SAFEGUARDING BOTH ACCESSIBILITY AND THE ENVIRONMENT
– The Dutch View on Infrastructure –

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Under unchanged conditions car traffic in the Netherlands until 2010 will grow by some 70%. In the Dutch Transport Structure Plan a number of measures are proposed to limit the growth to 35%. These are aimed at reducing the need for a car, making the car less attractive ("push"), and improving the alternatives ("pull"). Very specific "targets" are defined, the achievement of which can be checked on regular intervals. These relate for example to the reduction of exhaust gases, the growth of car and public transport, the structure and quality of the trunk road network, the improvement of the rail system, and parking provision in employment centers.

1. INTRODUCTION

In this paper, the position of transport infrastructure in the Second Dutch Transport Structure Plan (TSP-2) is described. It also contains a description of the contribution of physical planning to limit the growth of car use; as stated in the Amended Fourth National Plan on Physical Planning.

On a national level, the Dutch government is trying to limit the growth of car use to meet specific targets with respect to the environment, traffic congestion and traffic safety. On a local level, municipalities attempt to reduce traffic noise and air pollution. This is done with the aid of "environmental traffic maps", based on transportation models.

2. OUTLOOK UNDER UNCHANGED POLICY CONDITIONS

2.1 Current Infrastructure

The Transport Structure Plan is concerned with the approximately 2,800 km of the trunk road network, of which some 2,100 km is in the motorway class. The rail network is about as extensive: about 2,850 km, of which 2,600 km is used for passenger transport. Around three quarters of domestic traffic, both passenger and freight, is carried by road and this percentage is growing. Roughly 40% of this road traffic is carried on the trunk road network.

2.2 Exogenous Developments

When the TSP-2 was drafted, various scenarios were constructed using economic forecasts from the Central Planning Bureau (CPB). Here we shall refer only to the so-called middle scenario. The main emphasis of this paper is passenger transport, although freight transport causes substantial environmental problems as well.

Population will increase from 14.5 million in 1986 to a little more than 15 million by 2010. Reduced family sizes will cause a sharp increase in the number of households. Changes in population structure involve a reduction in the share of the younger age group and parallel increase in the elderly groups.

The working population will increase by 29%, including a substantial increase in the number of working women. It is expected that the largest growth in employment will occur in the service sector. Real income per worker will increase by roughly 65%. As a result of the increasing number of workers per household, real household incomes will increase by more than 85%.
2.3 Anticipated Mobility under Unchanged Policy Conditions

How will mobility change until 2010 if these exogenous changes take place and policy remains unchanged — i.e., continuation of the First Transport Structure Plan (TSP-1 from 1979) for investment level and scheduling while fuel taxes and fares on public transport are assumed constant in real terms?

Numbers of driving licences and cars will increase by 31% and 74% respectively. Mobility (in passenger kilometres, for all purposes and by all modes) will increase by around 30%. There will be a sharp increase in the average length of trips. The share of trips by car will also increase sharply: from 64% in 1986 to 74% in 2010. In absolute terms, car kilometrage will increase by 70%. The other modes will grow less rapidly than total mobility, so that their share in the total passenger kilometrage will decline.

The growth of car traffic can be explained by the following factors:
- about 20% increase from demographic and employment changes;
- about 10% increase from increased licence holding;
- about 30% increase from growth in car ownership;
- about 10% from road and public transport network improvements.

From this it can be seen that to a large extent increasing car mobility is the result of changes in demography and employment and not simply the result of the growth of car ownership. It is also clear that network improvements are only a minor cause of traffic growth. That supply creates demand, is only true to a limited extent.

Because the planned infrastructure will not keep pace with the growth of traffic, time losses due to congestion will more than double, and the associated costs more than quadruple.

3. THE NEW POLICY OF THE SECOND TRANSPORT STRUCTURE PLAN

3.1 Policy Assumptions and Aims

Mobility is inherently positive and essential for social and economic development. The negative effects of increasing mobility (energy consumption, emissions, accidents, space consumption, public transport deficits, congestion, etc.) are however reaching undesirable proportions.

The Second Transport Structure Plan (part D, TSP-2D) formulates with respect to this main aim (accessibility) and constraints (environment, safety, etc.) certain maximum and minimum targets which ought to be attained at fixed dates in the future (1995 and 2010).

The following policy measures are being employed as the main means of achieving these goals:
- reduction of car use (through pricing policy, improvement of the alternatives, land use planning, peak spreading, etc.);
- improving accessibility by public transport through service improvements and construction (high speed rail lines, connections to new development areas and so on);
- increasing capacity, widening existing roads and building new ones; methods to improve the use of existing infrastructure;
- improvement and construction of rail links for freight.

From the point of view of land consumption and fragmentation of the countryside the aim should be the smallest possible infrastructure extension, given the stated aims and constraints.

In order to satisfy the constraints numerical targets for growth indices (interim goals) of certain mobility categories are indicated in the TSP-2 as guidelines for the measures to be introduced:
- the increase in car traffic up to 2010 should not exceed 35%
- average car occupancy for travel to work ought to increase from the current occupancy of 1.2 to 1.6 in 2010;
- public transport use in the peak in the main corridors ought to increase by 50 - 100%;
- the scale of rail freight traffic ought to increase to 50 million tonnes per year (a tenfold increase).

3.2 Highway Infrastructure Policy

Highway infrastructure policy in the Transport Structure Plan is based on a number of new concepts concerning structure, hierarchy, quality and priorities. A
hierarchy has been introduced in the trunk road network, coordinating with the Fourth Report on Physical Planning:

- the trunk road network (2800 km) provides more-or-less direct links among the 40 administrative and economic centres and with neighbouring countries. The detour factor is no greater than 1.4 and the distance between the rural area and the trunk road network is no more than 10 km (or 15 minutes journey time).

- the so-called "main transport axes" of the trunk road network (1600 km) link the 13 urban focal nodes named in the Fourth Report and the "main ports" Schiphol Airport and the Port of Rotterdam with each other and with their hinterland.

- among the main transport axes the "hinterland axes" are distinguished as a category (about 900 km) which link the "main ports" with their hinterland in the rest of Europe.

In determining what type of road, the trunk road network should have, how many lanes and so on, a new norm is being employed for the level-of-service for traffic. The old criterion used in TSP-1 took insufficient account of the effect of the fluctuating intensity of traffic in causing congestion. The new norm applies the concept of the "probability of congestion": the level-of-service for traffic on a section of the trunk road network is expressed as the average percentage of the daily traffic that encounters a jam on that section of road. An economic approach was followed in determining the norm; a level of quality was sought that gave the lowest possible sum of direct (construction, maintenance etc.) and indirect costs (environmental, accidents, delays etc.). Figure 1 gives the results of the calculations made to date.

The economically optimal traffic flow quality is found to be where there is a probability of delay of around 2%. After further consideration during the development of the TSP-2 it was decided that there should be a norm of 2% only on the hinterland axes, whereas 5% on the rest of the trunk road network was considered sufficient: for comparison, it may be noted that some trunk roads in the Randstad currently have a congestion probability of 20-30%.

A set of priorities has also been applied to the type of measures:

1. maintenance of the existing road capacity comes
first;
2. next come the measures aimed at upgrading and better exploitation of the capacity available, including:
   - infrastructural measures such as separate lanes for freight vehicles, buses, car-poolers and (toll) business traffic;
   - traffic management measures: "tidal flow", ramp metering, variable signing, traffic signalling etc.;
   - information systems: journey planning, route guidance;
   - toll systems: booths, permits, road pricing etc.;
3. increase of capacity by widening of existing links, adding extra links to eliminate bottlenecks, is the third priority;
4. finally, construction of missing road links.

An additional important feature of the TSP-2 infrastructure policy is the so-called target group policy; this involves providing selective accessibility to various groups of road users:
- business traffic and freight will not be subject to tolls;
- drivers without passengers and commuter traffic in the peak will face increased costs;
- there will be special provision for car-poolers, freight vehicles and buses (separate lanes and where there is ramp metering);
- consideration is being given to the separation of long and short distance traffic.

In short, the infrastructure will no longer be a uniform entity but will be made available to users selectively, depending on the characteristics of the user, and at varying prices.

3.3 Rail Infrastructure Policy

The Rail 21 plan of the Netherlands Railways makes a distinction between connecting line systems that link areas and feeder line systems that open up areas. Three levels are distinguished in the connecting line system, the so-called three-level train system:

a. the Intercity/Europcity network for long distance traffic. Speeds of up to 200 kph are aimed at on this network.
b. the Inter-Regional network linking towns with more than 50,000 inhabitants. It gives fast links for middle distances with maximum running speeds of around 140 kph.

c. the Regional/Agglomeration network covering distances of 10-50 km within the urban areas with max. speeds of 120 kph.

The feeder system is formed by the so-called basic network which consists principally of underground, tram, bus and other services.

These investments will increase the capacity by more than 60% and make it possible to improve the level-of-service by keeping different types of train service apart.

Government expenditure on public transport and railways and on meeting deficits in the running costs of public transport will be at least 113 billion guilders (1 guider is appr. $ 0.60) in the planning period 1990-2010 and altogether forms 70% of all planned TSP-2 government expenditure (166 billion).

The total rail investment for passenger transport up to 2010 will be about 17 billion guilders, of which 3 billion is for the high speed lines.
Around 35 billion will be spent on the trunk road network (excluding the main tunnels which have to be privately financed).

The figures illustrate a clear shift: sharply increased investment in public transport at the expense of investment in roads, which has been reduced. The additional financing of the public transport measures must be found from the revenue of the various pricing measures applied to car traffic.

4. ANALYSIS PROCEDURE FOR PASSENGER TRANSPORT INFRASTRUCTURE PLANS

The infrastructure plans that form part of the final TSP-2 were derived from an iterative cyclical process. An outline of this process is given in Figure 2. This process consists of the following parts:

I. policy formulation: the formulation or interim adjustment of aims (e.g., accessibility), constraints (e.g., environmental) and policy priorities (e.g., first maintenance, then construction);

II. putting into operation: the formulation or interim adjustment of measures; an important part of this is the adaptation and extension of the infrastructure networks, followed by pricing and other measures;

III. network analysis: calculation of level-of-service for traffic (travel costs, travel times, congestion, etc.) at a given level of travel demand on the infrastructure networks (trunk road and rail) formulated in phase II;

IV. analysis of demand: estimation of the demand for transport by the various modes of transport under the planned policy measures and given the level of service on the infrastructure networks concerned, as calculated in phase III;

V. testing: to check to what extent transport demand calculated in IV and level of service calculated in III correspond with the aims and constraints formulated in I and, where they differ, if necessary to adjust the measures in II or even the principles in I.

There are three iterative loops in this process.

First of all, the large iteration described in I to V and back to I, which leads to policy adjustments including changes to the infrastructure networks.

Within the policy iterations there are calculation iterations to solve the 'chicken and egg' problem that transport demand (part IV) is dependent on traffic quality (part III): but that in turn traffic quality is dependent on the level of demand. This interaction of supply and demand is described in the TSP-2 analyses by calculation models which estimate alternately the demand for travel per mode and the traffic flow quality that results from it in each of the networks until an equilibrium is reached. In these models, the travellers' choices of mode, destination etc., depend partly on travel time and travel cost for each of the competing modes of transport and vice versa.

Finally, the traffic quality on each of the infrastructure networks is calculated iteratively (for the time being carried out only for the trunk road network). These iterations are necessary in order to take account of the interaction between demand and supply quality on a given network. After all, route choice and departure time choice by car drivers are partly dependent on congestion, but in turn congestion is dependent on the number of travellers who are using a given section of road at a given moment. The argument applies when there is a toll charge dependent on time or place on the roads. For train travel there is, in principle, a corresponding pattern of travel behaviour involving the availability of seats and fares.

In what follows we shall deal in more detail, in separate sections, with the estimation of the demand for travel and with the network analyses in which traffic quality is measured.

5. MOBILITY ANALYSIS IN THE TSP-2

5.1 Approach

During the formulation of the TSP-2, analyses were performed of the effectiveness of particular measures and of the extent to which the whole package of measures achieved the established aims.

For the purposes of these analyses three scenarios for 2010 were distinguished. These postulate high, moderate and low income growth; they differ in respect of the size of the workforce, employment, income growth, fuel and other prices, vehicle efficiency, car
ownership, etc.

In addition, for each scenario a number of regional distribution variants for population and employment were formulated (using the PRIMOS model of the National Planning Service and the RESPONS model of the Netherlands Economic Institute). In addition to the middle variant, on which the analyses have concentrated, two spatial variants: 'concentration' and 'deconcentration' respectively were formulated.

In order to provide a comparison with the estimates for TSP-2 an Unchanged Policy scenario has been constructed which in essence postis the continuation of the TSP-1 policy. In addition, various policy variants have been formulated for TSP-2 which differ as to the contents of the package and the severeness of the measures.

For the estimation of the demand for transport and the calculation of the effectiveness of the measures, use was principally made of the National Model System, which had been developed specifically for the quantitative analyses of the TSP-2.

5.2 National Model System

The National Model System (NMS) is a calculation model for the estimation of the current and future mobility characteristics of the Dutch population on an average working day.

These mobility characteristics include: licence holding, car ownership, numbers of trips, passenger kilometres, travel hours, travel costs, etc., split by travel mode and time of day.

These characteristics are determined separately for each travel purpose (commuting, business, shopping, education, etc.) and by traveller category (by age, employment, etc.).

On this basis the following calculations are made for the trunk road network: vehicle kilometrage and vehicle hours, in the peak and total for 24 hours; time loss waiting in traffic jams in the peak; and road sections or road length with structural traffic jams in the peak. From these basic data can be derived travel speeds, car occupancy, etc.

The NMS distinguishes between traveller groups according to household type, employment, age, etc. The mobility patterns within the groups so distinguished are relatively homogeneous, but they differ markedly between the groups. The behavioural preferences of the various groups are derived from observations.

In the first step the future size of each of the groups is estimated. Next, the circumstances that determine mobility (such as journey times and costs, for example) are derived from the characteristics of the policy scenario. Then the mobility characteristics are calculated for each group separately.

The calculation of mobility is performed with a series of state-of-the art disaggregate choice models. There are separate choice models for car ownership, the holding of a driving licence, travel frequency, mode choice, destination choice, time of day choice and route choice. All these models calculate the probability of choices from the set of alternatives available to a particular type of traveller depending on his personal characteristics (e.g., employment, age) and on the circumstances in which he makes his choice (e.g., travel times and costs for the competing modes). The parameters of these models, which describe the relative importance attached to those circumstances by the traveller groups distinguished in the NMS are derived from a large number of observations made over the last few years.

The NMS operates on the basis of a spatial differentiation. The Netherlands is divided into 350 zones. For each zone an estimate is made of the size of the market segments. To calculate the level of service of the competing alternatives there is even a division into 1150 subzones, linked to the national trunk road network and the rail network.

A more detailed description of the NMS is given in [3].

5.3 Competition between Rail Network and Trunk Road Network

While in the NMS the direct price and time elasticities of demand for transport (kilometres travelled) appear to be very high for both modes, the cross-elasticities are on the other hand quite low so that only far-reaching measures (e.g., parking restrictions) show any significant switches between the modes. However, spatial (e.g., distance to the station) and socio-economic factors (e.g., employment, income) do also have an effect. The use of the car and of the train is therefore partially
dependent on the economic scenario and the spatial distribution scenario.

5.4 Measures Evaluated

Not all of the measures in the TSP-2D document are suitable for quantitative analysis. A large number of measures are too unspecific or still too vague (e.g., carpooling). In the case of other measures it is at present completely unclear how they will work out, since there has not yet been any experience with them (e.g., regionalized planning procedures).

The following measures are included in the mobility estimates:

A. Measures to tackle problems at source:
   - more economic and cleaner vehicles
   - improving the energy efficiency of vehicles
   - introduction of speed limits (including 30 kph zones)

B. Pricing policy
   - levying tolls on the Randstad ring
   - increasing fuel taxes
   - doubling parking charges and the area of paid parking
   - changes to the travel cost tax allowance
   - increasing public transport fares

C. Improvement and extension of highway infrastructure
   - 15% increase in capacity (5% through management measures and 10% through autonomous improvements)
   - 12% expansion of trunk road network (removal of bottlenecks including five new tunnels)
   - 15% expansion through extra lanes (road widening)

D. Improvement of alternatives to road freight and car use
   - introduction of the 'Rail 21' plan for network structure and timetable
   - speed increases on the basic public transport network (excluding trains)
   - introduction of peak-hour buses on heavily used car routes
   - reduction of the journey time ratio for public transport against car to 1.5 on the most heavily used commuter routes
   - introduction of public transport information systems
   - improvement of bicycle infrastructure

E. Land use policy and 'time policy'
   - application of the A-B-C location type system
   - parking restrictions at work locations according to the A, B, C norms

F. Improvement of freight efficiency.

5.5 Key Figures for Passenger Mobility in TSP-2D

The TSP-2D package manages to bring down the total passenger mobility for all modes compared with unchanged policy: the growth index is 127 instead of 131. Car use is substantially reduced compared to unchanged policy (from 170 to 147), while the other modes increase compared with unchanged policy to a greater or lesser degree. In options where still stricter controls are introduced (higher tolls or higher fuel taxes) there is a sharper reduction in car kilometrage.

Around 75% of the reduction in car kilometrage is the result of "push" measures for i.e., against the car while about 25% is achieved by improvements of public transport. This relationship also varies strongly according to the situation. About two thirds of the car kilometrage reduction is so-called 'evaporation', as a result of fewer and shorter car journeys. Around one third consists of a shift to other modes of transport, of which more than half to public transport.

Table 1 Growth indices for passenger kilometres working day 2010 (index, 1966 =100)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Unchanged Policy</th>
<th>TSP-2D</th>
</tr>
</thead>
<tbody>
<tr>
<td>car driver</td>
<td>170</td>
<td>147</td>
</tr>
<tr>
<td>car passenger</td>
<td>85</td>
<td>95</td>
</tr>
<tr>
<td>train (*)</td>
<td>109</td>
<td>138</td>
</tr>
<tr>
<td>other public transport (*)</td>
<td>94</td>
<td>117</td>
</tr>
<tr>
<td>bicycle and pedestrian</td>
<td>89</td>
<td>97</td>
</tr>
<tr>
<td>total</td>
<td>131</td>
<td>127</td>
</tr>
</tbody>
</table>

(*) Excluding the effects of the "Studenten OV kaart": students in the Netherlands now have free public transport from the Ministry of Education

6. TRANSPORT IN THE FOURTH NATIONAL PLAN ON PHYSICAL PLANNING

According to the Amended Fourth National Plan
on Physical Planning 2, physical planning must play an important role in the attempt to limit the growth of car use.

The general location criteria for housing, employment and recreation areas provide a guideline for municipal decision making. These criteria are:

- new building locations must be sited near existing urban areas
- access by means of public transport
- coherence between housing, employment, recreation and landscape
- protection of rural areas (open space) from urbanisation so as to maintain ecological and agricultural balance
- ease of implementation.

Distinction is made between the locations of new housing and the development of commercial and industrial areas.

Location of new housing

Between 1995 and 2015, it is estimated that 835,000 new houses will be built in the Netherlands. Of this total, 425,000 will be built in the Randstad provinces. From 1995 onwards, every major residential area must be sited close to high quality public transport facilities. First priority is given to the development of locations within existing urban areas. Second priority is given to locations at the periphery of existing urban areas.

Location of industry and commerce

According to Dutch location policy, every company should be sited at the location best suited to its needs. Industrial and commercial establishments that attract large numbers of visitors and employees must be located close to public transport facilities. Locations beside motorways must be reserved for production and distribution companies which specifically require such a location.

Each location has an accessibility profile. This indicates quality of access to the location by public transport and by car. Industrial and commercial organisations have a mobility profile. This describes the mobility requirements for each organisation with regard to the movement of people and freight.

According to Dutch location policy, accessibility profiles of locations and mobility profiles of businesses are coordinated with each other, so that ultimately each business can be situated at a location which is best suited to its own particular transport requirements. In such a way, the use of public transport can be stimulated and accessibility can thus be guaranteed.

Distinction is made between three types of location:

Location type A: These are sited close to public transport interchanges of national or regional importance. In cities and towns with an Intercity/Eurocity railway station, the area near the station is an A-location. Employment density is high. There are few parking facilities. Connections to the motorway system are not very important.

Location type B: These are sited close to public transport connections of local or regional importance, and near a major local road or motorway connection. Employment density is lower than for A-locations. There are also more parking facilities.

Location type C: These are sited close to a motorway connection, in or on the periphery of urban areas. Public transport connections are of no importance and there is no upper limit to the parking capacity that is being provided.

The mobility profiles pay attention to labour intensity, visitor intensity, dependence on the car for business and road haulage facilities.

By means of investment in rail (public transport) or road infrastructure, new A-, B- and C-locations can be created and existing A-, B- and C-locations can be changed.

Dutch location policy has been developed for application at a regional level. In a recent working paper, the government gives guidelines for local and provincial authorities for its location policy. The paper also contains a list of the types of companies and services suitable for each location category.

The implementation of the location policy may
have some problems:

- Theoretically, each location should contain a homogeneous group of companies. In practice, however, large discrepancies exist between companies situated at any one location.

- Regional differences exist in the choice of transport modes. There is at present an imbalance between available locations in relation to demand. There is a lack of A-locations.

- Competition between municipalities in attracting companies.

Possible problems for municipal implementation of location policy are:

- There is a lack of knowledge of the expected traffic impacts when a certain company is placed at a specific location.

- There are no adequate models to compute the effects of local or regional location policy.

- It is probably too simplistic to distinguish only between three location categories.

Nevertheless, Dutch location policy provides good opportunities to reduce the amount of car traffic by physical planning. Furthermore, it demonstrates how investment in public transport and road infrastructure can be used to create locations for specific kinds of companies and facilities.

7. HOW UNIQUE IS THE DUTCH APPROACH?

The Dutch TSP-2 approach is unique, because explicit numeric targets for accessibility, safety, and environment for the years 1995 and 2010 have been defined. If the Minister of Transport would stay very long in office, she would well run a considerable risk!

Many transport problems are common to all developed countries. Can the Dutch approach be transferred to other countries? Partly, there is a necessity to do so. Most environmental air pollution in the Netherlands comes from abroad. Inversely, most air pollution generated in the Netherlands is exported abroad. So, even with the very best plans environmental problems cannot be solved by this country alone. This was one of the reasons for the formation of an EEC committee, co-chaired by the former Dutch Minister of Transport, Ms. Smit-Kroes. The committee has recently submitted its recommendations to Mr. Van Miert, EEC commissioner for Transport, and they resemble remarkably those of TSP-2.

8. ENVIRONMENTAL TRAFFIC MAPS

All municipalities with more than 40,000 inhabitants are eligible for a subsidy (75% of total cost) for the preparation of so called 'environmental traffic maps'. These include calculations of noise levels on buildings and of the concentration of CO and NO₂ on pavements. The studies examine the present situation, as well as two future situations (one based on current local policy, and one based on a more 'environmental' policy). The aim of the study is to enable municipalities to examine the consequences of alternatives for traffic circulation. The municipalities work together with consultants.

The majority of eligible municipalities have completed these studies, or are currently engaged in this work. The remainder are due to start their studies in the near future. In these studies, different measures can be integrated into an alternative for local transport policy. These measures focus on:

- location of new industry and housing;
- location, prices, etc., of parking facilities;
- traffic circulation;
- different types of road surfacing;
- different street layouts (e.g., distances between roads and pavements or houses);
- behaviour influencing measures;

Government policy concerning environmental traffic mapping studies has proven to be successful. However, there is scope for improvement, for the following reasons:

- Most municipalities evaluate only the more traditional schemes (e.g., traffic circulation and road surface types). There is a lack of knowledge of the (quantitative) impact of more uncommon schemes.

- Software often poses difficulties for users.

- Many municipal officers have insufficient time allocated to follow up activities after completion of the initial study.

Solving local problems by changing traffic circula-
tion can be disadvantageous on a national level, because it may result in longer routes. This turned out to be a general problem for most municipalities that have finished the initial studies.

Nevertheless, one of the most important results of these studies is that local officials are now far more conscious of the relationship between traffic, physical planning and the environment.

9. CONCLUSION

In the period until 2010 a strong increase in car mobility can be expected, largely caused by socio-economic factors. Although there is scope for government policy to limit this growth, one can characterise such an effort as "swimming against the tide".

In the Dutch TSP-2D targets are quantified for accessibility, environment, and safety for the years 1995 and 2010. To meet these targets the growth of car mobility compared to 1986 must be restricted to 35%. The base package of policy measures will not be enough to accomplish this. Drastic additional measures will be necessary, particularly pricing.

With respect to road infrastructure a particular priority is chosen: maintenance of the existing road capacity comes first; next come the measures aimed at upgrading and better exploitation of the capacity available; then increase of capacity by widening of existing links; and finally, construction of missing road links.

To reduce the growth of car traffic, new public transport infrastructure is definitely necessary. These "pull" measures, however, are not enough. Supplementary "push" (especially pricing) measures to discourage car use are absolutely mandatory.

In the Fourth Report policy is defined with respect to new housing and location of businesses. New dwellings should be located near existing urban areas. Business locations are categorised as A (favourable for public transport), B, or C (principally accessible by car). Although these guidelines are valuable, in some instances there is a gap between theory and practice.

Environmental traffic maps are a useful tool for policy at the municipal level. Sometimes, however, there may be a conflict between local and national objectives with respect to the environment.

REFERENCES