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## Serie Research Memoranda

### European Transport Policy: The Links between Mobility and Sustainability

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**EUROPEAN TRANSPORT POLICY: THE LINKS BETWEEN MOBILITY  
AND SUSTAINABILITY**

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## 1. INTRODUCTION

The role of transport in our modern societies is hybrid in nature. Transport has created many socio-economic benefits; all societies rely heavily on transport services for their economic functioning. However, transport has also given rise to numerous and severe problems. The unconstrained transport growth in Western Europe appears to have reached in many places a point beyond which any increase in traffic is counter-productive (i.e., a situation of negative marginal benefits).

Natural resources affected most by transport are energy, air, land and water, which are in a wider sense also connected with human life and health, flora, fauna and the aesthetic quality of the human environment. Priority settings on these problems vary according to whether global, national, regional or municipal considerations are used.

In densely populated parts of Western Europe, traffic has in many places reached the available capacity of the transport system resulting in heavy congestion. And all over Europe road traffic has exposed cities - and significant parts of whole nations - to continuing noise and pollution impacts, not to speak of everyday risk of traffic accidents. Furthermore, in European core areas transport is also competing with other activities in terms of claims on the available land area.

Despite the increasing popularity of Just-in-Time (JIT) systems and related concepts (e.g., materials requirement planning (MRP)), the actual practice of both commodity and passenger transport is disappointing and often frustrating. Severe traffic congestion phenomena at the urban or metropolitan level (e.g., Athens, Rome, Paris), unacceptable delays in medium and long distance transport during peak hours, unsatisfactory service levels of European railway systems (and public transport in general), unreliable airline connections due to limited airport capacity and slow technical and institutional renewal of air traffic control in Europe: all these phenomena illustrate the difficult position of the European transport sector. And there is no clear perspective for a drastic improvement of this situation.

Since many transport problems can be interpreted as a symptom of both failing market mechanisms and of failing government policy, these problems can hardly be solved only inside the transport sector. Confronted with a clear inconsistency between demand for more mobility and negative effects of traffic, Europe is faced with a need for stronger governmental actions in order to ensure a balanced relationship between demand and supply. When we regard the volume of cross-border traffic, the international nature of the car industry, the national trade interests and the global aspects of air and water pollution, it is obvious that actions of the national governments are bound to remain insufficient; actions at the European and global level are needed.

In the next section (Section 2) a sketch of the evolution of transport problems is presented, while next a review of general megatrends (Section 3) as well as a discussion about trends in transport policy (Section 4) are given. Future prospects of European transport policy are then examined with the aid of a scenario analysis in (Section 5).

socialist countries is even worse. In Lithuania 30 people per 100,000 population were killed in road traffic in 1991. In all Baltic countries road deaths have increased by 60 per cent since the mid 80's (Seegercrantz, 1992).

Table 1. Road transport fatalities per year and per one hundred thousand inhabitants 1989

Country	Number of persons killed	Killed/100 000 inhab.
Austria	1 402	18.4
Belgium	1 993	20.1
Denmark	670	13.1
Finland	734	14.8
France	10 528	18.7
Germany, Fed. Rep.	7 995	12.9
Greece	1 699	17.0
Ireland	460	13.1
Italy	6 410	11.2
Luxemburg	67	16.8
Netherlands	1 456	9.8
Norway	381	9.0
Portugal	2 375	22.7
Spain	7 188	18.5
Sweden	904	10.6
Switzerland	925	13.9
United Kingdom	5 554	9.7
EC + Efta	50 741	14.8

Source: ECE, Statistics of Road Traffic Accidents in Europe, 1991

Finally, there is the issue of land use by the transport sector. In the former FRG the entire transport infrastructure took a fraction of about 5 % of its total area, or approximately 1,2 mill. ha. In agglomerations like the Rhein-Ruhr area the share of transport infrastructure is more than 10 % of the area, and in some cities even considerably more, especially if we also include parking space and other transport provisions. In the time period from 1968 to 1988 the area needed for roads in the former FRG increased with about 35 % due to an extension of the length of the road network and of the width of existing roads (Blum and Rothengatter, 1989). A similar situation can also be found in the Benelux countries, England and some parts of France. If the increase in road traffic with accompanying road construction will continue in Europe, we may face the American situation where, according to Renner (1989), at least one third of an average city's land is devoted to roads, parking lots, and other impingements of traffic infrastructure.

problems will however, affect the possible gains in the emission reduction. In the USA, where catalytic convertors have been in use already from the late 70's, the emissions of HC and CO from transport were in 1987 still around 60 per cent of the emissions observed in 1975, and only a very minor reduction in the NO<sub>x</sub> emissions could be observed (Linster, 1990).

Road transport noise is another, really widespread phenomenon. More than 50 per cent of the population of OECD European countries are exposed to noise levels of more than 55 dB(A) (Linster, 1990). According to a survey from 1986 in the former FRG 65 % of the respondents felt affected by road traffic noise, 25 % of them severely (Blum and Rothengatter, 1989).

The evolution of transport problems in Europe is tightly connected with the European socio-economic development, the changes in global ecology and the directions in European transport policy. These matters will be further discussed in the next sections.

### 3. REVIEW OF MEGATRENDS

#### 3.1 From the Industrial to the Postindustrial Age

According to Bruckmann (1987), the economic history of man can be subdivided into three ages: the preindustrial, the industrial, and the postindustrial age. We are now living at the turning point between the last two. What is most interesting is that Bruckmann supposes that the whole framework of our social evolution is changing. During the history of mankind there has always been scarcity, but no limits in growth. Now we have become affluent but the limits in further growth are obvious. The affluence is of course only related to the developed nations. The scarcity is still prevailing in developing nations as well as in former socialist countries in Europe. All are, however, equal in facing the limits in growth. Also King and Schneider (1991) are waiting for a new era, witness the title of their new report to the Club of Rome "The First Global Revolution".

The characterisation of human activities up to a level where we can speak of the industrial age is a very rough one. Industrial production of artefacts is actually only a continuation of prehistoric handicraft. The difference is mainly in the scale and the technology used. The major point is the affluence starting with industrial development, which has changed and expanded all human activities.

The importance of agriculture has not diminished during the industrial age. We are still totally dependent on it for our food. Also in the postindustrial age we will remain dependent on agriculture to get food and on industry to get artefacts. What is actually changing is the number of people directly working in production. Because of rationalization and automation the quantity of workers needed per produced item is steadily and structurally diminishing. This implies that more and more people can be engaged in other human activities.

Sarkar (1967) has developed a theory that world ages change according to the dominant "Weltanschauung", which is based on archetypes. The relevant archetypes are soldiers, intellectuals, capitalists, and workers. The last ones have never had power, but the three previous groups of people have in the

tional (i.e., cross European) perspective the following megatrends at the European level can inter alia be observed:

- Despite many institutional frictions, there is an increasing tendency towards an integrated and open European market, which by 1993 will become the largest trade block of the world. This trade block will increasingly also include EFTA-countries.
- At the European scale, many initiatives are being taken to improve and expand the current international infrastructure (e.g., the Channel Tunnel, the extension of French TGV, the construction of the Trans European Motorway, the design of an advanced European telecommunications system, etc.), so that all European countries will be linked to each other via a common and accessible network.
- Internationally, the heartland of Europe is shifting towards both the east and the south, which has enormous economic and social implications for transport and mobility all over Europe. Furthermore, many different kinds of border problems still have to be solved in Europe's unification policy.
- Many countries have officially adopted a "basic right" principle towards peripheral or less accessible areas, which means that a certain level of accessibility is ensured on the basis of this equity paradigm. However, in the case of severe budget stress such principles tend to be easily neglected, particularly when it is accompanied by privatisation of (parts of) the infrastructure networks for public transport services, telecommunications, etc. This may lead to severe imbalances and serious equity problems at the European level.
- The European trend toward more deregulation and decentralisation may seduce policy makers to question whether there is a case for planning at all; more particularly, the seemingly higher efficiency gains of a market oriented planning system need to be traded off against the social welfare gains of public interventions (see also Subsection 4.1).
- International spatial interactions in the form of physical movements of persons or commodities are increasingly influenced by recent developments in the field of communication and information technologies (including telematics).
- The area of commodity transport is going through a rapid transition phase, especially due to the emergence of modern logistic systems. For both national and European freight transport this development has far reaching consequences, not only in efficiency terms but also in terms of social consequences.
- The conflicts between economic efficiency goals, social equity goals ("access") and environmental sustainability goals become increasingly sharper in the transport sector.

Clearly, the above mentioned examples of megatrends in transport are by no means exhaustive, but they suggest in any case that the 1990s will require new ways of policy analysis in which a meaningful blend has to be found between allocative efficiency, distributional equity and environmental spill-overs (and other externalities) in a highly dynamic urban and regional setting of European countries marked by structural changes in technology,

Table 2. Number of cars, average annual car kilometers and total car kilometers in the Netherlands, 1970-1989.

1970	2.405	14.890	35.810
1971	2.637	14.980	39.510
1972	2.833	14.390	40.760
1973	3.005	14.300	42.960
1974	3.134	13.850	43.400
1975	3.289	14.430	47.450
1976	3.444	14.530	50.050
1977	3.636	14.380	52.290
1978	3.811	15.010	57.190
1979	4.052	14.360	58.190
1980	4.240	13.880	58.850
1981	4.314	13.570	58.520
1982	4.350	13.860	60.260
1983	4.438	14.220	63.110
1984	4.519	14.460	65.340
1985	4.600	14.120	64.950
1986	4.462	14.680	68.140
1987	4.755	14.980	71.230
1988	4.921	15.350	75.530
1989	5.086	15.190	77.260

Source: Blaas et al. (1992)

In addition, the awareness of the limits to growth in mobility has also dramatically increased. Environmental and safety considerations have become major factors in the social acceptance of our mobile society. Thus new transport solutions and technologies will have to be implemented within increasingly narrower limits imposed by our society. The range of such solutions is even further limited by the simultaneous behaviour of all actors in the transport sector generating congestion effects (see Kreutzberger et al., 1992).

The "undesirable" outcome of a highly mobile society is - almost paradoxically - the result of rational and plausible actions of a great many individuals. Social science research has convincingly demonstrated that the neglect of social costs in individual decision-making must by necessity lead to a macro outcome that is far from optimal. This explains the worsening quality of life conditions in major cities in Europe.

Thus it seems as though quick and effective actions coping with the negative externalities of the transport sector are absolutely necessary. On the other hand, many people in our society are not convinced that such actions should necessarily be a responsibility of governments, as they see a clear conflict between goals, measures and social acceptance of policies in the transport sector. Therefore, it is necessary to pay more explicit attention to the role of governments in the transport sector.



## (b) Norms of ethics and justice

A second reason for government intervention on the economy, besides correcting market failures, occurs if, in accordance with ethical or political beliefs of society or governments, outcomes of the market economy are regarded as inequitable or unacceptable. One may think here of large socio-economic inequality to which the market system may lead. An obvious case is discounted fares for children or elderly in public transport. In addition, the government may hold the view that in some cases the consumer is inclined to underestimate structurally the importance of some goods and services (merit goods). That is why sometimes the consumption is made compulsory (for example, compulsory car insurance) or consumption goods are provided free of charge or at a reduced price (for example, school milk). It may also occur that the consumption of some goods will be decreased for everyone's own interest (demerit goods). This occurs, for instance by imposing high taxes (for example, gasoline use) or by forbidding consumption (for example, high travel speed).

However, it is gradually recognized that government intervention does not always imply an improvement; it may happen that government intervention itself is not free from imperfections with regard to the increase and the distribution of welfare. This is then called government failures (non-market failures) (see also Barde and Button, 1991).

A first kind of non-market failures may result from an imperfect insight into the real demand for public services (e.g. parking space). In addition, imperfections may occur in case of non-optimal production of public services. A third kind of non-market failures is the result of insufficient recognition of (positive and negative) effects of policy that occur in the longer run and which may have the effect that, among other things, a service in terms of quantity is too low (in case of positive effects) or too large (in case of negative effects). Furthermore, government intervention may result in unintended - but in reality possible - (re)distributions of incomes, knowledge and power, by which conditions are created for new kinds of inequality and discrimination. Finally, government intervention is often accompanied with bureaucracy as well as with complicated and nontransparent legislation and regulation which, among other things, results in an increase of social costs for government and firms.

In reality, it turns out that, first, many government interventions can hardly be explained by the existence of market failures or by a desire for a more equal distribution of income and wealth; second, government interventions sometimes cause more misallocation of economic resources than they correct; and, third, intervention is often accompanied with considerable transaction costs for the industry, for consumers and/or for the government itself.

Nevertheless, there may be a case of government intervention in the transport sector. First, lack of socio-economic equity is so clearly mirrored in the mobility patterns of society that norms of justice (e.g., access to services) may induce governments to play an active role in providing transport services to less favoured groups (e.g., children, elderly) or regions. A second argument plays a more important role in the context of our paper; the problems of unsustainable development are - not exclusively but at least significantly -

only operator on its lines represents a severe commercial handicap for international transport.

Interfaces between national transport systems, viz. border crossings, play a principal role in international transport. Inefficient functioning of customs services may hamper the fluidity of traffic. Border formalities have been the cause of important delays in international traffic, both passenger and freight, particularly between east and west. Much progress has been accomplished in facilitating border crossings but much still remains to be done especially for rail transport all over Europe and for all modes at the borders of former socialist countries.

There have been bilateral agreements between neighbouring countries, multilateral agreements within groupings of countries such as the EC, and cooperation with the aid of various international organizations such as the European Conference of Ministers of Transport (ECMT), the former CMEA or COMECON and the United Nations Economic Commission for Europe (UN/ECE). However, all these activities were either limited in geographical scope or could not proceed beyond a certain degree of cooperation as a result of the former division of Europe into two blocks.

The ECE has elaborated a set of new agreements on integrated European infrastructure networks for each transport mode: rail, road, inland waterways, and combined transport<sup>1</sup>. Work is at present underway on similar guidelines for the integrated high-speed rail network. These agreements and guidelines are being extended to include also former socialist countries. Similar work has been carried out by the Commission of the European Communities (CEC). The CEC has stressed that in the future its infrastructure policy would concentrate on covering all modes, including the intermodal dimension, in order to take account of all major flows of passengers and goods. It would favour the introduction of new technologies, better passenger safety and improved environmental protection. Its policy would also be established in concertation with non-EC countries (see also ECE, 1991).

In order to assess at an early planning stage the possible harmful transboundary environmental impacts of proposed transport infrastructure, an ECE Convention on Environmental Impact Assessment in a Transboundary Context has recently been adopted. With regard to transboundary pollution control, a Convention on Long-range Transboundary Air Pollution has been adopted by the ECE countries and is widely adhered to by industry, including the transport industry. In conclusion, some progress on environmental policy in relation to transport policy may be expected in Europe, but the road towards sustainable development is still paved with many stumbling blocks.

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<sup>1</sup> European Agreement on Main International Railway Lines (AGC), of 31 May 1985 (ECE/TRANS/63); European Agreement on Main International Traffic Arteries (AGR), of 15 November 1975 (E/TRANS/16, Corr. 1 and Amend. 1); European Agreement on Important International Combined Transport Lines and Related Installations (AGTC), of 1 February 1991 (ECE/TRANS/88).

The authors noticed that scenario (3) was a necessary complement to scenario (2). The scenarios (2) and (4) would aim at the same goal, the first one with stringent restrictions and the last one by long-term development. The authors noticed that scenario (3) was a necessary complement to scenario (2). The scenarios (2) and (4) would aim at the same goal, the first one with stringent restrictions and the last one by long-term development. The authors estimated environmental impacts in Western Europe obtainable through scenario (2) to be as follows:

- (a) energy consumption (and CO<sub>2</sub> emissions) would decrease by 10% and NO<sub>x</sub> emissions by 85% compared to the situation of late 1980s or
- (b) energy consumption (and CO<sub>2</sub> emissions) would increase by 10% and NO<sub>x</sub> emissions would decrease by 80% compared to the situation of late 1980s

The differences between (a) and (b) were triggered by two different forecasts in scenario (1), which formed the starting point for measures of scenario (2). In forecast (a) car traffic was supposed to increase by 40% and in forecast (b) by 70% before implementing measures according to scenario (2).

Masser et al., (1992) designed long-term scenarios of transport and communications in Europe based on explicit assumptions. Three component scenarios representing different policy directions were developed for each field:

- the Growth Scenario which shows the most likely development of transport and communications in Europe if all policies emphasize economic growth as the primary objective and if state intervention would be as little as possible;
- the Equity Scenario which shows the impacts of policies that primarily try to reduce inequalities in society in terms of both social and spatial disparities;
- the Environmental Scenario which emphasizes quality of life and environmental aspects and hence assumes restrained use of technology and some control of economic activity.

Since growth, equity and environment are three partially conflicting paradigms, the authors of this work find a combination of these scenarios the "most preferred" one.

When considering various policy dilemmas the EC is faced with, the Group Transport 2000 Plus (1990, p. 28) mentions three possible options, of which they recommend scenario (c):

- (a) the continuation of present policies, which could result in many negative effects;
- (b) the intensification of infrastructure investment in order to alleviate the congestion problems, which could also increase negative effects;
- (c) the new short, medium and long term policy guidelines that assume a total change in transport mode preferences.

international agreements obtained by governmental decisions and the need for environmental sustainability advocated by scientists. According to the governmental agreement it is sufficient if carbon dioxide emissions will stay at the level of the year 1990, whereas scientists are asking for a reduction of 30% (King and Schneider, 1992) or for 60% (Döös, 1991). For nitrogen oxides emissions the same holds true; the governmental agreement asks for a reduction of 30%, but scientists (Kauppi et al., 1990) ask for a reduction of 75 or 90%.

The governmental target for carbon dioxide emissions - to keep the emissions at the level of the year 1990 - seems to be obtainable through transport policies regarding car traffic (see Subsection 5.1). When car traffic forms the major element in surface transport and also its fastest growing sector, it is probable that the target can be reached in all surface transport modes.

The governmental agreement in Europe to decrease nitrogen oxides emissions by 30% seems easy to reach, at least in car traffic, with the aid of catalytic convertors. With the aid of proposed stringent regulations for diesel vehicles it may be possible to obtain the target in all surface transport activities.

Referring to Subsection 5.1, it seems however, not possible to obtain in Europe a 30% or 60% reduction of carbon dioxide emissions as proposed by scientists. This holds true even though the measures included in the scenarios studied are very stringent compared to the present situation.

According to the same source it seems possible to reduce more than 75% of nitrogen dioxide emissions of European car traffic. This is needed for forest preservation. However, the possible reduction falls somewhat short from 90% which would stop the acidification. Some caution is here necessary even with the reduction of 75% because practical results from the USA are much more modest (as stated in Subsection 2.2).

## 6. CONCLUSION

In light of the above considerations, it is obvious that current transport policies are not adequate. There is a pressing need for a rigorous implementation and enforcement of the legislation and measures adopted at all levels, including the European level. There exists some consensus about the direction of the actions needed.

International agreements about the reductions of emissions are very modest and the reductions obtained through transport policy up today are even more modest. Future transport policies, according to the above scenario analyses, are able to obtain the targets stated by international agreements by using stringent measures. However, prospects to secure more far reaching targets are rather uncertain. This poses some unanswered questions; is there a lack of knowledge and understanding when confronting global complex questions and/or is it at all possible to turn mass consumption societies towards the path of environmental sustainability?

When considering the nature of governmental actions presented in Subsection 4.2, the possibilities to reach environmental sustainability seem to be very

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