not been suggested.

3. One general environmental point is worth stressing. Our society is moulded by its transport - level of trade, type of holidays, where we live relative to work, and even the level of international understanding, all depend on cheap transport. This may have to change, although there is no evidence that the population at large wishes to revert to the parochial society of a century-and-a-half ago. There is, on the other hand, evidence to indicate that it will resist further intrusion into the environment by transport infrastructure.

Pattern of energy use and production

4. Gross inland consumption of energy in the Community amounts to 1 billion tons oil equivalent (916 mtoe in 1977). The % breakdown between primary energy sources is as follows(1978 figures):

Solid	Oil	Gas	Nuclear	Electricity (hydro)
20.9	55.5	17.4	3.7	1.4

Eurostat, Energy Statistics Yearbook 1978 (published 1980)

Some solid fuel, oil, etc, are used to generate electricity, and the % breakdown in final consumption is as follows (1978 figures):

Solid	Oil	Gas	Electricity
7.7	45.5	14.7	29.7

5. The transport sector accounts for 20.9% of energy consumption (again, 1978 figures, Eurostat Energy Statistics Yearbook), with industry accounting for 32.6% and households 39.3%. Transport accounts for about 6.5% of GDP.

6. Transport is overwhelmingly dependent on oil, to the extent of 95.5% in 1975, with 3.5% provided by electricity. Transport accounts for about 29% inland consumption of petroleum products. The problem of energy use in transport is having to carry the store of energy on the vehicle: the fuel therefore needs to have a high energy density and to be easily handled, and oil meets these criteria admirably. The carriage of stored electricity is inefficient, although lines can be provided if the routes are exactly fixed. Gas requires heavy containers, and coal is bulky and not easily handled.

7. It is therefore unfortunate for transport that the energy crisis is one of oil dependence: the possible exhaustion of supplies in the early part of the next century, exacerbated by the creation of an effective cartel, has raised dual problems of the availability of oil supplies and their price. A search for new supplies has been prompted, but these will be expensive to extract. Large reserves of tar sands and heavy crude deposits exist, but extraction may well raise serious environmental issues; nor is it clearly economic. The overriding need for the foreseeable future is to reduce oil dependence as much as possible.

8. In the overall energy field, attention is rightly being given to non-conventional sources of energy. Most of these generate electricity (wind and wave power, for example) or low grade heat (some types of solar). There are also processes for liquefying (or gassifying) coal, and such synthetic fuel could be used in place of oil fuels. The energy efficiency of these processes need to be scrutinised carefully, however, and the resources necessary to pursue a synthetic fuel strategy should not be underestimated.

9. Petrol engines can also operate on alcohol or alcohol/petrol mixtures, without modification if the proportion of alcohol in the mixture is less than 15-20%. Ethanol and methanol are the forms of alcohol of most interest. Methanol is an important product in the chemical industry. Although ethanol and methanol can also be produced from biomass, large areas have to be cultivated in the production of ethanol. In European conditions, therefore, only a limited mixing of methanol based on biomass with ordinary fuel might be expected.

10. Of oil consumption in the transport sector, around 84% is for road use, 10% for air transport, 4% for inland waterway, and something over 2% for rail (which also uses most of the electricity for transport - see para.6).

Objectives and strategy

11. The two objectives of saving energy and improving the transport system sometimes coincide and sometimes clash. The following priorities, which are likely to apply for the foreseeable future, are suggested:

(i) maximum saving of oil (with present standard of transport),

(ii) economic use of all energy sources (with present standard of transport),

(iii) improving the transport system.

If the problem becomes even more acute, degradation of the transport system should be kept to the minimum consistent with the reduction in consumption necessary.

12. Three time periods are suggested:

- the short term, until 1985,
- the medium term, 1985-1995 (the horizon for political decision-making),
- the long term, 1995 and beyond.

The division between these is of course not rigid, and developments suggested for one period (see paragraphs 13-15 below) will overlap into other periods.

13. Present technology and organisation will see evolutionary progress through all three periods. Given the new priorities, a spurt of progress in the short term will lead to large-scale deployment of improved vehicles, etc., in the short and medium term, depending on the replacement cycle for equipment.

14. For new technologies and methods of organising transport, the short term will be used for reviewing possibilities and decisions on which projects warrant further R & D. The medium term will see R & D and some experimental deployment of new developments, with large-scale deployment following in the longer term.

15. The short term should also be used to effect coherent policies for pricing and taxation on the one hand and for administrative and legal structures (eg. airline 'deregulation') on the other. The long term may see some reorganisation of living and working patterns, and some changes in cultural values concerning travel.

16. When planning for the long term, it is necessary to have a flexible strategy. Thus as well as promoting conservation and technologies which are not oil-dependent, a fuel policy should:

- encourage continuing research into more efficient oil extraction and refining processes and into the optimum mix of products; this may imply some stimulus to the use of LPG (now often flared-off at the well or refinery) and diesel fuel (which is a lower 'cut' in the range of refinery products); overall economies of perhaps 10-15% are possible,
- investigate the use of biomass to provide some alcohol content in liquid fuels,
- invest in some capacity to liquefy coal, despite question marks as to coal production capacity, economics and whether using coal to provide electricity for electric cars would not be more efficient overall. Production can be blended with conventional fuel and some capacity may be vital for air transport,
- step up experimental activity aimed at analysing and specifying fuels accurately; this is particularly needed with the advent of a wider variety of fuels. Existing methods - such as octane ratings - do not fully reflect the energy content of fuels and until new standard methods are developed, the specification of both fuels and engines is likely to be non-optimal.

Modes

17. Agreed comparisons of the energy efficiency of various modes are almost impossible, as the jobs the modes do differ. Rail transport is very efficient but the journey has to be completed by transfer and carriage by lorry at each end. The following are therefore for illustration only:

Passengers: (MJ/passenger-km)		Freight: (MJ/tonne-km)	
Rail - intercity	0.9 - 1.0	Rail - bulk	0.4 - 1.2
- suburban	1.1 - 1.6	- other	0.5 - 1.7
Car - motorway	1.6	Road - bulk	1.4 - 2.4
country	2.0	other	0.9 - 3.5
urban	3.1		

(Advisory Council on Energy Conservation - UK)

A German source (Elektrizitatswirtschaft 1977/vol.9) suggested the following, for a load factor of 50%:

Passenger: rail - 1 : bus - 1.2 : car - 4.6 : air - 17

Freight: rail - 1 : inland boat - 1.7 : lorry - 4

18. Some principles are general to each mode when trying to reduce energy consumption: improved aerodynamics (or hydrodynamics), more efficient motors and propulsion systems, and reduced weight. In addition, increasing size will improve the payload: deadweight ratio. Larger road vehicles raise environmental questions, however, and this method of increasing energy efficiency is irrelevant to the majority of lorries, which are in the small and medium classes.

19. Similarly, greater economy in operation is achieved by a smooth flow of traffic (in all modes) which eliminates bottlenecks and stop - start progress. Investment in infrastructure must be maintained. Reducing speeds further leads to real social costs and is best kept as an emergency measure.

Rail transport

20. The future for rail transport is difficult to predict. On the one hand, it is very economical and moreover already uses electric traction for about 50% of its double or multiple-track network, a proportion which can be increased. Electricity can be generated from primary sources other than oil, and electric trains have to carry neither a fuel supply nor a primary-energy converter. On the other hand, rail cannot offer a door-to-door service, which hampers its ability to take over freight and local passenger traffic, and reduces overall energy efficiency. Inter-city rail traffic is competitive with air traffic to around 500 km.

21. Comparisons with road transport are confused by argument on whether taxation of the latter fully covers the costs it imposes on society and the use it makes of the road network. There has been relatively little investment in rail infrastructure.

22. In the short term, improved aerodynamics, lower weight and higher propulsive efficiency are expected to reduce consumption. Although consumption could be cut by 30% for express trains and 10-20% for freight (by 2000), the slow rate of replacement of equipment will mean delay in realising these gains. Extension of the amount of track electrified is under way - such schemes have to bear in mind the 'network' effect whereby the benefit of electrifying a substantial portion of the network is greater than the sum of the benefits of individual electrification schemes. Hence the need to provide an electrified core network for Europe.

23. In the medium term, further developments in regenerative braking and automatic control can be expected. Widespread deployment of high speed trains would extend rail's ability to take traffic from the air-lines; there ought to be scope for pooled efforts in developing such trains. One might also see some reconsideration of coal-burning locomotives, for use on non-electrified lines; these might use fluidized-bed boilers, in which air is injected into powdered burning coal, allowing very complete combustion and good heat transfer to boiler tubes immersed in the coal.

24. In the long term, automatic routing of individual self-propelled freight trucks is a possibility, as are new forms of high speed train using linear motors and magnetic levitation; the economies of the latter are unclear.

25. Despite these technical advances, it is not energy savings within rail transport that are significant (it accounts for less than 5% of transport consumption of energy), but the scope for transferring traffic from road and air. With regard to the latter, higher rail speeds lead to overall energy savings. With regard to the former, the limiting factor is the need to change modes for a door-to-door service. Two approaches seem worth investigation:

- the 'piggy-back', in which lorry trailers, or whole trucks, are driven to a loading station, travel the bulk of their journey by rail, and complete delivery at their destination. This is in operation in Germany, and - provided that some emphasis is put on a speedy, reliable service - seems to have a useful role to play.

- a hybrid vehicle, combining electric traction from a lightweight overhead supply with some "off-wire" capability from batteries or internal combustion engine. If rubber tyred, this could serve dispersed pick-up points for commuter or freight operation, and then join reserved road-lanes or paved rail routes provided with overhead electricity. Variations on this idea are possible. It is not confined to urban or ex-rail routes, and it would allow the damaging change between modes to be avoided.

Air transport

26. Aircraft are the vehicles most reliant on oil-based fuels. The overriding concern of aircraft design is the reduction of weight, so fuels have to have high energy density (both in energy content per kg. and energy content per unit volume) as well as having to be easily handled. These factors point inexorably to oil-based fuels; the only real alternative is synthetic fuel from coal. Hydrogen-powered aircraft have been proposed, but are unlikely to be accepted on safety and economy grounds.

27. Consumption by aircraft amounts to only about 2.3% of European oil consumption, and about 4% worldwide. Nevertheless, continued growth in air travel is expected. Fuel already accounts for 30% of total airline operating costs, so there is already high pressure to economise, which has been reflected in improvements of around 5% in traffic carried per unit of fuel each year from 1974 to 1979. This progress was helped by the size of aircraft rising by 58% between 1969 and 1979.

28. In the short term, the main prospects for further economies lie with:

- Re-equipping fleets. The replacement cycle for aircraft is long and there are many aircraft still flying without the benefit of high by-pass ratio engines or 'supercritical' aerodynamics. More recent designs also tend to be larger further improving efficiency. Reduction of the average age of fleets could therefore give major savings. Although a 'scrap and build' scheme could accelerate re-equipping of fleets, airlines are currently in an ordering boom and manufacturers are hard-pressed to supply the aircraft.

- Evolutionary developments, especially in electronics and instrumentation aiding the optimisation of flight paths, etc.

- Rationalisation of air traffic control (ATC). European airspace is undoubtedly crowded and complex; flights are on average 15% longer than the distance between origin and destination, and vertical flight profiles are similarly non-optimal. Control of airspace is divided between civilian and military authorities in some countries, and Eurocontrol operates certain sectors of upper airspace. This is surely a mess which urgently needs sorting out, in your draftsman's view on the basis of a renewed and enhanced Eurocontrol Treaty.

- Market structure. Airlines are highly regulated by public authorities, especially in Europe. This is of course right so far as safety is concerned, but less justified for routes and prices. The mixed US experience of massive deregulation has seen increased fuel efficiency. An allied problem concerns route patterns: the historic hub-spoke pattern based on European capitals is no longer ideal for the market viewed as a whole. Perhaps carriers could dedicate part of their fleets to one or more consortia with more logical route patterns? Perhaps there is scope for Community stimulus as with Euronet?

- Weight reduction. One extra way to reduce the carriage of "dead" weight would be to have duty-free sales made after landing instead of before take-off. Safety would be improved too.

29. In the medium term, one might expect to see the widespread use of plastics materials in secondary structure and of active controls (i.e. those which operate automatically to reduce stress thus allowing lighter structures). The propeller, or a hybrid propeller-fan, is likely to reappear for short-medium ranges.

30. In the long term, plastics are likely to be applied to primary structure. New aerodynamic layouts, relying on artificial stability, are possible, as are engines of variable by-pass ratio so as to optimise performance both at take-off and altitude.

31. In these developments, Europe will be hampered by its lack of a research organisation equivalent to NASA in the USA, and the Commission's proposal for a common R. & D. programme should be vigorously pursued.

Waterborne transport

32. This is almost wholly confined to carrying bulk freight for which the slow speed is not important. The network is rather limited, although some routes are of significance: in the FRG and Belgium, inland waterways carry almost as much freight as rail, for example, and in the Netherlands much more. There is some waterborne freight in France, but effectively none in the remaining Member States. Especially in Italy, coastal shipping could pay a much bigger role.

33. Barges are fairly efficient, but the possibilities for technical progress are more limited than with other modes. In the short term, there should be evolutionary developments in the efficiency of diesel propulsion and perhaps hydrodynamics: in addition more widespread use of multi-barge convoys is likely.

34. No dramatic improvement in hydrodynamics can be expected in the medium term, techniques for reducing wetted area - such as hydrofoils or hovercraft - not being particularly well suited to river or canal work. With regard to propulsion, a return to coal-fired steam engines is possible, using fluidised-bed combustion. The longer term might see some form of boundary layer control in hull design, and wind-assisted propulsion.

35. Enhanced efficiency is therefore likely to rely on the extent to which waterways can accept, or be adapted to accept, the operation of larger vessels.

Road transport

36. This is undoubtedly the most important sector to consider, accounting for about a quarter of the Community's oil consumption. This is divided approximately 4:1 between private cars and other road vehicles.

37. Not only do private cars form the most significant sector, they are operated by consumers rather than producers. These consumers are largely unaware of the operating costs of their vehicles and demand for fuel is rather inelastic. Consciousness of the need for economy is not helped by a constant or even falling real cost for fuel: 1 litre of fuel 'cost' 16 minutes' work for an average UK worker in 1953, yet only 6 minutes' in 1977.

38. Road use encompasses car travel (both long- and short-distance), carriage of freight (both long- and short-haul), and public transport (overwhelmingly short-distance). Likely technical developments are similar between cars, lorries and buses, although the latter two already use diesel power widely. Technical improvements are likely to filter into the car fleet sooner than, say, the bus fleet because the replacement cycle is faster.

39. In the short term, savings of the order of 30% are possible. Even more might be achieved with limits on fuel availability for private motoring, and lower speed limits. But these involve social costs and may only be enforceable for a limited period, especially as motorway driving seems to account for only about 15% of the total. Such measures are best kept for emergencies. Desirable developments include:

- reduced weight (reducing urban consumption especially), better aerodynamics (for higher speeds), and greater use - especially by lorries - of radial tyres,

- reduction in car size for each market slot, cars rarely being loaded to their maximum, and agreement on regulations for larger lorries,

- application of microelectronics, both to increase design efficiency (higher compression with anti-knock sensing, partial cylinder cut-off, etc.) and to maintain engine tune; the latter alone may save 5 - 8%,

- increased use of diesel for cars; the diesel has particular advantage for urban use, although comparisons rarely try to quantify the performance loss; some health questions remain unresolved,

- increased use of LPG, which would be especially suitable for buses because of its low pollution and because the supply network would be simpler,

(Both these fuels are oil-related products, and there is an optimum mix between LPG, diesel and petrol. A rational pricing and taxation structure is required. A useful allied development would be the introduction of multifuel engines, hitherto used mainly by military vehicles).

- the achievement of the voluntary targets for improved consumption by European car manufacturers (10% by 1985); although rather loosely specified market pressure is likely to ensure their attainment,

- improved methods of presenting information to the private motorist; education and publicity have a short-lived effect, and better designs of instantaneous fuel consumption meters for the dashboard and, ideally, overall cost meters (perhaps fed with up-dated assumptions at each service) are desirable,

40. Some of the developments possible in the <u>medium term</u> may require breakthroughs rather than evolutionary development:

- stepless transmissions: engine design is compromised by the need to operate over a wide band of speed; an efficient stepless transmission would overcome this,

- electric vehicles: the 'Holy Grail', not because they offer energy saving but because their source electricity can be generated from a variety of sources; they are likely to be more expensive than conventional vehicles; considerable progress has been made with new battery designs, but it is unclear whether the breakthrough needed is technical or financial/economic, i.e. the leap necessary to achieve mass production, mass market and complete infrastructure,

- some production of liquid fuel from coal,

- some production of liquid fuel (alcohol) from biomass,

- hybrid vehicles, having conventional engines for longer distances, plus limited electric capacity.

41. The <u>long term</u> may possibly see the use of engines such as those based on the Stirling cycle, but these may not represent a large enough gain in economy. Further improved batteries, and perhaps dramatically cheaper fuel cells, would improve the prospects for electric vehicles. Otherwise it will be necessary to rely largely on liquefied coal.

Other modes

42. The need to develop some combined modes has already been mentioned with regard to rail. Two other technical possibilities need to be borne in mind: pipelines, and reduced need to travel because of advances in microelectronics.

43. Pipelines are widely used in Europe for transporting gas and to a lesser extent oil. Their use could be extended to carry coal in the form of slurry. Cost would probably be comparable with rail, though adequate water supply could be a major problem.

44. Technical advances and falling costs in microelectronic and communications technology may make tele-conferences more practicable than hitherto, and thus reduce the need to travel. It is similarly possible to envisage administrators and secretaries working remote from their offices and communicating via multi-purpose home terminals; commuting would thus be reduced. There is a deeply-felt need for human contact in both situations, however, and such developments are unlikely to make much impact until well into the next century.

Ownership

45. Present ownership-cum-administration of the overall transport system is mixed. Cars are in private hands and road freight largely so; many, but not all, airlines are state-owned; urban public transport is publicly-owned, as are the railways. Clearly, in some sectors the public service element or the need for a single network is so strong that public ownership or public control is inevitable. On the other hand, experience indicates that the private sector is more economy-conscious.

46. Certainly privately-owned airlines could make a bigger contribution in air transport, if allowed to do so as part of deregulation. More speculatively, perhaps some sections of urban transport could be put out to tender at regular intervals (on the basis of performance contracts). One might also investigate the possibility of the rail system becoming a "common carrier" - i.e. the infrastructure could be common, charging for whoever might wish to operate trains on the track.

47. Wherever the dividing line between public and private sector might be, new developments should not be considered in discrete compartments: new gantries which might be put up should be available for use not not only by public sector trolley-buses but perhaps also by private-sector trolley-lorries, for example.

CONCLUSIONS AND RECOMMENDATIONS

48. There is a vast amount of work being done to improve energy efficiency, and many of the developments mentioned above will transpire as a result of market pressures. The emphasis in the short and medium term has to be on conservation. This can only be implemented in a dispersed way, mainly by private enterprise. But conservation requires investment, and the right climate for this has to be created. This is a task for individual Member States but the Council should provide a lead.

49. With regard to action at EC level, it is not our intention to put down a list of projects where the Community might get involved, but rather to point out where it has to play its part. This seems to fall under three headings.

50. Community responsibility in setting overall policies necessitates :

- action to achieve rational pricing and taxation of energy supplies, in particular relative price and tax between petrol, diesel and LPG, the production of which is interdependent;
- legislation aimed at reducing noise, pollution and barriers to trade which will also promote energy conservation;
- effective publicity on methods of saving energy, including training in energy-saving driving techniques;

One might mention here the great gains to be had from simple re-equipment and reducing the age of transport fleets. A "scrap and build" fund is liable to be too expensive, but there could be a Recommendation to Member States on investment incentives in this field.

51. Community responsibility in transport policy has been dealt with in the main report, but we would mention:

- the need to implement the proposal on a Community infrastructure programme (to remove bottlenecks, etc.),

- the need to rationalise air traffic control, renewing and extending the Eurocontrol Treaty,

- the need for some deregulation of air transport routes and markets (but maintaining regulation of safety, of course),
- the need to support further electrification of railway networks,
- the need for more widespread exclusion of traffic - particularly in older cities - from congested centres.

52. With regard to research and development, the Community should be concentrating on those issues where duplicated effort is wasteful rather than usefully competitive and where the scale is such that individual Member States are unlikely to undertake the work. Much of the work on improving present vehicles (eg. lorry aerodynamics) is being satisfactorily done, but the next four years will require decisions on those projects to be pursued for experimental and large-scale use in the medium term and beyond. We would like Community action to support :

- a common R & D programme for the European aircraft industry,
- construction of coal-liquefaction plants,
- demonstration projects on producing alcohol from biomass,
- a demonstration project for a power plant suitable for barge or locomotive use, employing fluidized-bed technology to burn coal,
- a demonstration project to follow on from the research already being supported on hybrid vehicles with an off-wire capability (preferably to include lorries as well as buses),
- research into stepless transmissions,
- research into new methods of fuel analysis and specifications,
- study of the non-technical barriers to the introduction of electric cars, followed by action to help overcome them,
- ensuring compatibility between types of high-speed wheeled train now being developed, so that development of a European network is not hampered.

53. The main committee is asked to incorporate in its motion for a resolution the demands appearing as indents in paragraphs 50, 51 and 52.

QUESTIONNAIRE

for the participants in the public hearing
on energy saving in the transport sector

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1. To what extent do you think more rational uses of energy in the transport sector can help to bring about substantial overall energy savings?

2. Do you share the view that the present energy crisis ar the short, medium and long-term prospects for the Community's energy supplies in the transport sector will require drastic measures, or will gradual adjustments and improvements be enough?

3. What research activities are now being conducted and/or considered in the short, medium and long-term with a view to energy savings in the different transport sectors, i.e. road, inland waterway, rail, sea and air transport?

4. In your opinion, can these research activities be regarded as adequate?

5. What significant measures would you say had already been taken to promote more rational and economical uses of energy in the different transport sectors? What specific savings have these measures achieved?

6. Do you think that greater economy should be achieved by:

   (a) making better use of existing means of transport and transport technology, or

   (b) developing new technologies, whether or not on conventional lines?

7. What innovations and improvements do you consider desirable in the specifications of different means of transport (road vehicles, inland waterway vessels, trains, seagoing vessels, aircraft)?

8. What, from the point of view of energy saving, are your views on the development of

   (i) alternative energy sources;
   (ii) alternative means of propulsion?

9. Are you in favour of measures to boost public transport? If so, what specific action do you think should be taken?

10. Do you think that the use of combined rail and road transport should be intensified? What are your suggestions?

11. Do you approve of transferring traffic from the roads to railways and inland waterways? If so, what form would this take in practice, and what savings could be expected? If a serious crisis suddenly arose in the Community's energy supplies, what sectors of road transport should be given priority in the distribution of scarce fuel supplies?

12. Would you recommend the introduction of legally binding maximum fuel consumption standards for road vehicles?

13. How important do you consider speed limits? Do you think they should be made even lower for road vehicles? Would it be worthwhile to introduce speed limits in air, rail and sea transport?

14. How highly do you rate the following as ways of achieving economies in air transport:

   - improvements in existing air traffic control systems;
   - improvements in route planning;
   - operational measures?

15. What specific projects would you recommend in urban centres to reduce congestion and so cut down on fuel wastage?

16. What in your opinion would be the most effective ways of influencing driver behaviour? What specific proposals can you make?

17. What specific measures would you propose as regards infrastructures for the different transport sectors?

18. What financial and fiscal options would you recommend as a matter of urgency to the authorities to make essential investment funds available for the energy economy programmes envisaged?

19. What proposals can you put forward as regards cooperation between the European Community and third countries in:
    - research and development in energy-saving technologies;
    - the adoption of energy-saving measures in the field of transport?

20. What contribution can you see the Community, and in particular the Commission, making to energy economies in the transport sector?

ANNEX II

LIST OF THOSE TAKING PART IN THE PUBLIC HEARING ON 27 and 28 NOVEMBER 1980[1]

1. Commission of the European Communities
   - Directorate-General VII 'Transport', Mr LE GOY, Mr VENTRELLA, Mr LEONARDI
   - Directorate-General XVII 'Energy', Mr ALLION

2. Group of railway companies of the nine countries of the European Community: Mr FLACHET, Mr MONNET, and Mr SQUILBIN

3. IATA: Mr SHAW, Captain JESSOP, and Mr CUNNINGHAM

4. LCAI (Liaison Committee of the Automobile Industry): Mr GLATZ, Mr LEWIS and Mr BISSEL

5. The European Environmental Bureau: Mr HOLFORD-WALKER

6. EAAEM (The European Association of Aerospace Manufacturers): Mr PIAGGIO and Mr DE FONVENT

7. IRU (International Road Union): Mr PROST and Mr DELSEAUX

8. UNICE (Union of Industries of the European Community): Mr LANDREVILLE And Mr VAN HISSENHOVEN

9. IEA (International Energy Agency): Mr BILOT

10. Action Committee of Public Transport in the European Community Mr GUTKNECHT, Mr GLASSBORROW and Mr DEVROYE

11. ICAO (International Civil Aviation Organization): Mr VERES

12. Central Commission for the Navigation of the Rhine: Mr DOERFLINGER

13. Council of European Municipalities: Mr GRAHAM, Mr FEUILLATRE and Miss GATEAU

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[1] A representative of IMCO (Intergovernmental Maritime Consultative Organization) was also invited, but excused himself at the last moment.

14. EBCU (European Bureau of Consumers' Unions): Mr VENABLES and Miss LE BORNE

15. Permanent Conference of Chambers of Commerce and Industry of the EEC: Mr ROGGE, Mr SENIOR and Mr ROEG.

ANNEX III

REPLIES TO THE QUESTIONNAIRE AND WRITTEN SUBMISSIONS[1]

1.	IRU (International Road Union)	PE 66.969
2.	IEA (International Energy Agency)	PE 66.993
		PE 68.337
3.	UNICE (Union of Industries of the European Community)	PE 66.999
4.	ICAO (International Civil Aviation Organization)	PE 67.102
5.	Group of Railway Companies of the Nine Countries of the European Community	PE 67.472
		PE 68.329
6.	LCAI (Liaison Committee of the Automobile Industry)	PE 67.908
7.	European Environmental Bureau	PE 68.254
8.	EAAEM (European Association of Aerospace Manufacturers)	PE 68.344
		PE 69.865
		PE 70.638
9.	EBCU (European Bureau of Consumers' Unions)	PE 69.242
10.	Permanent Conference of Chambers of Commerce and Industry of the EEC	PE 69.404
11.	ENI (Ente Nazionale Idrocarburi)	PE 69.564
12.	Council of European Municipalities	PE 69.566
13.	IATA	PE 69.815
14.	Central Commission for the Navigation of the Rhine	PE 70.637
15	IRF (International Road Federation)	PE 72.249

[1] The rapporteur received several replies from members of the UITP (Internation (International Public Transport Union)