

# World Transport Policy & Practice

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### **Mission Statement**

*World Transport Policy & Practice* is a quarterly journal which provides a high quality medium for original and creative work in world transport.

WTPP has a philosophy based on the equal importance of academic rigour and a strong commitment to ideas, policies and practical initiatives that will bring about a reduction in global dependency on cars, lorries and aircraft.

WTPP has a commitment to sustainable transport which embraces the urgent need to cut global emissions of carbon dioxide, to reduce the amount of new infrastructure of all kinds and to highlight the importance of future generations, the poor, those who live in degraded environments and those deprived of human rights by planning systems that put a higher importance on economic objectives than on the environment and social justice.

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## Abstracts & Keywords

### **Traffic reduction versus development pressures: Sustainable transport in Liverpool, United Kingdom**

*Paul Tranter & Peter Lonergan*

This paper examines sustainable transport in Liverpool, in the context of broader changes in societal awareness and in Government policy. After a brief discussion of the concept of sustainable transport and the role of traffic reduction within this concept, the paper briefly evaluates changes in national transport policy. It then focuses on Liverpool, examining policies directed at sustainable transport and the barriers to achieving this goal. The paper concludes with a discussion of the importance of Government support and leadership on sustainable transport.

**Keywords:** Liverpool, public policy, sustainable transport, traffic reduction

### **The Ten Myths of Automobile Dependence**

*Peter Newman & Jeff Kenworthy*

The myths about automobile dependence are analysed and dismissed as no longer having the inevitability they once had. The myths relate to wealth, climate, space, age, health and social problems, rural life styles, the road lobby, land developers, traffic engineering and town planning praxis. Only the tenth one seems to continue to have an inevitability due to entrenched practices which should now be updated and replaced.

**Keywords:** Automobile dependence, cities, development, engineering, myths, new urbanism, planning, traffic.

### **'Moving together' – on shaping automobilisation**

*Jörg Beckmann*

This article draws attention to how automobilisation as a mobility paradigm is shaped by social agencies such as national automobile owners associations. The author argues that by means of their reflexivity and their distinct responses to the risks of automobilisation, these clubs contribute to the reproduction of automobilisation. They do so, in that they mediate between the omnipresent expert systems that are embedded in the car and the individual lay user. Hence, these 'car custodians' enable what can be seen as the 'auto-man' – a hybrid consisting of the car and its user.

**Keywords:** Automobilisation, breakdown & recovery services, cars, car clubs, members' magazines

### **Sustainable Development & Transportation: Past Experiences and Future Challenges**

*Edward Akinyemi & Mark Zuidgeest*

The term 'sustainable transportation development' is a combination of sustainable development and transportation. As a concept, it involves the application of the sustainable development idea to transportation systems. This paper deals with how the concept of sustainability is currently used and how it should be used in the future engineering of transportation systems. First, the current definitions of sustainable development are reviewed and it is shown that there is a need for definition and criteria that can be used by engineers for planning, design and operation of transportation systems. Second, the current approaches of sustainability in transportation planning are reviewed and discussed. Subsequently, it is proposed that the focus should be on a sustainably developed transportation system, i.e. a system that meets the people's needs, with the available or affordable environmental, financial and social resources. Finally, it is shown that a sustainably developed transportation problem is basically a mathematical problem.

**Keywords:** Sustainable development, transportation engineering, optimisation problem

### **Sustainable Transport – A Comparative Analysis of Israel, the Netherlands and the United Kingdom**

*Pnina O. Plaut & Deborah F. Shmueli*

In recent years 'sustainability' has become an important issue in policy discussion and decision making, especially with regard to transportation. Here the role of 'sustainability' and the forms of its incorporation into transportation policy is surveyed and compared for Israel, the Netherlands and the U.K. In particular, comparisons are made and discussed across these countries based on several factors, including existence of plans (strategic and integrative), specific objectives and targets, institutional arrangements, environmental impact assessment processes, implementation tools, and political and public commitment and involvement. The comparisons highlight two major tenets of the Israeli system that present obstacles to the establishment of transportation and environmental linkages. The first involves the lack of transparency in the planning process and the corresponding dearth of political and public participation, consensus and commitment to plans. The second is the existing institutional structure.

**Keywords:** consensus building, integrated transport-environment-land use policy, Israel, Netherlands, sustainable transport, United Kingdom.

## Editorial

This is the first issue of this journal to be produced in electronic format only. It is not available in print and it is free of charge. The first five years of this journal's life have made us aware of the importance of access to high quality information. For all the hype and pseudo-sophistication of the so-called information age we begin the 21<sup>st</sup> century with serious information deficits and serious flaws in the channels of communication that are available to deliver this information to places where it is needed and at times when it is needed. Making this journal available free of charge is a contribution to putting right one of these major flaws. We have been impressed (and occasionally depressed) by the many and sometimes urgent requests for copies of the journal from contacts in Eastern Europe, India or Africa who have no resources for purchasing information or journals and yet are at the sharp end of detecting and resolving the most intransigent of global transport problems. They also need high quality information that has been through a selection and editing process against a known set of criteria. We are now delighted that we can support our colleagues in Calcutta, Delhi, Harare, Bucharest and Bratislava without the imposition of a financial barrier to communication.

In recent weeks one of our editorial board (Eric Britton in Paris) has demonstrated very eloquently indeed the value of quality information. This value lies in the capacity to identify what is important and discard what is not, to make that information available speedily and to facilitate a process of development where the information itself becomes an agent of social change. Eric has performed all of these overlapping roles in the case of Bogota's car free day in February 2000. This one event will very soon be seen as a spark that ignited a movement. The information flows galvanised Bogota's leading thinkers on this subject by giving them confidence that success was certain for their endeavour. The social support networks that came with the information provided reassurance when it was needed and the success will now be self-propagating.

A car free day requires everyone to rethink basic assumptions and basic assumptions cannot be challenged or re-cast in an information vacuum. Eric's web site has information on car free issues (including Bogota) and also hosts this journal <http://www.ecoplan.org>

In the late 1960s and early 1970s the Swedish geographer, Torsten Hägerstrand, (based at a delightful car free university campus in Lund) wrote about the way that the world was polarised into the mobility rich and mobility poor groups. This most basic of insights which still fails to inform the policies of social democratic governments everywhere has now reappeared in the world of information. Many of us have far too much information and cannot even come anywhere near to coping with it whilst others have very little and are locked into unequal struggles with those who are building flyovers in Calcutta or getting rid of non-motorised vehicles in Indonesia. Information makes a powerful contribution to redressing a democratic deficit. We can learn from Hägerstrand's work and avoid information deficits in those parts of the world that need the information content and the social support networks that go with quality information.

Information also requires feedback. Is it the right kind, expressed in the right way for the right target audience? We need to know. Please let us know by contacting the editor directly on [ecologic@gn.apc.org](mailto:ecologic@gn.apc.org)

We have produced a large number of specific papers in the past. We have also produced thematic issues on sustainable freight, telematics and teleworking, and car share. Geographical themes are also possible and we have special issues on Calcutta and Israel. We will add to this list and we need to identify the researchers and practitioners out there who also have high standards, a vision of what is possible and a strong commitment to work with citizens to make it happen. Feedback helps us to do this. Please help us to get the information content right.

*John Whitelegg*  
*Editor*

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# Traffic reduction versus development pressures: Sustainable transport in Liverpool.

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## Abstract

This paper examines sustainable transport in Liverpool, in the context of broader changes in societal awareness and in Government policy. After a brief discussion of the concept of sustainable transport and the role of traffic reduction within this concept, the paper briefly evaluates changes in national transport policy. It then focuses on Liverpool, examining policies directed at sustainable transport and the barriers to achieving this goal. The paper concludes with a discussion of the importance of Government support and leadership on sustainable transport.

## Keywords

Liverpool, public policy, sustainable transport, traffic reduction

## Introduction

Over the last ten years there has been a growing awareness of the negative impacts of road traffic – social, economic and environmental – in the United Kingdom. However, despite this changing awareness, and despite changes in UK transport policy, car ownership and use continue to rise.

This paper examines sustainable transport in Liverpool, in the context of broader changes in societal awareness and in Government policy. After a brief discussion of the concept of sustainable transport and the role of traffic reduction within this concept, the paper briefly evaluates changes in national transport policy. It then focuses on Liverpool, examining policies directed at sustainable transport and the barriers to achieving this goal. The paper concludes with a discussion of the importance of Government support and leadership on sustainable transport.

## Sustainable Transport

This paper takes a broad view of the meaning of

sustainable transport. In environmental terms, a sustainable transport system is one in which:

- the rates of use of renewable resources do not exceed their generation,
- the rates of use of non-renewable resources do not exceed the rate at which sustainable renewable resources are developed, and
- the rates of pollution do not exceed the assimilative capacity of the environment (Green & Wegener, 1997).

But as well as the physical environment, the economic and social environment is an important component of sustainable transport. A transport system cannot be seen as sustainable if it has high levels of injury-producing accidents, or if its continued use generates greater demand for ever more infrastructure and space. Nor is a sustainable transport one in which there are gross inequities in the access to transport and in the sharing of the burdens of transport. Equity among generations, nations and individuals is also generally regarded as integral to the definition of sustainability (Green & Wegener, 1997, 178).

By any definition, transport systems in the United Kingdom are manifestly unsustainable. The U.K. transport system fails the basic test of being able to meet the transport needs of the current generation without compromising the ability of future generations to meet their transport needs. Excessive car use has been identified by the Royal Commission on Environmental Protection as a major cause of the unsustainability (RCEP, 1994).

Bringing about a reduction in motor vehicle traffic will not only reduce energy use and pollution (particularly carbon dioxide levels), but it will also effectively address the range of other issues related to sustainability. It will help bring economic gains to city centre retailing as well as national economic

benefits. It will promote healthy neighbourhoods, reduce the cost of new infrastructure, and will spread the benefits of transport more equitably toward children, the elderly, the poor and those with disabilities.

### **National transport policy in the U.K.: Revolution or Rhetoric?**

In the 1980s transport policy in the U.K. was based on a 'predict and provide' approach which assumed that increases in road traffic reflected a growing and vibrant economy. Such a belief was evident in the 1989 Conservative Government White Paper *Roads for Prosperity* (DoT, 1989), which stressed the importance of continued road building for economic development.

The 1990s saw an apparent reversal in Government transport policy. A number of documents illustrate a growing awareness of the importance of sustainability and environmental protection. The Royal Commission on Environmental Pollution (1994) provided an influential indictment of the impact of transport. It highlighted many of the environmental problems caused by road-based traffic, including climate change, local air pollution, noise, community severance and resource use. The Commission advocated strong policies to restrict road traffic growth, recognising that new technology alone could not lead to a sustainable transport system.

Another important turning point in Government transport policy was a report from the Standing Advisory Committee on Trunk Road Assessment (SACTRA, 1995), which recognised that new road construction simply generated more traffic. Awareness of the need to reduce traffic growth was also reflected in *Planning Policy Guidance Note 13: Transport* (Department of the Environment & DoT, 1994), which clearly recognised the need to promote acceptable alternatives to the private car. It provided a clear attempt to guide local authorities to locate new developments in areas more easily served by public transport, or more accessible by walking and cycling. Also, and significantly, it highlighted the importance of limiting the amount of car parking in new developments.

In 1996, the Conservative Government Green Paper on Transport acknowledged that continued road building was not a viable option, either environmentally or financially (Chadwick & Ampt, 1998). Yet the Government would still not fully commit to policies for restraint. In 1998, the Labour Government published its policies in a Transport White Paper *A New Deal for Transport: Better for Everyone* (DETR, 1998). This document provided

encouraging rhetoric about sustainable transport. It recognised the problems created by cars and by privatisation and deregulation. It stated clearly that more roads would not solve the problems of the car: the policy of 'predict and provide' didn't work. The importance of local as well as national action was addressed, and it promised new planning tools for local councils, including levies on workplace parking.

Despite these positive policy statements, *A New Deal for Transport: Better for Everyone* presents a very weak approach to solving the problems created by the car. Indeed, it does not even aim to reduce traffic. Instead, it suggests: 'We need to reduce the rate of traffic growth' (Paragraph 1.35, p.16). This statement can also be interpreted as 'We shall allow road traffic growth to keep on increasing!' Other aspects of the document indicate a lack of commitment to real change. It suggests that more people will be able to afford a car and that we must have a better deal for motorists. Such statements are not compatible with a realistic view of sustainable transport. Also, while a change in Government policy on transport was becoming evident, other Government policies encouraged more, not less, traffic. One of the most significant of these relates to education policy, where the notion of school catchment areas has been considerably eroded, leading to longer journeys to school and increasing reliance on cars.

A strategic initiative in sustainable transport policy was provided by the Road Traffic Reduction Bill, launched in July 1995 by the Friends of the Earth, the Green Party and Plaid Cymru. The Bill required local authorities to set targets for reducing levels of local traffic. Since 1997 two Acts of Parliament have been passed for road traffic reduction. Both cases involved intense lobbying for the inclusion of specific national targets for reductions, but in order to gain approval these clauses were deleted. At present the campaigning groups are pressing for the introduction of a third bill, the Road Traffic Reduction (Further Provisions) Bill which, if enacted, would require the Government to cut traffic by 10% by the year 2010.

### **Liverpool: The current transport context**

Motorists visiting Liverpool would be impressed by the easy access from the motorway network, the generally high quality roads including expensive tunnels under the River Mersey, flyover access to the city centre which has abundant car parking. If such visitors believed that road building led to economic success, they may assume that Liverpool is a thriving

economic centre. In fact, Liverpool is one of the most economically deprived areas in Britain, with high unemployment and poverty levels, and a shrinking population, falling from 516,700 in 1981 to 468,000 in 1998. In 1993, Merseyside was awarded Objective One status by the European Union, in recognition of Merseyside's economically disadvantaged position, well below the European average. Objective One status makes it eligible for special funding from the EU to improve its economy.

Liverpool City Council (LCC) is now one of five councils in Merseyside (including the unitary authorities of Wirral, St Helens, Sefton and Knowsley). The former Metropolitan County of Merseyside (comprising these five councils) was abolished in 1986 by a previous Conservative Government in a move that did little to assist the provision of integrated transport in Merseyside. In order to counteract this missing Government level, the five councils work together on transport issues in an attempt to produce a co-ordinated plan, even though this cannot ensure that policies will be uniformly implemented in all council areas. One outcome of this co-ordination is a joint submission for the Merseyside Package Bid (a submission for Government funding for transport projects). LCC also develops its own Transport Policies and Programme submission (TPP).

Compared with cities such as Leeds, Sheffield or Birmingham, Liverpool has little traffic congestion. That is largely due to the very low car ownership levels (0.224 cars per head). Car ownership levels have increased by about 10% in Liverpool from 1991 to 1996. Across all of Merseyside, car driver trip mileage increased by over 20% from 1988 to 1996, from 6.1 to 7.6 km per day, mainly due to more trips per person. This indicates that though car usage levels are still low by national standards, traffic is still increasing.

Traffic growth forecasts suggest that between 1996 and 2031, traffic growth levels for Merseyside at 43% will be lower than the national average, predicted to be about 52%. However, all councils within Merseyside recognise that even this lower figure 'is unsustainable in economic and environmental

**Table 1: Liverpool & National car ownership & use**

|  | Liverpool | National |
|--|-----------|----------|
| Car ownership (%)                              | 22.4      | 69       |
| Average daily use (km)                         | 7.1       | 13       |
| DETR (1998) Transport Statistics Great Britain |           |          |
| Merseyside Countywide Travel Survey, 1996      |           |          |

terms, and therefore unacceptable' (Merseyside 1999/2000 Package Bid, 1998, p.9).

The current low level of car ownership in Liverpool means that a greater percentage of the population is dependent on public transport. The majority of public transport provision is by buses, all of which are operated by private companies. Approximately 38% of all trips into the city centre are made by bus, compared to 10% by rail (LCC, 1998b, p.7). The Mersey electric rail system is extensive, offering frequent and reliable services and includes a loop serving five stations in the city centre. It is, however, considerably under-utilised, and is subsequently heavily subsidised. It has the potential to reduce car trips if other measures, such as parking reduction, were implemented.

Since the deregulation of bus services, LCC has little direct input into the provision of buses. However, an organisation called Merseytravel is responsible for ensuring the effective provision of public transport in Merseyside. Merseytravel has been proactive in producing environmental and public transport strategies, but its funding and powers are inadequate. It has little control over the private bus operators, and has to negotiate with them even to get them to use new bus facilities (see below). It also provides financial support for non-commercial bus services as well as to the local rail network. It operates both the Mersey Ferries and the Mersey tunnels, and finances the most comprehensive concession travel scheme outside London.

While congestion is not a pressing problem in Liverpool, air pollution is. The city has been shown to exceed the maximum recommended levels of air pollutants in the form of PM<sub>10</sub>s for over 50 days in one year. Merseytravel's own Environmental Strategy has

**Table 2: Main Mode of transport to work by region of workplace, Autumn 1997**

| Workplace                                      | car/van/<br>minibus | 2wmv | bicycle | bus | rail | walk |
|--|---------------------|------|---------|-----|------|------|
| West Yorkshire                                 | 70                  | -    | 2       | 13  | -    | 12   |
| South Yorkshire                                | 71                  | -    | 2       | 13  | -    | 12   |
| Metropolitan West Midlands                     | 73                  | -    | 2       | 12  | 2    | 9    |
| Merseyside                                     | 67                  | -    | 3       | 13  | 4    | 11   |
| Great Britain                                  | 71                  | 1    | 4       | 8   | 5    | 11   |
| DETR (1998) Transport Statistics Great Britain |                     |      |         |     |      |      |

acknowledged that buses are a contributory factor to localised air pollution, particularly in relation to particulate pollution. As in many other provincial cities, competition on bus routes is unhelpful in environmental terms. Many operators over-supply the market, and the city centre often has line-ups of buses holding each other up, each with small passenger numbers.

### **Policies directed at sustainable transport in Liverpool**

Liverpool, like many other local authorities throughout the U.K., has made some useful progress towards more sustainable transport. A significant part of its approach is to develop a balanced transport system, based on a multifaceted approach to sustainable transport. It aims to achieve this through co-operation with Merseytravel and public transport operators to produce a good quality public transport service, by promoting and supporting initiatives for walking and cycling, as well as targeting roads with high traffic volumes for traffic management (LCC, 1998a). The discussion about Liverpool in this paper focuses mainly on Liverpool City Council, with some reference to other organisations and other councils. The information for this section is based on published documents from LCC and Merseytravel, as well as semi-structured interviews with transport planners, transport researchers, members of the public and representatives of transport lobby groups. Initiatives in the following areas are discussed: parking, walking and cycling, public transport, inner city revitalisation, leading by example, working with other councils, road construction, and marketing.

#### *Parking*

Control over parking availability and cost is one of the most effective strategies for reducing car use in cities, even more so than levels of public transport provision in areas well served by public transport (Dasgupta, 1994; DoE & DoT, 1994; Hine, 1998).

LCC, along with other authorities in Merseyside, has accepted as a broad policy principle that there should be no overall increase in the supply of car parking beyond current levels in the main centres, except to meet the minimum operational needs of major town centre developments (Merseyside 1999/2000 Package Bid, 1998, p.25). While this falls short of a more radical move to actually significantly reduce car parking availability, the City Centre car parking strategy is primarily aimed at reducing commuter travel and thus encouraging a modal shift to public transport. The council is reducing its provision of long stay car parks, while still providing for short term parking to meet the needs of shoppers. Also, the

controlled parking zone (maximum of two hour parking) around the city centre has been extended, thus further limiting commuter parking.

Local authority control over parking is limited by the large number of privately operated off-street parking spaces in Liverpool. More than 70% of the 15,000 available spaces are privately controlled. The council does have control over the construction of additional car parking in new developments. Indeed, PPG 13 has encouraged the use of parking restrictions on new developments. However, recent evidence suggests that developers are able to evade any limitations on maximum car parking spaces. Indeed, even published planning documents suggest that planners are very sympathetic to the demands of developers for more parking space: the key issue of parking will continue to be reviewed in light of the numerous redevelopment proposals now being considered in the City Centre, many of which are requiring a level of car parking seen as essential to the developers to sustain their developments (LCC, 1998b, 15).

Some recent developments in Liverpool city centre (e.g. Queen Square) have been accompanied by large car parking structures. Approximately 65% of the 650-space car park for Queen Square development is for public use. A large number of cleared/vacant sites are used for parking (both long and short stay).

It is unlikely that council policies will have any impact, especially in the short term, on the availability of car parking in central Liverpool. What is desperately needed is the development of strong disincentives for workplaces (including universities and hospitals) to add to their own supply of private long term non-residential parking, as well as incentives for these workplaces to encourage non-car modes for the journey to work.

#### *Walking and Cycling*

Walking and cycling are arguably the only truly sustainable modes of transport. Not only do they have widely recognised health benefits, but also they are crucial to any urban transport policy. Despite low car ownership levels, walking and cycling levels in Liverpool fall well below the national average for person trips by these modes. This is largely due to the danger and unpleasantness associated with walking and cycling in Liverpool. Thus there is considerable potential for enhancing these modes.

Liverpool has two strong cycling lobby groups, one of which (the Merseyside Cycling Campaign) has



been particularly effective in ensuring that cycle facilities are included in all significant development applications. Liverpool also has a privately run cycle centre in the city, the 'Liverpool Cycle Centre and Hub Café'. Aimed at encouraging cycle commuting, it includes a cycle shop, café, showers and changing facilities, and cycle storage. However, because this is a commercial venture, it has had to cut back on some of its most innovative areas. For example, its opening time was put back to 10 a.m. Local authority funding for such a venture could greatly assist the development of cycling.

LCC has developed a comprehensive cycling strategy, which acknowledges the current poor level of provision for cyclists. A network of cycle routes is planned for development over the next few years, including 130 km of strategic cycle network and 124 km of secondary connecting network. The measures to be introduced include: dedicated cycle lanes, advisory routes and traffic calming measures to promote safety for cyclists, and cycle parking facilities. In addition, cyclists are permitted to use newly created bus lanes throughout Merseyside.

A number of targets were set for Liverpool in relation to cycling, including specific targets for overall modal share for cyclists (from 1.5% in 1998, to 4% in 2001, 8% by 2007 and 12% by 2012). Recently,

these targets were lowered (e.g. to 8% by 2012). If the original targets could be achieved, Liverpool would change from one of the lowest levels of cycle usage in the U.K., to levels that approximate cycling rates in Germany (see Table 3). Although the council believes that it has set itself ambitious targets for increasing cycling, other urban areas in UK already have much higher levels of cycling. In York, Oxford and Cambridge 20-25% of all journeys are made by bicycle. In Groningen in the Netherlands, the current figure is about 50%! A continued commitment to the bicycle strategy should allow Liverpool's targets to be achieved.

The pedestrian environment in Liverpool is currently inferior, even compared with many other areas in the U.K.. Although there is a significant and well designed pedestrianised area within the city centre, outside this area pedestrians are poorly served. Pavements are often poorly maintained, street lighting is poor, and crossing busy roads is often difficult, even for able-bodied adults. The council has expressed a commitment to promote walking, through the provision of facilities for pedestrians, making key pedestrian routes as direct as possible, removing conflict with vehicular traffic (LCC, 1998b, p.19). Traffic calming is also seen as a way of improving the environment for pedestrians. However, though the council does recognise the importance of walking as a mode of transport, it has not set any specific targets to improve the modal share, as it has for cycling. Instead it seems content to continue with its program of general maintenance repairs to footways and upgrading of pedestrian crossings (including new dropped crossings). Given the current standard of footways and crossings, it appears that the budget for such maintenance has been inadequate for many years, indicating that until now, pedestrian movement has

**Table 3: Percentage of all trips made by bicycle**

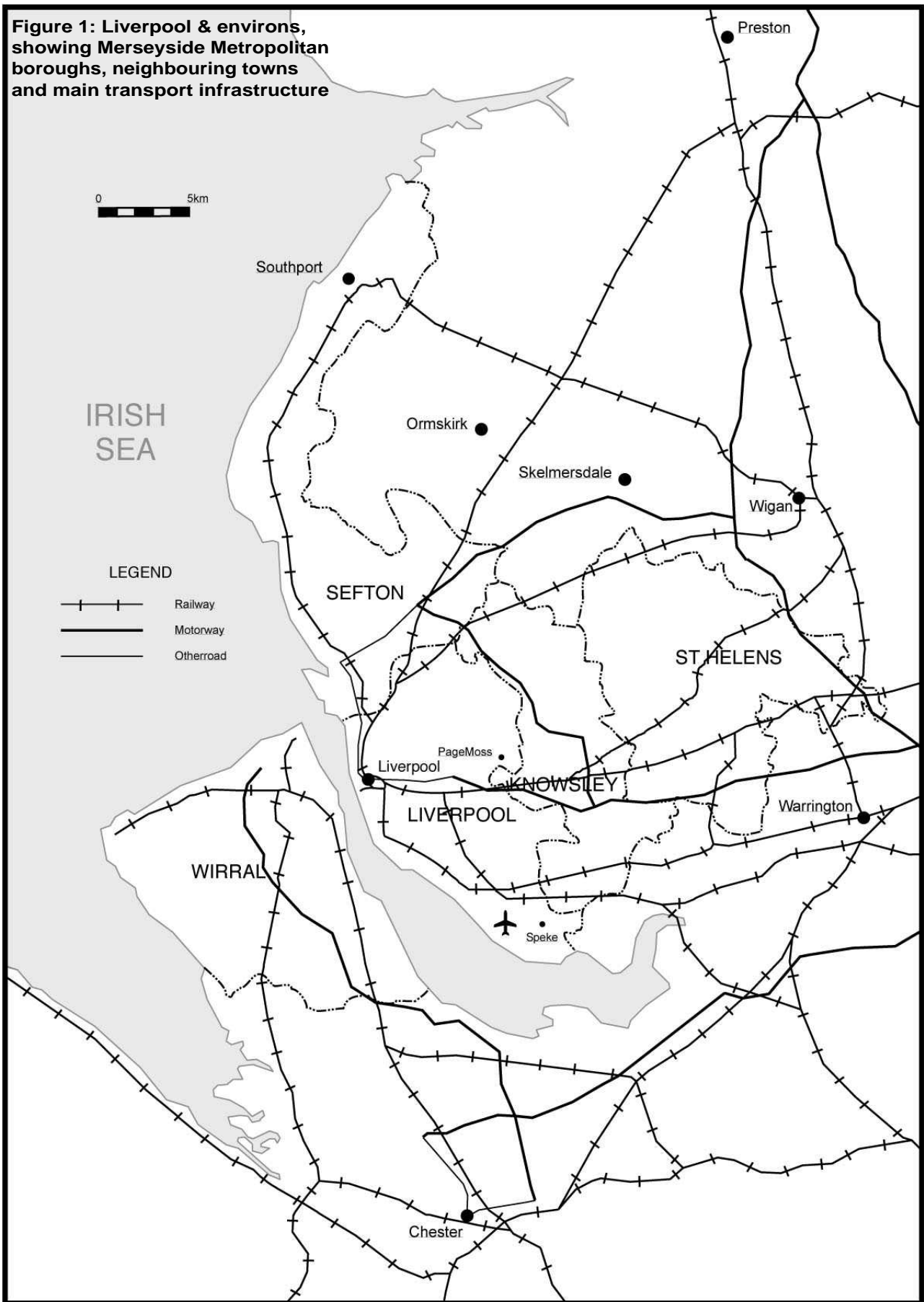
|                         |    |
|-------------------------|----|
| Netherlands             | 30 |
| Denmark                 | 20 |
| Germany                 | 12 |
| York (England)          | 20 |
| Erlangen (Germany)      | 26 |
| Groningen (Netherlands) | 50 |

Sources: International Bicycle Fund, DETR, 1998, p.36  
<http://www.ibike.org/statistics> <http://www.detr.gov.uk/>

**Table 4: Transport Priorities – York & Liverpool**

| York  | Liverpool  |
|---|--|
| 1 Pedestrians                                     | To encourage modes other than the private car                  |
| 2 Disabled People                                 | To implement measures to reduce private car use                |
| 3 Cyclists  | To improve conditions for walking and cycling                  |
| 4 Public Transport Passengers                     | To reduce dangers to road users                                |
| 5 Commercial / business vehicles requiring access | To create a safer environment to increase independent mobility |
| 6 Car-borne shoppers                              |  |
| 7 Coach-borne visitors                            |  |
| 8 Car-borne long stay commuters and visitors      |  |

Sources: Liverpool City Health Plan, 1996, L.C.C. York City Council Traffic & Transportation Committee, 1990



not been a transport priority.

Unlike the cycling strategy LCC has no inspiring policy on walking. It could follow the example of York, which places pedestrians clearly at the top of its hierarchy of users, which already has pedestrianised a significant proportion of its central area, and which is also implementing a pedestrian route network throughout the city, linking the city centre to residential areas, shops and schools.

Another element within the area of walking and cycling is the concept of Safe Routes to School, which is a key element within the Schools Transport Policy identified within the Liverpool Cycling strategy. The Government has highlighted children's travel to school as a key example of where changes in travel behaviour can make a real difference. Safe Routes to School have already been implemented by a number of local authorities throughout the U.K. However, Liverpool has been slow to develop any initiatives in this area.

Another problem with the journey to school in Liverpool may be an attitudinal one. Both children and staff in Liverpool schools are not supportive of cycling to school. For many children, cycling is seen as not cool and some school principals do not seem to want the responsibility of encouraging children to cycle to school, partly because of problems with bicycle theft and partly due to traffic dangers. Consequently, some schools actively discourage cycling by their students. To break this vicious circle, the local authority needs to be proactive: facilitating cycling generally and safe routes to school, but also giving more publicity to cycling as a realistic alternative to other transport modes.

### *Public transport*

Before World War 2, Liverpool had one of the most extensive tramway systems outside London. This included lengths of segregated rights of way. However, there was a lack of investment in the system, and a decision was made in 1945 to replace it with a bus network. Deterioration set in, and the tramway system was closed down in 1957. Liverpool now has no trams or light rail, though these are showing a resurgence in other UK cities (e.g. Manchester, Sheffield). By contrast, public transport in Liverpool now consists of a train network and private bus operators.

LCC now has little control over public transport. Even Merseytravel has limited power to improve the system. Many of the improvements Merseytravel and the council are making involve tinkering with a

fundamentally flawed model of deregulated, privately-operated public transport. Even the Government's Transport White Paper explains: 'Privatisation and deregulation of public transport failed the passenger because they fragmented networks and ignored the public interest' (Paragraph 1.4, p.10).

Instead of being able to develop a fully co-ordinated and well-planned system of public transport, improvements are limited to such actions as: quality partnerships (in which, for example, changes are made to bus lanes, and bus shelters and facilities are improved); publicity campaigns; and educational campaigns for school children.

Co-ordination of bus services in Merseyside is extraordinarily difficult. This is even more of a concern, considering that 85% of all public transport trips in Merseyside are made by bus. One of the most important strategies for improving bus services is the development of Quality Bus Corridors based on the innovative SMART services. SMART bus services include such features as: low flat-floor buses to assist wheelchair users and adults with young children; bus priority measures offering slightly reduced and more reliable travel times; high quality bus shelters, some of which provide real-time information; and special driver training. A demonstration experiment with SMART buses, funded with EU support, was implemented along a route considered commercially non-viable. The success of this scheme has stimulated further development of the Quality Bus corridors.

Merseytravel has reported difficulties convincing some operators to use new bus stations and facilities. For example, it took up to three years to get some operators to use new bus facilities in Queen Square, where exceptionally well designed bus shelters, with glazing from floor to roofline, increase the sense of personal security by allowing for passive surveillance by other citizens.

Given the difficulties facing Merseytravel and LCC in their attempts to increase the efficiency of bus services, it is hardly surprising that the targets in the Package Bid for transport funding are not inspiring for buses. The specific target was simply to maintain bus patronage at the 1994/1995 level while increasing rail by 10% (Merseyside 1999/2000 Package Bid, 1998, p.101).

As well as improvements to existing bus services, there are plans to develop new public transport systems based on different technology. For example, Merseytravel, in co-operation with LCC and Knowsley MBC, has developed a proposal for a Rapid

Transit guided trolley bus system, to run from Page Moss to the city centre as the first stage in a three-line system. Another proposal, by the Liverpool Light Rail Group, is to run from Speke via the airport to the city centre. While LCC supports this scheme as well, it would be funded from private finances. Unfortunately these have been rejected for Government funding, suggesting a lack of real commitment to improving public transport.

### *Inner City Revitalisation*

LCC is aiming to re-establish a residential population in the city centre, as well as to encourage the managed development of on-street activities such as pavement cafés, which add to the life and vitality of the city centre (LCC, 1998a, p.52). Recent examples of this include residential redevelopment of docks, and redevelopment of Concert Square with residential apartments, offices, bars and cafés, set around a public space. Such actions show an awareness of the importance of facilitating exchange between people (Engwicht, 1992) in order to create the social conditions for a truly sustainable city. This type of inner city revitalisation (with both housing and social activity) will help achieve a sustainable transport system by reducing the need for travel, as well as making the city a more attractive place for people and for investment.

### *Leading by example*

One of the most important ways to encourage people to leave their cars at home, or to avoid buying one in the first place, is to provide examples of how leaders of society can reduce their own car travel. Local authorities can provide such examples, setting the highest standards of non-use of the car, eliminating on-site car parking, and encouraging alternative forms of transport (especially walking and cycling). Given that local authorities are often among the top generators of traffic themselves, this is particularly important.

Local authorities in Merseyside, including LCC, are aware of the importance of leading by example. However, LCC has been tardy in setting standards for sustainable transport. Although there has been an attempt to raise awareness about transport issues, and to secure TravelWise pledges from staff, little has been done to reduce car use or encourage other modes in the operation of the council itself. For example, councillors are not encouraged to leave their cars at home. Planners had to lobby strongly even to get a bicycle cage in the basement of the new council offices. LCC has car parking for senior executives, and a car users allowance.

This situation contrasts strongly with the situation in the City of Edinburgh Council, where senior executives make a point of coming to work by means other than a car. Two individuals in particular, Councillor David Begg and the Director of City Development, George Hazel, have been instrumental in effecting this policy of leading by example. There is no parking provision for private cars, only a car park for operational needs. There are bicycle parking facilities and showers. There is a mileage allowance for people who use a bicycle for work purposes. There is also a Staff Travel Information Pack that encourages council employees to walk or use a bus token rather than using a car on council business. Edinburgh thus provides an excellent example to other local authorities.

### *Road Building*

Although, road building in Liverpool has been substantially curtailed, there is still a belief that some circumstances may justify capacity improvements on some roads or additions to the highway network, but only where they are considered essential to improve access (LCC, 1998b, pp.15, 32). Such a view is partly understandable, given that it may be impossible, under the current deregulated public transport system, to develop public transport solutions to improved access. However, in principle, if a sustainable transport system is to be developed, building more road capacity can only encourage more car use, and hence create a less sustainable system.

### *Marketing*

One of the biggest obstacles to people changing their travel habits is a lack of awareness of alternative modes of transport. In 1997, the five local authorities in Merseyside joined with Merseytravel to launch the TravelWise campaign. This encourages people to change their travel behaviours, limiting car use to essential journeys and using public transport, walking and cycling wherever possible. The SMART bus initiatives have also helped with the marketing of public transport. However, much more can be done, for example, with strategies to make public transport more attractive through travel card schemes with transfer ticketing.

### **Limitations on achieving more sustainable transport**

A particular problem for sustainable transport in Liverpool seems to be the emphasis placed on the economic development of the area. This is partly understandable, given the dire economic circumstances of Merseyside, but it is by no means unique to this locality. Economic development motives, rather than

sustainability, seem to dominate decisions made by local authorities in many areas of Britain. A survey of Scottish local planning authorities showed that while traffic reduction was a consideration when assessing new developments, economic development was regarded as the most important factor (Hine, 1998). In the Merseyside Transport Strategy, Core Policy One reflects the importance which the Partners (local authorities and Merseytravel) place on economic regeneration (Merseyside 1999/2000 Package Bid, 1998, iv). This emphasis seems to be influencing the decision of LCC, for example to allow the construction of new car parks in the city centre.

A possible explanation for the lack of resistance to developers who require more car parking relates to the perceived competition for inward investment from other areas, including nearby cities such as Manchester. Indeed, there is a perception that any traffic reduction strategy may reduce the competitiveness of a city, and allow investment and retail activity to be attracted to other areas. However, such a perception may be unfounded. Research in England and Wales has indicated that there is no relationship between accessibility to the road system and economic prosperity (Whitelegg, 1997, p.15). This argument has been supported by the SACTRA (1999) Report, which questions whether road investment provides any economic gain at all (Chadwick and Ampt, 1998). Similarly, research in Germany shows that there is no link between the levels of car parking in the city centres and the amount of retail spending. Thus, city centre retailers may be better off without high levels of car parking, as long as access by other modes is encouraged. This would attract investment and retail activity through the creation of a more people-friendly environment.

Another problem in reducing car use relates to the phenomenon of unintended consequences. For example, restricting car parking in the city centre may not achieve overall reductions in car use over the metropolitan area. While it may reduce the number of trips to the central area, not all of these trips will be replaced by public transport. Some people may continue to use their cars, but use them to visit suburban or out-of-town centres instead. Thus restricting the availability of city centre car parking will reduce overall car use only if it is combined with wider policies of car restraint (possibly including increased car parking charges at suburban centres).

Liverpool has few really innovative or strong policies for a move toward sustainable transport. Instead, existing policies seem to be aimed only at moderating the upward trend in car use (LCC, 1998b,

19) rather than actually reducing traffic. The lack of local authority control and the restrictions on local authority interference in public transport means that innovation is very difficult in Britain. In contrast, many European countries are much more progressive concerning public transport. Public investment in new public transport systems (often rail based) is commonplace in France and Germany for example. In contrast, in Britain, the local authorities must involve the private sector, and rely on complicated arrangements with private companies whose interests are more concerned with profit making than with developing integrated transport systems.

Despite these limitations, Liverpool can look to other British cities for examples of stronger policies on sustainable transport. One of the best examples of innovative policy can be found in Edinburgh (Hazel, 1998), where a range of initiatives exist, based on the recognition that a first class economy and a first class environment must go hand in hand and that a holistic approach to transport is needed. The policy statements in transport documents are strong, mentioning radical measures and the need to reduce traffic levels. There is even the promotion of car free residential areas and city car clubs (based on car share schemes). The significance of such schemes is not in the immediate impact on overall car use in Edinburgh, but in the effect it has on the mind set of Edinburgh residents. They allow residents to see that there are alternatives to the way cars are usually used by people.

## Conclusion

The creation of more sustainable transport systems through significant reductions in traffic is an achievable goal. The formula for success is the combination of local initiatives with strong central Government support and intervention. Perhaps the most significant obstacle to the creation of sustainable transport in Liverpool is the absence of Government support. The White Paper promised this support (DETR, 1998). It proposed that local authorities should have powers to introduce road pricing and car parking taxation and keep the money to spend on improved public transport and improved conditions for cyclists and pedestrians.

However, such support depended on new legislation. In November 1999, the Government finally announced a legislative program which includes a Transport Bill. While this bill includes provisions for road pricing, workplace parking charges, etc., it also signalled a u-turn towards the

bad old days of road construction. More recently, the consultation draft to update *PPG 13* contains parking maxima which are more generous than, and thus undermine, those of many local authorities.

What this suggests is that the road lobby has again effectively stifled any national innovations in sustainable transport. In the short term, it is unlikely that support for local authorities will be improved. Consequently, there is even more pressure on local authorities to do everything they can to reduce car use on their own initiatives, working within the constraints of an appalling privatised public transport system and a market-oriented neo-liberal climate which promotes competition rather than co-operation. Local authorities need to develop their own regional partnerships, and come to agreements about regional norms on car parking provision to discourage a competitive bidding up process. They need to lead by example, to take radical steps, to model their changes on best practice models (from cities throughout the world) and concentrate on the creation of attractive and livable environments rather than on a narrow vision of car dependent economic development.

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# The Ten Myths of Automobile Dependence

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## Abstract

The myths about automobile dependence are analysed and dismissed as no longer having the inevitability they once had. The myths relate to wealth, climate, space, age, health and social problems, rural life styles, the road lobby, land developers, traffic engineering and town planning praxis. Only the tenth one seems to continue to have an inevitability due to entrenched practices which should now be updated and replaced.

## Keywords

Automobile dependence, cities, development, engineering, myths, new urbanism, planning, traffic.

## Introduction

Cities show varying degrees of automobile dependence (Newman & Kenworthy, 1989, 1999). The rationale for justifying the extent of car-based low density dispersal has many different forms which are encountered whenever discussions are held showing the variations in different city forms and transportation patterns.

In Table 1, we list 10 of the most common reasons which have been suggested to explain the phenomenon of automobile dependence. This paper will argue that none of them are sufficient in themselves. They are therefore called 'myths about automobile dependence'. They are the basis for addressing public policy and administration issues to do with cities and cars as they reach to the

**Table 1: 10 Myths about the Inevitability of Automobile Dependence**

|                                     |   |
|-------------------------------------|---|
| 1 <i>Wealth</i>                     | Automobile dependence is an inevitable consequence of wealth. People will always buy cars and larger amounts of private urban space, thus alternative urban forms, public transport and non-motorised modes will inevitably die out as people get richer. |
| 2 <i>Climate</i>                    | Automobile dependence is inevitably induced by warm climates where people can enjoy low density suburban lifestyles, whereas compact, transit-oriented cities are mostly in cold climates.  |
| 3 <i>Space</i>                      | Automobile dependence is inevitably part of countries that are very spacious, whilst those with little space have compact cities.   |
| 4 <i>Age</i>                        | Automobile dependence is an inevitable feature of modern life and thus new cities developed predominantly after 1945 show it more than old cities.  |
| 5 <i>Health and Social Problems</i> | Automobile dependence is inevitably created by the reaction to density and its health and social problems.  |
| 6 <i>Rural Lifestyles</i>           | Automobile dependence is inevitably created by the attraction of rural lifestyles in the suburbs with their associated promise of withdrawal from the evils of city lifestyles.   |
| 7 <i>Road Lobby</i>                 | Automobile dependence is inevitably created by the powerful combination of road interests.  |
| 8 <i>Land Developers</i>            | Automobile dependence is inevitably created by the powerful interests of land speculators and developers and there is little that planning can do to stop them.   |
| 9 <i>Traffic Engineering</i>        | Automobile dependence is an inevitable outcome of the standard processes of transportation planning.  |
| 10 <i>Town Planning</i>             | Automobile dependence is inevitably regulated into cities by local town planning.   |

assumptions that are causing so many policy makers, practitioners and activists to feel there is nothing they can do about automobile dependence.

**Dispelling the myths about automobile dependence**

**Wealth**

*Automobile dependence is an inevitable consequence of wealth. People will always buy cars and larger amounts of private urban space thus alternative urban forms of transportation will inevitably die out as people get richer.*

Many urban commentators suggest there is an inevitable link between rising living standards and rising demands for private space and car use (e.g. Gomez-Ibanez, 1991). ‘As soon as people get enough money they will buy a car and move to the suburbs’ is how the inevitability is generally expressed. Stopping these sprawling car-based cities is therefore like being the hapless King Canute.

Rising living standards obviously do impact on transportation and land use (Schafer & Victor, 1997). Historical analysis shows how cities have moved outwards following trams and trains, and then cars, as people developed the economic means to take advantage of these technologies. Also, increasing incomes meant that people could afford to buy bigger homes and more spacious surroundings which they appreciated for cultural reasons.

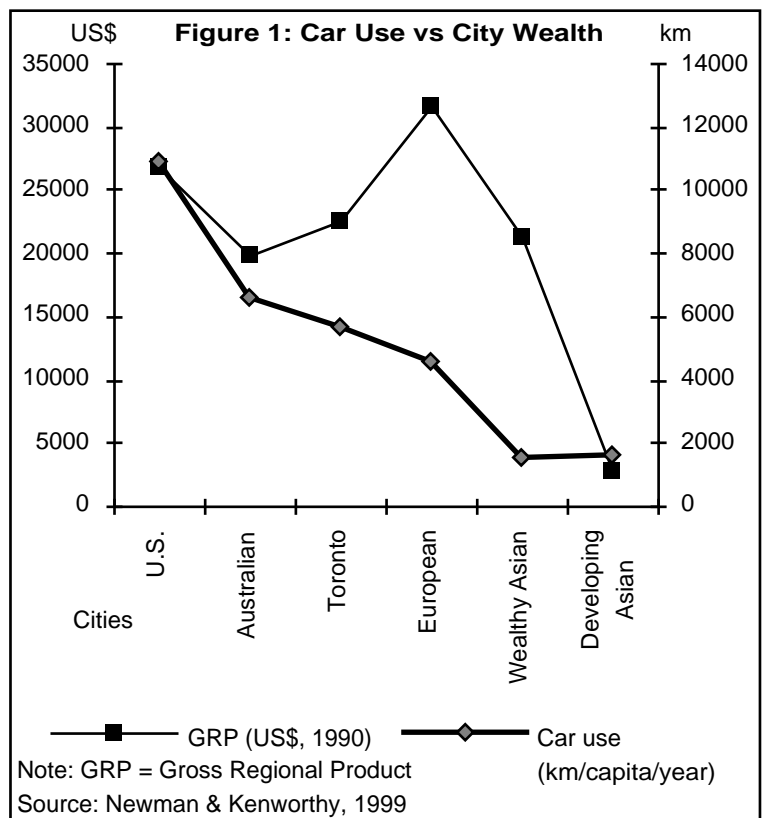
However, the link between living standards and a more car-based, low density city is not automatic. In fact, the correlations are very weak and in more recent times are going in the opposite direction (see Newman & Kenworthy, 1999, and Figure 1). Thus the future does not necessarily bring more automobile dependence. Technological determinism based on cars can be switched into transit if a quality service is available and the major road and freeway systems are operating close to capacity. Cultural choices vary and the dream of space in the suburbs can be replaced for some with a dream of urban living near to the full range of amenities and cultural attractions. In addition to this, the economic processes which link wealth and urban form, as suggested above, are much more complex than conventional argument has considered.

An analysis by Frost (1991) provides a detailed understanding of the link between wealth and urban form based on whether

wealth is mostly reinvested in new suburban infrastructure or into industrial development. North American and Australian cities have mainly done the former and hence have developed low density, car-based cities while others have become more compact as they reinvested more into industrial innovation. Frost seriously questions whether any cities can continue to move in the direction which assumes growing wealth from our rural hinterlands is the basis of urban growth patterns. The financial problems with urban sprawl have led the Bank of America to reject investment in dispersed suburbs in favour of more compact development (Bank of America, 1994)

Other urban researchers (reviewed in Newman & Kenworthy, 1989) have shown how levels of car ownership and use are significantly less in higher density areas of cities at all levels of wealth (why use a car if you can walk or take transit more quickly and conveniently?).

Our global cities data (Newman & Kenworthy 1989, 1999) reveal a significant difference between U.S./Australian and European/Asian cities in their density and in their car use patterns – and yet European city incomes are higher. Indeed many European cities have per capita incomes 20% to 50% higher than in Australian and U.S. cities, yet are four





times as dense and two to three times less intensive in their car use.

When we talk to European planners they are adamant that their urban policies are determined to minimise sprawl. Most European urban and transportation policy documents indicate a strong commitment to, and belief in, physical planning policies intended to contain sprawl and to provide effective alternatives to the car. These policies have taken a while to begin working, but results are becoming more evident in some cities.

Perhaps some of the last European cities to tackle automobile dependence are those in the U.K., but their Planning Policy Guidance Notes (PPG) 6 (1996) and 13 (1994) favour re-urbanisation and reducing the need to travel. The new policies suggest that there should be no more new 'out of town' shopping centres. This has come in response to the decay of their cities under Thatcherism, which was stopped equally by the 900 anti-motorway groups and the business owners in traditional centres whose trade was dying. As the Royal Commission on Environmental Pollution (1994) put it:

'There has been a significant shift in thinking away from what Lady Thatcher once called the 'great car economy'.

In the U.K. they seriously question the notion that greater wealth means greater use of cars and more sprawl. Examples of the old way of car-based thinking still emerge and some steps backward are taken, but the universal belief in the car as a source of wealth is no longer quite as dominant. Mobility and wealth have become decoupled as the quest for the sustainability agenda becomes more and more mainstream.

There are now many examples of wealthy cities in which densities have gone up and in which transit and walking/cycling have grown at the expense of car travel. The data trends show that European cities were in general reducing in density but at a slower rate than in U.S. cities. Now they are reversing like Stockholm which grew in density in each part of its city in the 1980s and also grew in wealth. The changes towards re-urbanisation that have occurred rather than being due to incomes reducing, have often occurred because of the attraction of market processes which appear to favour compact urban nodes. This appears to be because of the new information-based city which favours more intense multi-nodal urban environments, or simply because of different planning priorities, e.g. transit preferred to highways due to the politics of high capacity roads which are no

longer favoured by communities.

Finally, it is worth remembering that the most expensive places to live in all U.S. cities are in their high density downtowns such as in New York (Manhattan), Boston (Beacon Hill), Philadelphia (Society Hill), San Francisco (Knob Hill or Mission Bay) and so on. There appears to have been a long term market in the U.S. for these areas which favour dense, walking-based urbanity and increasingly there is a shift in the suburban market to nodes that are more city-like. See, for example, the publications from the Center for the Livable Communities which show this change in urban values very clearly (Center for the Livable Communities, various dates).

### Climate

*Automobile dependence is inevitably induced by warm climates where people can enjoy low density suburban lifestyles, whereas compact transit-oriented cities are mostly in cold climates.*

The argument generally goes like this: a warm, low rainfall climate means people spend time outdoors, they travel more and have large private blocks of land for their houses so they can enjoy gardening, barbecues, swimming in private pools and so they can give children the extra space for sports and games. In relation to Perth, one early 1980s transportation study proudly proclaimed:

'Our climate promotes the 'quarter-acre' and 'fifth acre' block: we seek space for garages and gardens, pools and patios, barbecues and boats' (Director General of Transport, 1982, p.65).

Conversely, the argument is that in cold climates, snow and ice motivate people to take transit rather than drive a car on dangerous roads and that people don't mind living in compact, apartment settings because outdoors is so unattractive. An interesting variation on this occurs in Calgary (renowned for its frigid winters). Here the planners say that the reason Calgarians so much like their low density, single family homes is because the climate is so cold! How so? 'Well if you live in such an awful climate you want to be able to rush outside as soon as the weather turns nice!' (Calgary City Planner personal communication).

Our global cities study of 32 cities found there was no correlation between gasoline consumption (a key indicator of automobile dependence) and average annual temperature, or between urban density and average annual temperature (Newman & Kenworthy, 1989).

This at least suggests there is nothing about hot

weather, as such, which induces travel or sprawling cities. Conversely, there appears to be nothing about cold climates which induces people to drive little and cram together in apartments. Certainly, indoor activities can be just as attractive in hot weather as in cold weather. The positive effect of climate on certain outdoor activities such as gardening and games is not limited to hotter climates, particularly considering the popularity of winter sports.

The use of transit seems also to be related to more than just climate. All our data show that it depends on how fast transit is relative to cars, how frequently it comes and how easy it is to get to.

If we go beyond the scope of the global cities study, it is easy to find cities that are not cold and yet have a high density urban form with good transit and much more use of non-motorised transportation. In Europe there are Athens, Barcelona, Madrid and Rome. In the Middle East there are, for example, Istanbul, Cairo, Jerusalem and Teheran, with many Middle Eastern cities continuing to build in a compact way to create micro climates with shade and orientation of buildings and public spaces to optimise cool breezes. In South and Central America almost every city has a hot climate – Mexico City, São Paulo, Rio de Janeiro, Lima, Buenos Aires – and all are compact and high density. In the U.S. there are Honolulu which features some very high density areas such as in Waikiki, and the dense, compact city centre of old San Francisco. In Asia, again all cities are densely populated regardless of the climatic conditions.

Alternatively, many cold northern cities are low density and car oriented. Detroit and Denver have few supposed car-enhancing climate features for much of the year, but are totally dominated by the automobile and extensive, low density suburban land use.

If low density planning and high car use are encouraged in a city, it is probably for deeper reasons than lifestyle induced by the climate.

### Space

*Automobile dependence is inevitably part of countries that are very spacious, whilst those with little space have compact cities.*

‘It might just be that here, in the biggest State in the sparsest continent, we love space... It may be a faintly amusing concept to many of us to imagine Perth people crammed together in a transportation efficient city on the edge of the wheatbelt and outback, and next to the void of the Indian Ocean’ (Western Australian Director General of Transport,

1982, p.65).

A number of points can be raised about such assertions. Other countries with ‘plenty of space’ have not developed sprawling cities along the lines of those in Australia and North America with densities of about 10 to 20 people per ha.

Central and South America have vast areas of rural land similar to the U.S. and Australia but their cities are all high density (Buenos Aires 80 per ha, Salvador 90 per ha, Santiago 144 per ha, Lima 171 per ha, Caracas 175 per ha and Mexico City 224 per ha). Russia has no shortage of land but its cities are very efficient users of space (Moscow 139 per ha and St Petersburg 85 per ha).

However, more compact cities in countries with lots of space are not limited to developing world situations. In fact Stockholm, historically one of the world’s most wealthy cities, has consciously sought to develop in a more compact way despite having an abundance of space (Cervero, 1995). Sweden has vast expanses of rural land, mostly forest, but the few cities are for the most part highly compact with little wasted space. Sweden has a long tradition of planning urban services in an equitable and efficient manner. Stockholm has no ‘need’ to concentrate its land use because of lack of space, but its planners believe that a good city has:

- a railway station within 500 to 900 meters (i.e. short walking or cycling distance) of most housing;
- a train service without a timetable, i.e. a frequency of 12 minutes or less; and
- people living not more than 30 minutes from the city centre.

These policies ensure a compact urban form based around a fast electric train with housing and other land uses concentrated around stations. Indeed, as is shown in our latest data, Stockholm is the only city which actually lowered its per capita use of cars a little between 1980 and 1990, it grew in transit use from 302 to 348 trips per capita and, at the same time, it grew in density in its central city, its inner city and its outer area.

If a nation has ‘plenty of space’ it does not automatically lead to a low density urban form where land use is highly inefficient, although this perception in the U.S. and Australia appears to play some role in facilitating or at least justifying the low density city. Frontier land views of space (cowboy cities) can be rationalised in a frontier economy. Now we are all global cities in a global economy and as our data suggest, those cities not addressing the global

agenda (including sustainability) may well go the way of the cowboy.

### Age

*Automobile dependence is an inevitable feature of modern life and thus new cities developed predominantly after 1945 show it more than old cities.*

The city's age does affect its spatial and transportation traditions. Cities founded before the middle of the 19<sup>th</sup> century were built around walking, then transit spread the city out, and finally the car allowed even lower densities. However, many modern cities have been built with a walking-based or transit-based urban form around which they continue to develop. Asian cities, including modern Tokyo, Seoul and Hong Kong are high density walking and transit cities with tiny levels of car use compared to U.S. and Australian cities. European cities mostly maintain their medium-density, transit-oriented land use in much of the new development which has been added to these cities in the age of the car's dominance.

The sprawling low-density city is essentially a U.S. and Australian phenomenon – one taken to the extreme in old railway-based cities such as Detroit and Los Angeles, which were rebuilt into totally car-based cities. It is now being recognised that such fully-motorised cities cannot function efficiently and hence rail systems are making a comeback in most Californian cities, along with a growing trend towards re-integrating development into high density, mixed use patterns around stations.

Canadians have perhaps gone furthest in beginning to change from car-based sprawl to more compact, modern rail-based cities, having adopted a deliberate policy on this in the early 1970s (see case study on Toronto and Vancouver).

Although a city's age is important in its spatial traditions, it is not an inflexible determinant.

### Health and Social Problems

*Automobile dependence is inevitably created by the reaction to density and its health and social problems.*

While recognising the economic and environmental problems of automobile dependence, some urban commentators suggest that the primary motivation behind low density cities is one of health and social amenity. They draw on a long tradition that 'density is bad for you'.

The spread of disease was always thought to be through the air (via 'miasma'), and lowering densities was seen as a way to improve health through a 'wholesome supply of good air'. This

justification for the garden suburb continued even after a century of medical evidence showed that sewerage and sanitary facilities were the key factors in the promotion of good health. Cities such as Hong Kong and Singapore have extremely high health rates, yet some planners and academics still talk about the need for plenty of space for your health.

Social 'ill health' (crime, delinquency, suicide, drug taking) has also been linked to higher density, yet there is no consistent evidence to support this. We analysed crime rates and density (Newman & Kenworthy, 1989) and found that the data showing how low density reduces crime (as is so often stated) are very difficult to find. Poverty is the biggest correlate with crime, especially if there are extremes of wealth nearby (Knox, 1982). But this occurs at all densities. Indeed crime seems to be higher in low density cities in the U.S. (Newman & Kenworthy, 1989). International data tend to suggest European crime rates are lower than in the U.S. and Australia, and Asian city crime rates are even lower than in Europe (Fischer, 1976).

Obviously socio-cultural factors dominate the causes behind these data – but the evidence goes against the belief that increased density leads inevitably to increased crime. There is also a larger body of literature which suggests that higher density that is designed to create 'defensible space' for neighbourhoods may keep down some forms of crime, probably because of the 'eyes on the street' phenomenon (Jacobs, 1961; Newman, 1972; Gehl, 1994; Sherlock, 1991; & the New Urbanist Writers). Other literature shows the importance of community empowerment in easing crime (Herbert, 1982; Rosenbaum, 1986) and this process requires sufficient density for neighbourhoods to become communities.

At the very least, the data suggest there is no inherent relationship between higher density and crime and the common fear about increasing densities leading to an increase in violent crime is unfounded.

The one main study by Schmitt in 1963 which suggested a relationship between density and social disorder is widely quoted, but Schmitt's 1966 paper in which he re-examined the data and no longer found the correlation, is rarely quoted. The Australian sociologist Paul Wilson suggests: 'rhetoric about the effects of high rise living must rank as one of the major hoaxes imposed by social scientists on an unsuspecting public' (Wilson, 1976, p.45-46).

Not only has urban sociology had this particular strand of being anti-density, there are other social sciences afflicted by it as well. Psychologists in the

Anglo-Saxon world have studied rats in cages, students crammed in rooms and people walking in crowded city streets and concluded density is bad for us. Major critiques of these studies have shown that either their results cannot be reproduced, are meaningless (rat studies), or they do not consistently show problems with density (Fischer, 1976; Baldassare, 1979; Guskaynak & LeCompte, 1977). For example, crowding sometimes produces positive effects in behavioural studies and not the expected negative. The classic studies of New Yorkers avoiding mugged victims in the street was attributed to the density of people, but when repeated in Dutch cities this did not occur (Korte, 1976). Despite such studies, the belief in the negative impact of density remains very strong. Yeung (1977) concludes that so many of the studies on density were dominated by 'half truths based on ethnocentric perspectives' (p.594), suggesting that we have wanted to find negative aspects of density. Baldassare (1979, p.6-7) suggested that

'In a sense crowding became the non-social explanation of the society's social problems'.

Against the anti-density tradition there is another that has emphasised the positive human benefits of increasing densities. Freedman (1975) developed a crowding model which tries to make sense out of the conflicting evidence from empirical studies, while also recognising the adaptability of humans. He suggests that 'crowding is not generally negative and it does intensify human reactions to other people'. It stimulates human interaction, which means the human effects of density are up to us. Higher density produces negative effects if we design it that way, but we can also make higher density into something beneficial.

This is why we can find examples of high density areas with problems, then produce examples where the opposite is true (studies summarised in Newman & Hogan, 1981). For example, Conway & Adams (1977), in a study of identical apartment buildings found one had a high level of social disturbance while the other did not; the difference was attributed to better management. Others have studied the role of individuals or collectives of residents who were the catalyst for social cohesiveness and stimulation as part of a high-density complex.

The growing literature on crime reduction through urban design mentioned before is based on the need for human scale at the street level with diversity and as much activity as possible (e.g. Gehl, 1994). The data are suggesting that if communities want to create livable areas, then it is essential that they are

brought together. Minimising crime and creating healthy cities, is not a crude process of simply reducing densities. In fact data from Durning (1996, p.24) suggests people in low density car dependent suburbs are more likely to die from a car accident than urbanites living in high crime areas are likely to die from violence.

### **Rural Lifestyles**

*Automobile dependence is inevitably created by the attraction of rural lifestyles in the suburbs with their associated promise of withdrawal from the evils of city lifestyles.*

Cities with low densities and a great commitment to the private car, usually have an Anglo-Saxon tradition, and attempts to increase urban densities in Anglo-Saxon countries in the latter part of the 20<sup>th</sup> century have been met with strong opposition from the urban community. The reactions have been so emotional as to suggest that more than just environmental or economic factors are involved, and that such reactions probably lie deep in cultural attitudes.

Literature of an anti-urban character has frequently come from Anglo-Saxons suggesting they are scared of increasing densities because they have little of a pro-urban tradition. The dominant cultural tradition has never really been committed to the city. Artists and intellectuals from this tradition have not believed the city is a force for good, a place where culture can grow and all that is best in the human spirit can thrive. In general, English, American and Australian traditions have idealised rural places and their literary heroes are from the countryside, the prairie and the bush. Cities in this view serve only to corrupt the purifying aspects of country life.

This idyllic view of rural life, is called 'pastoralism' and asserts that the country provides solitude, innocence and happiness. This tradition has been seen as the answer to human yearnings right through the twentieth century and has its expression in some arcadian philosophy and to some extent has been continued in the ecology literature of today. It reached its zenith in the literature of nineteenth century authors such as George Elliot, Thomas Hardy and D.H. Lawrence in England and with Banjo Patterson and Henry Lawson in Australia. In the U.S. the tradition is based around authors such as Thomas Jefferson, Ralph Waldo Emerson, Henry Thoreau, Nathaniel Hawthorne, Herman Melville and Henry James.

The pastoral tradition has not led to a return to

village life; instead it has helped create the rationale for the suburban lifestyle. The pastoral anti-urban tradition appears to have been grafted into Anglo-Saxon cities by people withdrawing behind their private suburban walls to escape the negative impacts of city living. The rationale for this kind of living has been developed through town planning theorists like Frank Lloyd Wright, through organisations like the Town and Country Planning Association with its motto of 'nothing gained by overcrowding' and through the rural images promoted for each new fringe suburb by the real estate industry.

However, each new spacious 'rural' kind of suburb is soon surrounded and engulfed by more suburbs and the appeal of rural life is never quite what the real estate brochures promised. Indeed, most of the problems of the city seem to follow and distances are so large that automobile dependence is endemic.

European and Asian traditions are much less anti-urban and have always maintained strong commitments to cities where people can meet in the street and in public spaces, where green space can be a public facility rather than a large private space, thus automobile dependence is not an inevitable process arising out of these cultures.

Many social scientists have also criticised the romantic approach to rural life with its negative approach to cities. They instead have asserted that the city, particularly the high density city, can be a positive force of culture and human experience, just as rural life can be a source of deprivation and that the rural/urban dichotomy has directed attention away from more fundamental sources of social disorder and loss of innocence (Ellul, 1970). That is, the city need not be a source of human alienation and environmental disaster, but can in fact be the opposite. As Howarth (1976) says

'... it is impossible to describe a natural element for man, in contrast to which city life may be considered unnatural' (p.300).

Thus there is an opposing tradition which stresses the positive aspects of dense cities and tends to have an anti-suburban rather than anti-urban thrust. In this tradition there is much more hope and attractiveness in the mixed, dense neighbourhoods of old cities with their variety and history. Such writing can be found in the midst of the more dominant anti-urban literature in Anglo-Saxon cities (Williams, 1985; Mumford, 1938; Kunstler, 1993). The writings of Jane Jacobs have provided a strong urban voice along these lines for town planners since the early 1960s. Gratz (1989), Holtz Kay (1997) and others have followed in this

organic city tradition and today youth culture in particular is far more celebratory about urbanism. Artists in many cities are some of the pioneers that help in the revitalisation of older urban areas and the re-urbanisation process described in this book is being driven by younger professionals.

The power of the anti-city myths cannot be underestimated as a continuing force in causing automobile dependence, but it is not an inevitable process. The task for this generation of urban politicians, developers and managers is to help facilitate some of the enthusiasm for urban life if the processes of anti-urban development are to be reversed. The evidence that it is possible to reverse is clearly there in virtually every Anglo-Saxon city, though some show it more than others (Newman & Kenworthy, 1999).

### Road Lobby

*Automobile dependence is inevitably created by the powerful combination of road interests.*

The politics of transportation is dominated by an acrimonious conflict between road and rail lobbies. The most controversial story of this sort concerns the road lobby which dismantled the urban electric rail systems in U.S. cities. In the 1930s a holding company, National City Lines, which was made up of interests from oil, tyre and car industries, bought the private electric streetcar systems in 45 U.S. cities and then closed them down (Klein & Olson, 1996). According to Snell, the reasons for this were clear: 'one subway car or electric rail car can take the place of from 50 to 100 automobiles' (Snell, 1974). In 1949 a Grand Jury ultimately convicted General Motors, Standard Oil of California, Mac Trucks, Phillips Petroleum and Firestone Tyres on a criminal indictment of anti-trust conspiracy, but the damage had been done. Los Angeles was the worst affected with 280 million passengers a year being pushed into buses and cars and within a few decades there were four million cars in LA and the era of automobile dependent U.S. cities had begun. (Snell and others (e.g. Holtz Kay, 1997) also highlight the role of the so called 'National Highway Users Conference', pioneered by General Motors' Alfred Sloan which, in 1932, brought together automobile, oil and other highway interests to lobby for road funds and an end to mass transit funding. The result was the U.S. Highway Trust Fund through which the U.S. government spent \$1,845 million on highways between 1952 and 1970, while rail systems received only \$232 million. The establishment of this fund and its massive spending on the U.S. Interstate

Highway System set in place automobile dependent trends that have continued to grow steadily to the present day. Between 1981 and 1995 the spending on Federal Highways in the U.S. grew from \$9 to \$19 billion whilst transit stayed at \$4 billion. It is not hard to see why U.S. cities continued their rapid car use growth in the 1980's.)

Similar lobbies exist in all countries (Hamer, 1987) but not all are as successful as in the U.S. The political power of the road lobby everywhere is strong but not overwhelming; governments are answerable to the wider public as well as to the lobbyists. The influence of strong private industry lobbies for the automobile in many European and Asian countries has been minimised by equally powerful lobbies for transit. Data show that transit support and funding can be given a high priority, and recent trends in transit demonstrate that it can influence the future direction of our cities. The political appeal of new and upgraded rail systems in conjunction with urban villages, can be a powerful force to reshape automobile dependent cities, just as road lobbies previously shaped them.

#### Land Developers

*Automobile dependence is inevitably created by the powerful interests of land speculators and developers and there is little that planning can do to stop them.*

In the same way that transportation politics can determine transportation priorities and hence urban land use, it is possible to examine land politics and see how it determines urban land use and thus transportation patterns.

Capitalism is based on the accumulation of wealth and its investment into physical assets which produces further wealth. Cities appear to have been built in cycles with most construction related to the level of capital accumulation. Suburbanisation is explained as the need to invest capital in both the land and transportation systems to service it (Harvey, 1973; Walker, 1978). Most suburbanisation follows economic booms and when the economy contracts, so the city turns back into itself rather than expanding on its fringe.

North American and Australian auto cities have been analysed to show how suburban land has been developed in response to capital accumulation (Cox, 1978; Sandercock, 1975, and Badcock, 1984). In these cases urban planning is seen as having little power to direct urban growth for public purposes; private capital just maximises private gain wherever it likes.

But not all capitalist cities have optimised

private gain in an automobile dependent way. Many European cities, in particular, have managed to create a far less car dependent kind of urban growth. Developers still make money, but their capital is used to create the kind of densities that enable social goals to be achieved, such as walkable and transit-based cities.

The statement is often made that developers in the U.S. and Australia would not put up with this kind of socialistic control over their development 'rights'. We are not so sure that the systems in Europe and the U.S./Australia are that different.

The land development system in U.S. cities and Australian cities is still under planning control. The process has many built-in subsidies which favour capital to invest in land on the urban fringe. Primarily the building of large roads from Federal grants opens up the land which normally would not be worth developing. Then local government offers a range of incentives to have the development come to them rather than in other areas. Both of these processes are market interventions. In other places they would be described as socialism.

Then the developer takes the large set of regulations which have been developed over years of suburb building and dutifully carries them out in their development – again it is a process controlled by planning. Undoubtedly the process of achieving less automobile dependent cities is helped if there is a city-wide planning agency which is deliberately attempting to minimise sprawl. However, a city-wide planning agency can also facilitate car dependent sprawl.

In the late 1990s some developers are realising that profits can just as readily be derived from urban development practices that are more socially and ecologically responsible. Such developers are putting their capital into re-urbanisation, transit-oriented development and New Urbanism development. For them, the planning process in the U.S. and Australia is hopelessly socialistic, full of inappropriate subsidies and out-of-date regulations. The revitalisation of the inner city in Australia, the New Urbanism suburbs in the U.S., the transit-based development in Portland, and the growth management in Boulder, Colorado, are all forging new, more sustainable ways of physical planning. Some of this is given direction by public agencies but frequently the new alternatives are coming from private sector sources who are pioneering ways to create more sustainable settlements in a public planning milieu dominated by out-of-date, automobile dependent

assumptions. A more sustainable public planning can be further facilitated, but much is already happening without this being the driving force.

Planning is always going to be needed to guide the development process. To change development away from automobile dependence does not need draconian planning intervention – that is often already there. It just needs a new professional praxis which can facilitate development of a different kind in different parts of the city. Investors can still make money, but the process is helping to build in sustainability not automobile dependence.

### **Traffic Engineering**

*Automobile dependence is an inevitable outcome of the standard processes of transportation planning.*

The most important of the technical procedures in transportation planning is the land use/transportation modelling process which emerged in the mid-1950s as a distinct area of study. The purpose of these studies was to plan for anticipated growth in population, jobs and traffic as far ahead as 20 years, so as to ensure an equilibrium between the supply of transportation facilities and demand for travel as it arises out of land use.

The concept of the 'grand transportation study' was embraced with enormous enthusiasm with virtually every developed city at some point between 1955 and 1975 undertaking at least one major transportation study. They were part of what a city had to do to be 'modern'. The 1950s and early 1960s were a very optimistic and prosperous period characterised by booming car ownership and the political expectation, at least in the U.S. and Australia, that the car would be the future of urban transportation. Thus right from the outset land use/transportation studies tended to be strongly associated with planning for roads and cars rather than a balance of transportation modes, and most of the U.S. and Australian land use/transportation studies pioneered the building of elaborate highway and freeway systems.

Transit, especially rail, was glossed over and almost eliminated from cities like Detroit, Phoenix and Houston. Most forecasting was based on private transportation growth and land use patterns based around this. Once such land use is in place the only transit that can service it is an inefficient bus service, thus the conclusion is inevitably reached that a massive increase in road funding is needed to provide the 'grand plan' needs.

Most major cities which built extensive freeways then found that this process spread out land use and

generated more and more traffic, until very soon after completion the freeways were already badly congested.

The obvious response to the failure of freeways to cope with traffic congestion is to suggest that still further roads are urgently needed. The new roads are then justified again on technical grounds in terms of time, fuel and other perceived savings to the community from eliminating the congestion. This sets in motion a vicious circle or self-fulfilling prophecy of congestion, road building, sprawl, congestion and more road building. Automobile dependence is inevitable in such traffic engineering.

Awareness of this phenomenon, now called induced or generated traffic, is increasingly common in the literature. In fact, traffic is now being referred to not as a liquid that flows where it is directed, but as gas which expands to fill all available space (Litman, 1998).

There has developed an alternative to this kind of road planning treadmill which is comprehensive land use/transportation planning that develops alternative transportation systems and different land use patterns aimed at minimising unnecessary movement. The comprehensive plan is a much more community-based project that invites a city to envision its future and then seeks to find the appropriate infrastructure. This process requires a much more creative role from planners and engineers who need to provide the land use and transportation mix most able to meet the complex needs of the community. Other models are now available such as LUTRAQ from Portland that allows all options including new transit systems to be tested rather than just road options (1000 Friends of Oregon, 1993, 1997a & 1997b). There is also clear evidence that if road capacity is removed then a high proportion of traffic just disappears; this 'traffic evaporation' or 'traffic de-generation' also gives another tool to cities struggling with how to manage their future (Goodwin, 1994).

Urban planners and the general public are now in a key position to assert their roles in the development of cities. New goals and objectives can be given to the transportation/land use modelling process based around balancing the roles of various modes and minimising total travel in the urban system. The need to revitalise city centres and to protect neighbourhoods threatened by traffic means that the technical road planner using 1960s models cannot be the sole determinant of decision making. The U.S. TEA-21 legislation gives the framework for their new

approach.

Pressure from the community has meant that traffic calming is now on the agenda in virtually every developed city and many in the developing world. This European concept has been a major focus for many traffic engineers in European cities for 20 years, but is now a central issue for engineers and planners in every Auto City.

Technical planning tools and the politics which seems to go with them will always play a role in the area of transportation planning, but there is no necessary reason why these should favour roads and suburban sprawl to the exclusion of other transportation modes and more compact patterns of development. Many cities are indicating how this new balance can be found.

### Town Planning

*Automobile dependence is inevitably regulated into cities by local town planning.*

Low density suburbs around the world are often very similar in form as well as function. They can frequently be traced to a similar set of urban codes that have been developed and become known as 'town planning' regulation. Such heavily automobile dependent suburbia if left to a process of standardised mass production will inevitably create more and more of the problems outlined earlier.

This kind of planning is also facilitated when 'town planning' is considered to be what occurs at the local subdivision level and no overall strategic direction for the city or its regions is ever created.

However, strategic planning is now a much more developed process and especially where a city-wide government or co-ordinated set of governments, can provide a plan for the whole city. In such plans there are strategic networks of transportation, strategic land use that complement this and comprehensive processes and incentives to encourage the plan's implementation. In the U.S. such plans are required as part of TEA 21.

### Conclusion

The ten myths of automobile dependence are still alive and well in urban transportation policy discussions. However, the underlying basis for them seems to have lost its edge and the professional certainties are no longer so clear; indeed the evidence is growing daily that automobile dependence is not economically, environmentally or socially good for cities. However, the problem of how to do detailed planning at the local level which is not automobile dependent is still not solved. The regulations on set

backs, road widths, design, densities and mix, all favour the suburban model we see in nearly every new suburb. Developers wanting to change this find the process very hard. This is the one area of inevitability which still seems to be true. The few new suburbs which have broken the mould have not yet been absorbed into professional praxis. Thus groups, such as the New Urbanism, are trying to develop a new praxis or code of development which is not so automobile dependent.

Each of the first nine myths are important to show that they are not inevitable, but this tenth myth about town planning is particularly important to overcome. All the other myths depend to a large extent on how well a city can plan, i.e. how well the broader goals and aspirations for a city's future can be translated into practical community processes where the public realm is improved, not slowly eaten away. And how detailed design can create attractive, ecologically sensitive, low auto-dependent development This final myth must be finally robbed of its inevitability through new town planning practices.

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# 'Moving together' – on shaping automobilisation

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## Abstract

This article draws attention to how automobilisation as a mobility paradigm is shaped by social agencies such as national automobile owners associations. The author argues that by means of their reflexivity and their distinct responses to the risks of automobilisation, these clubs contribute to the reproduction of automobilisation. They do so, in that they mediate between the omnipresent expert systems that are embedded in the car and the individual lay user. Hence, these 'car custodians' enable what can be seen as the 'auto-man' – a hybrid consisting of the car and its user.

## Keywords

Automobilisation, breakdown & recovery services, cars, car clubs, members' magazines

## Reflexive Automobilisation

In David Cronenberg's remake of Kurt Neumann's science-fiction film, *The Fly*, a physicist constructs a transportation device similar to the 'energiser' in the popular *Star Trek* series. Seth Brundle, the scientist in question, has developed what is called a teleporter, i.e. a machine that displaces objects. It makes them disappear in one place and reappear in another. In other words, he invents a vehicle that provides its users with the possibility of overcoming space. It is this quality of 'displacing in space' that makes the teleporter analogous to some of our contemporary transportation technologies, the automobile for example. Just like the automobile, Brundle's machine enables individual travel from one point to another. Here, however, the plot does not end. By using his displacement device, the physicist encounters severe and unforeseen technical difficulties. It turns out that his travel tool is something of a genetic 'blender', in that it blends his DNA with that of other creatures – in this case a hapless fly that mistakenly entered the device at the same time as Seth Brundle. To cut a long story short, the physicist becomes a part of his own machine, a cyborg that consists of the travelling tool itself plus what ever is left of a human body. Just like the automobile, Seth Brundle's machine has merged

user and utensil together.

The 'auto-user' has elsewhere been coined as the 'car-driver hybrid' (Urry, 1999). This hybridisation has led to new ways of moving and dwelling in the car and on the road – ways so distinct from those promoted by former transport technologies that they altered time and space. As a vehicle for the overcoming of space, the motorcar gradually challenged and substituted not only the train, the bicycle and our feet as means of transport, it also changed our ways of life. It displaced the urban population and replanted it into suburbia, it became a sign of wealth, passion and strength (or poverty, boredom and weakness) – depending on the type or model selected. It offered a means by which to belong and remember, and one by which to differ and forget. In other words, it became a vehicle for distinction and identification, just as much as it offered a new type of spatial mobility.

We now know that the automobile is an ambivalent object. Not only has it increased parameters like the distance travelled by the modern individual or the gross national product of car-manufacturing countries like Germany, Britain, France and Italy, but it has also produced risks on a global scale. These risks range from the calculable to the incalculable, from the perceptible to the imperceptible or from the obvious to the subtle. With the rise of risks such as accidents, destruction of urban and rural landscapes, acid rain, exploitation of resources, 'time pollution' (Whitelegg, 1997) and 'time-space compression' (Harvey, 1990) experts and lay-people became more aware of the negative side effects of automobilisation. While until the mid-1970s, most transport experts were primarily concerned with the provision of access to the car, the 'community' has become more reflexive in the subsequent years. Under reflexive automobilisation (just as Ulrich Beck (1992) argues for modernisation) transport planners and politicians are now increasingly engaged in the definition and distribution of automobilisation risks.

The responses towards these risks, however, vary

in scope and scale. One will find families who try to live without a car, planners who promote car-free cities and mobility management, engineers and economists who introduce road-pricing schemes as well as car manufacturers and IT-companies who formed alliances to foster so-called Intelligent Transportation Systems. With most of these responses, automobilisation becomes increasingly complex. Step by step both the dynamic vehicles (cars) and the static vehicles (roads) become equipped with more and more instruments and features. These features have their genesis in expert knowledge. Expert knowledge on the risks of automobilisation has paved the way for expert systems like traffic lights, satellite based navigation systems, air bags, seat belts and ABS-brakes. These expert systems are not exclusively technical interventions – other types of knowledge are represented as well. Professionals nowadays, offer therapy to those who are repetitively caught driving drunk, provide advice for drivers locked in traffic jams, run frequent checks on cars and trucks, educate, operate, punish, treat and consult transport users. Professionals also carry out various forms of research and knowledge production on transport and mobility (All this coincides with increasing institution building, as Tom Rallis (1992, p.107) notes for the case of higher education in Denmark: 'The organisation of transport became more complicated and specialised and, thus, demanded a higher degree of expertise. This development is well represented in engineering education. The polytechnic institute became too small and had to be enlarged' during the mid-1970s). Expertise is, thus, vital for the reproduction of automobilisation. Indeed, it is hard to think of any other social subsystem in late modern societies that is so densely endowed with expert knowledge and interventions. Anthony Giddens remarks:

'When I go out of the house and get into a car, I enter settings, which are thoroughly permeated by expert knowledge – involving the design and construction of automobiles, highways, intersections, traffic lights, and many other items ... I have very little knowledge of how the car works and could only carry out minor repairs upon it myself should it go wrong. I have minimal knowledge about the technicalities of modes of road building, the maintaining of the road surfaces, or the computers which help control the movement of the traffic' (Giddens, 1990, p.28).

Automobilisation relies on its expert systems to such an extent that the car can reasonably be called an

embodiment of transport expertise. The automobile, so we say, solves the problem of how to organise our individual mobility. The fascinating aspect, however, is that we do not regard the automobile as a mobility expert. It is rather somewhat of a 'willing servant', upon which we impose our wishes. We control the expert – the expert does not control us. In our conception, it is the driver who is in charge. In other words, the automobile offers us the illusion of possessing control over our own mobility. This social construction of '*auto-mobility as individual mobility*' neglects the fact that auto-based transport is highly endowed with expert systems. It is not so much the driver, but rather the expert system that has asserted control over the task of getting from A to B. We have entrusted these expert systems with the task of organising our individual mobility – and it is them, which define the rules and mechanisms for the organisation of mobility. Expert systems assure that the driver has to stick to the roads; has to obey traffic regulations; has to get a driver's licence; has to listen to radio traffic reports and has to pay attention to road signs and maps. Nevertheless, the social and cultural construction maintains the opposite: the automobile as embodied expertise is seen to be the incarnation of individuality and freedom.

Clearly, expert systems within the realms of automobilisation are seen as liberating rather than alienating the individual. They free the driver from the constraints s/he is faced with as a result of growth in traffic. Rather than being part of the problem, expert systems are predominantly seen as the solution to the problem. This needs explanation. Why are expert knowledge/expert systems and the scientific rationality that is often underpinning such expertise, conceived of as helpful in overcoming automobilisation risks? Why are both the car as embodied expertise and the individual transport user not seen as antagonists, but instead subjected to a process of 'hybridisation'.

### **Car Custodians**

The 'moving together' of driver and car is a distinct feature of what I call reflexive automobilisation. The reflexive behaviour of the different actors (users, planners, producers, etc.) and their responses to the risks of automobilisation contribute to the hybridisation. The cyborg 'auto-man' is a reflexive product, in which the divide between expert system and lay user is gradually vanishing.

The diminishing divide between expert systems and lay users has been fathered by a few, but

nevertheless influential, agencies. One of those agencies is the automobile owners association – variants of which can be found in almost every country. These include the AA (Automobile Association) in Britain, the ADAC (*Allgemeiner Deutscher Automobil-Club*) in Germany or the FDM (*Forenede Danske Motorejere*) in Denmark. With services like 'auto ownership and maintenance', car purchase, travel insurance and other financial services they bring the automobile closer to its user. Though labelled as 'consumer organisations', in practice they are institutional bodies, whose task it is to maintain citizens' interests in the making and implementation of 'auto-policies' and to represent the local and contextual knowledge of its members on issues surrounding contemporary traffic debates. They could be conceived of as pressure groups, whose purpose it is to claim the rights of certain transport users – that is to say the social rights and interests of automobile owners. Ostensibly, their aim is to make the voices of the car user heard within a debate that is to a large extent defined by transport experts like planners, car manufacturers, politicians, safety researchers and automobile engineers. Thereby, the automobile clubs come across as democratic citizens' movements, as consumer organisations that speaks for the 'car-user hybrid'.

However, instead of regarding these clubs simply as the mouthpiece of those who make daily use of the automobile one may very well take up a different perspective. A more critical view on the social role of an automobile club would, to begin with, point at the contribution the clubs make to the reproduction of the mobility paradigm of automobilisation. AA, ADAC and FDM certainly have no interest in fostering an alternative mobility paradigm. By definition they are an organisation aiming at promoting a 'driving culture' rather than a cycling or walking culture. A critical perspective would then question the self-conceived social position of the clubs as consumers organisations. Although they are constituted by their members and may reflect their interests, these associations are themselves simultaneously engaged in defining these interests. Only with the birth of a club-like formation, one may argue, could these interests come into existence and find expression. The automobile clubs and associations are defining a particular group of people and thereby turn the diverse interests of individual car users into one homogeneous 'Über-interest'. They turn part-time car drivers into full-time supporters of a 'driving culture' – as if the members are never cyclists or

pedestrians. Moreover – and this is the third dimension of a critical perspective on the social role of automobile clubs – they express their interests whilst claiming an objective understanding of the threats of automobilisation. They use, for instance, their monthly magazines to define both automobilisation risks and the appropriate responses to them. This, the clubs' conception of the risks of automobilisation, rather mirrors the worldview of association cadres than association members. Thereby, the makers of the magazines present themselves as transport experts and use their publications to 'improve' the information available to the lay car user on how to deal with the risks of automobilisation. In this process, the representatives/servicemen of automobile associations become car custodians – the keepers of automobilisation's Holy Grail. How, one may ask, do these associations fill this role? To answer this question, I will illustrate the activities of automobile associations by referring to the Danish FDM.

### The *MOTOR*-world

The Danish automobile owners club (FDM) publishes a monthly magazine entitled *MOTOR*. Rather than being a publication of a consumer organisation, *MOTOR* is, I will argue, somewhat of a lifestyle magazine – or even more specifically, a 'mobility-style' magazine. By means of their monthly publications automobile clubs construct a 'life world centred around the automobile – that is to say around the relationship between the automobilist and the vehicle – and assigns almost all other spheres of life and every day phenomena a secondary role to this pivotal relationship. Education is rendered into traffic education, death is synonymous with death on the road, the quality of holiday resorts is determined by their automobile accessibility, etc.' (Krämer-Badoni *et al.*, 1971, p.183, *my translation*).

In *MOTOR* – and in the '*MOTOR* world' – human needs are subordinated to what is technologically feasible. FDM constantly adjusts the needs and motives of its members to the state of the art in 'auto-technology'. The 'life world as *MOTOR* world' is the glue that holds automobility together and keeps the threat of disintegration and non-sustainability, as represented by an ever increasing production of automobiles and a growing capacity problem on the roads, at bay. With this, the emergence of the 'life world as *MOTOR* world' comes across as a social fix for a techno-economical dilemma. It is in particular the traffic safety issues that have become an integral part of the 'life world as *MOTOR* world'. The attention given to traffic safety and the technological

interventions that aim at minimising safety risks, suggests that such emphasis is intended to compensate for all the forms of ontological uncertainty and external danger the modern human is confronted with.

In any case, the attention that traffic safety and safety interventions receive in issues of *MOTOR* must be seen in relation to an increasing number of expert systems within transportation. To maintain control over these systems more and more skills are demanded of the individual user. With an ever greater complexity, however, the possibilities to individually control these systems become more and more limited. Thus, the problem of safety is now constructed as a problem of either producing automobiles that free the user from functions of controlling and steering them, or, to 'educate' the user, so that he or she maintains the ability to employ, cope or interact with these systems. Within the 'MOTOR world', the task of educating the auto-masses is addressed by means of various articles and re-occurring columns.

The practical advice that is provided in one form by articles on traffic safety can also be found in another section, namely within the 'protocols' of automobile comparison tests. These tests and comparative tests of accessories are the prime instruments of market information. According to Krämer-Badoni *et al.* such instruments often serve to reinforce the marketing efforts behind particular automobile products (Krämer-Badoni *et al.*, 1971, p.214). The test results create the illusion of objectivity, i.e. an impartial and unbiased expert statement on the quality of different automobiles. *MOTOR* magazine does not serve the particular interest of one specific automobile manufacturer, but rather the industry as a whole. Thus, automobile tests are advertisements in disguise. Due to their ostensibly objective character, the reader is rendered 'defenceless' against the type of 'information' provided in the tests.

By analysing and interpreting the articles, columns and tests in these magazines, the social role of an automobile owners club is revealed. Another source of information that provides a further insight into the meaning of automobile clubs, are the front-page layouts of magazines like *MOTOR*. In the case of FDM one may argue that the association's social role is embodied in one reoccurring figure. This figure is that of the FDM 'serviceman', who scrutinises and describes new models, advises a user, fixes, checks and tests all kinds of cars. The serviceman's ever-vigilant eyes 'tame' the uncertainty and the risks of

automobilisation. It is in particular these servicemen – often pictured on the front page – who evoke trust. They are the benevolent and watchful sentinels of automobilism and come across as friendly and helpful characters, who enable us to organise our mobility better. They are the 'Friends, who Define Mobility' and they show how to cope with both the complexity of expert systems and the risks of automobilisation. The 'friends who define mobility' not only inflict upon the members' perception of risk and their risk-response, but eventually alter the risks themselves. They render risks calculable. What is made visible becomes perceptible and therefore calculable. The front-page is structured and the risk is assembled in such a manner that the risk-response can be interpreted directly from the pictorial content. The *risk-inscriptions* on the front pages unite experts and lay-people in that they impose the risk-definition of the former on the latter.

### Conclusion

The front pages of a magazine like *MOTOR* reveal how the expert systems of automobilisation and the user move together and form a hybrid 'car-driver'. Hybridisation takes place via a catalysing agent, which mediates between the binary categories of expert systems and lay-users. Automobilisation could not continue its reproduction by means of expert knowledge, if the lay-user could not cope with the changes. In order that s/he does so, the mobility paradigm has established anomalous categories like the 'friend who defines mobility'. As an anomalous category, the 'friend who defines mobility' appears as sacred, in that he bridges the opposing categories of the individual lay driver and the expert systems embodied in the car. He is the mentor of the car-driver hybrid. Without him, humans and non-humans would remain separate categories. With him, they become the 'monsters in metal cocoons' (Lupton, 1999). Thus, the reflexive behaviour of automobile clubs and their responses to the risks of automobilisation, actually bring the auto and the user closer together. They mediate between a risk technology, i.e. a socio-technological system that poses threats against the human body, and the modern individual. These mediators father the car-driver hybrid. Their contribution and reflexivity sustains automobilisation and assures its reproduction.

The 'friend, who defines mobility', however, is not and will probably never be such a good friend as the one our scientist, Seth Brundle, had. At the end of *The Fly*, what was once a highly mobile man-machine has turned into a mutation of mobility. Now, a paralysed

and immobile 'thing', Brundle urges his beloved to fire a gun at what is left of him. In complying, she relieves him, herself and the world of a failed experiment in transportation. In the case of the automobile, however, it remains to be seen, whether those who love it will eventually contribute to its termination.

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# Sustainable Development & Transportation: Past Experiences and Future Challenges

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## Abstract

The term 'sustainable transportation development' is a combination of sustainable development and transportation. As a concept, it involves the application of the sustainable development idea to transportation systems. This paper deals with how the concept of sustainability is currently used and how it should be used in the future engineering of transportation systems. First, the current definitions of sustainable development are reviewed and it is shown that there is a need for definition and criteria that can be used by engineers for planning, design and operation of transportation systems. Second, the current approaches of sustainability in transportation planning are reviewed and discussed. Subsequently, it is proposed that the focus should be on a sustainably developed transportation system, i.e. a system that meets the people's needs, with the available or affordable environmental, financial and social resources. Finally, it is shown that a sustainably developed transportation problem is basically a mathematical problem.

## Keywords

Sustainable development, transportation engineering, optimisation problem

## Introduction

There appears to be a consensus of opinion that the current pattern of transportation growth is not desirable. The reader will agree that the rate of the world's motor vehicle fleet growth, in the developed as well as in the developing world, is threatening our human, social and economic well being. Quality of life, levels of basic freedom, health, education, access to – and distribution of – resources, etc. are in danger. Reasons for this are *inter alia* the environmental and

safety impacts of transportation, and the dependence of land uses on the financial resources for construction and maintenance of its associated infrastructure both in the short- and long-term.

Sustainable development has been the topic of many conferences and activities by transportation professionals and international agencies. Despite the attention given, the concept still lacks clarity for certain groups of stakeholders, for example transportation engineers and planners.

This paper deals with how the sustainability concept is currently used in transportation engineering and planning, and how it should be rationalised in the future for the planning, design and operation of transportation systems.

## Sustainable Development and Transportation

The term 'sustainable transportation development' is a combination of sustainable development and transportation. As a concept, it involves the application of the sustainable development idea to the planning, design and operation of transportation systems.

### *Current understanding of the concept*

Definitions of sustainable development have been wide-ranging, but all have been variations on a theme. The most widely quoted definition is that of Brundtland (WCED, 1987), which refers to

development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

However, the more detailed definition of sustainable development by WCED, is a process of change in which exploitation of resources, the direction of investments, the assumptions of

technological development, and institutional change are all in harmony and balance and enhance both current and future potential to meet human needs and aspirations.

Analysis of many definitions and their underlying philosophy indicates that sustainable development involves two main aspects – sustainability and development. In addition, the basic idea is to harmonise the two aspects in human activities. The analysis also shows that the focus of most people and organisations is only on sustainability and is interpreted exclusively in terms of keeping the environment in a notionally ‘good’ condition. Furthermore, the interpretation of environment itself varies widely. Some interpret it only in terms of natural conditions while others consider it as a combination of natural and man-made conditions, etc. For example, Daly (1991) defines a sustainable society as one that satisfies three basic conditions, i.e.:

- its rates of use of renewable resources do not exceed their rates of regeneration;
- its rates of use of non-renewable resources do not exceed the rate at which sustainable renewable substitutes are developed; and
- its rates of pollution emission do not exceed the assimilative capacity of the environment.

These conditions imply that he interprets sustainability only in terms of keeping the natural environment in a good state. In contrast, many organisations, including the World Bank, define sustainability in terms of three building blocks, environmental conditions, economic conditions, and social and political conditions.

The same situation exists with respect to the application of the concept of sustainable development to transportation. Emphasis is on the elements of sustainability in transportation, or what constitutes a sustainable transportation system, rather than how to develop one.

There is a typology of definitions for a sustainable transportation system. The first type includes the definition of sustainable transportation by The United Nations Centre for Human Settlements (Habitat), the World Bank and other international organisations. According to them (see, for example World Bank, 1996), a sustainable transportation system is one which ensures that:

- transportation-related pollution levels are maintained at levels below those that human beings can safely tolerate and the environmental carrying capacity can allow;

- financial expenditures for operation, maintenance and carrying charges are not higher than what the users can pay; and
- each member of society is provided with the means to achieve fundamental social, cultural, educational and economic objectives.

Therefore, the World Bank identified the three main types of sustainability of a transportation system as:

- economic and financial sustainability, that involves the efficient use of resources and proper maintenance of assets;
- environmental and ecological sustainability that involves acceptable levels of environmental effects; and
- social sustainability that involves equity issues. To be effective, transportation policy must satisfy these three requirements.

A number of guiding principles for sustainability in transportation came from Roberts *et al.* (1992):

- Transportation is a vital element in economic and social activities but must serve those activities rather than be an end in itself;
- The consumption of distance by freight and passengers should be minimised as far as possible whilst maximising the potential for locally-based social interaction and locally-based economic activity;
- All transportation needs should be met by the means that is least damaging to the environment;
- There should be a presumption in physical land-use planning against those activities which by nature of their size and importance attract car-based users from a large area;
- All transportation investment plans should be subjected to a full health audit notwithstanding the uncertainties surrounding epidemiological proof. Proposals which are potentially health’s damaging should be rejected;
- All transportation investment plans should have clear objectives designed to cover social, economic and environmental concerns and be evaluated by an independent authority with sufficient expertise to comment on value for money, costs and benefits and the availability of alternative strategies to achieve the same objectives;
- All transportation investments should be monitored over their lifetime to check on the degree to which they meet their stated objectives and their contribution to environmental damage;



- All transportation policy matters should be dealt with in a transportation policy directorate that has no direct responsibilities for the management of individual modes. The responsibilities of the directorate are to deliver sharply focused policies that minimise danger, minimise air and noise pollution, maximise social interaction and urban quality of life and oversee the non-policy making executives (for road, rail and air) whose role is to implement the directives of the transportation policy directorate.

In these principles the elements of the sustainable transportation system are discussed, but again an actual description of how the balance between needs and resources should be achieved is omitted as is a description on what the needs actually are.

A similar approach could be found in the first Netherlands' National Environmental Policy Plan (NEPP) (Ministry of Housing, 1989), where the objectives were as follows:

- Vehicles must be as clean, quiet, safe and economical as possible;
- The choice of mode for passenger transportation must result in the lowest possible energy consumption and the least possible pollution;
- The locations where people live, shop, work and spend their leisure time will be co-ordinated in such a way that the need to travel is minimised.

The second type of definition for a sustainable transportation system is typified by that proposed by Deen and Skinner (1994). It is a transportation system and a process for modifying or adapting the system that can accommodate expected population changes, growth in economic activity and changes in resource availability and (yet) meet environmental standards.

Based on the preceding observations a number of conclusions can be drawn. The first is that there is a need for new interpretations and measures relating to sustainable development and its application to transportation. The current interpretations do not sufficiently address development and how sustainability and development objectives can or should be harmonised. Furthermore, criteria for sustainability are defined in terms of general principles and requirements, which can lead to a wide variety of interpretations and uses. For example, there seems to be no consensus on what constitutes the environment and environmental limits in the short and long-term. In addition, what constitutes:

- the means to achieve fundamental social, cultural, educational and economic objectives?

- minimum danger, air and noise pollution, consumption of distance by passengers? and
- maximum social interaction as well as quality of life?

The second conclusion is that the international community of researchers does not seem to be addressing the real problems of sustainable transportation development. Some of the questions which need to be addressed are:

- what, in both qualitative and quantitative terms, defines a sustainable transportation system?
- what characterises a developed transportation system and a developing transportation system? and
- how can the concepts of sustainability and development be harmonised in the planning and design of a transportation system in an area?

#### *Proposed understanding of sustainable transportation development*

The preceding analysis has shown that sustainable transportation development is basically a process of harmonisation of sustainability and transportation development requirements.

It is proposed that an ideal transportation system, in the framework of sustainable development, should be one that meets the aspirations of transportation consumers and in which the scarce resources consumed do not exceed affordable levels. It is further proposed that such a system should be defined as a sustainably developed transportation system. In addition, sustainable transportation development is defined as the process of improving a transportation system towards a sustainably developed system. Consequently, it is proposed that a transportation system can only be said to be sustainably developing if two main criteria are satisfied

- its performance is improving towards the performance level desired or needed by the users in the area; and
- its resources consumption is less than the available or affordable resources capacity in the area.

Based on these definitions, the basic sustainable transportation development problem can be said to be how a transportation system:

- can meet basic movement needs; and
- consumes resources less than the affordable resources capacity.

Undoubtedly, solution of these problems requires, amongst other things, determination of:

- movement needs and aspirations of the people and

the equivalent desired level of transportation system performance;

- resources which are consumed by transportation systems;
- resource capacities; and
- a suitable tool for assisting the process of sustainably developing a transportation system.

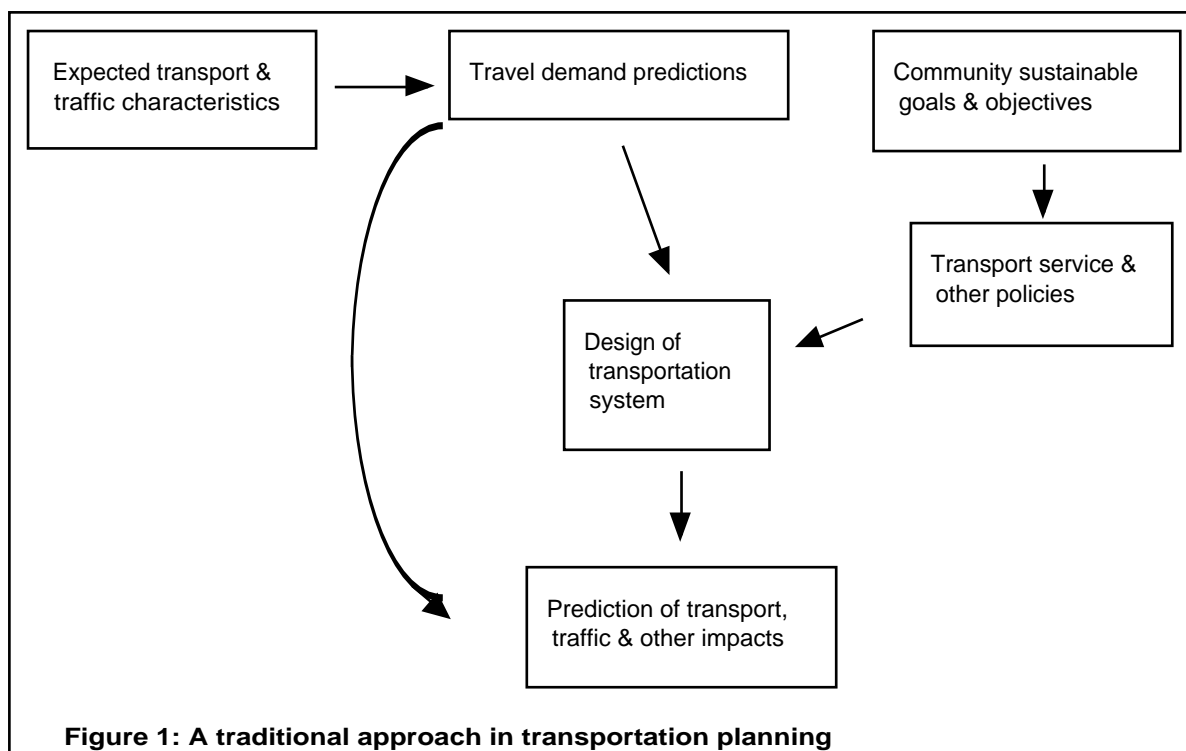
#### Basic needs

There is no clearly accepted description of what constitutes a ‘basic need’. From a behavioural science point of view basic needs are well described by the fundamental categories of Maslow. His theory (1970) states that all basic human needs can be summarised into five fundamental categories, i.e. physiological needs (food, housing, etc.), safety needs (order, certainty, personal safety, etc.), belongingness and love needs (family, friendship, etc.), esteem needs (self-confidence, independence, self-respect, etc.) and need for self-actualisation. These needs are most naturally satisfied in this sequential order. Howe (1983) states that there is a wide spectrum of meanings about basic needs ranging from, at one extreme, a minimal list of those things which are required by human beings for bare survival, like food, shelter and clothing, to, at the other extreme, an emphasis that human needs are not only physical but also psychological, not absolute but relative to what is enjoyed by other people in society, not finite but

expanding as the satisfaction of one need gives rise to another. At this inclusive extreme, which incorporates Maslow’s ideas, basic needs include not only commodities but also public services such as cleaner water, transportation, education and employment. WCED (1987), as another example, regards employment as the most basic need for a livelihood. It is apparent that transportation can be seen as a derived need.

#### Transportation service requirements

The capacity of an individual or group of people to meet their basic needs is dependent largely on their accessibility to various economic, cultural and social endeavours, that is, the ease by which they can accomplish such activities. In addition, accessibility to an activity depends on one’s essential mobility as well as the cost and safety of travel. Essential mobility can be described as ability or capacity to travel to and from locations of essential activities without being mentally and/or physically exhausted in the process. Consequently, the basic need which should be met by a transportation system in an area is to ensure acceptable levels of essential mobility, cost and safety of travel in the area. Alternatively, the basic service requirement of a transportation system is to ensure acceptable time, cost and safety of travel at all times by all individuals to or from locations of essential economic, cultural and social activities in an area.



**Figure 1: A traditional approach in transportation planning**

Scarce resources consumption

Based on (for example Whitelegg (1993), Dijkstra (1997) or Haq (1997)) climate change, people’s health and safety, air pollution, and noise are major problems of sustainable development. Therefore, there is no doubt that environmental quality and the future value of the everyday environment need to be included in the development of a sustainable transportation system. However, there is also a need to include land sustainability in addition to financial sustainability, which is necessary for the efficient use and proper maintenance of infrastructure.

Consequently, the basic scarce resources variables can be defined as consumption of land, air quality, noise quality, safety and short- and long-term finance.

*Current approaches to the problem of sustainable development in transportation*

Review of relevant published literature indicates that, similar to the situation with the definitions and interpretations of sustainable development, the current approaches focus on the elements of a

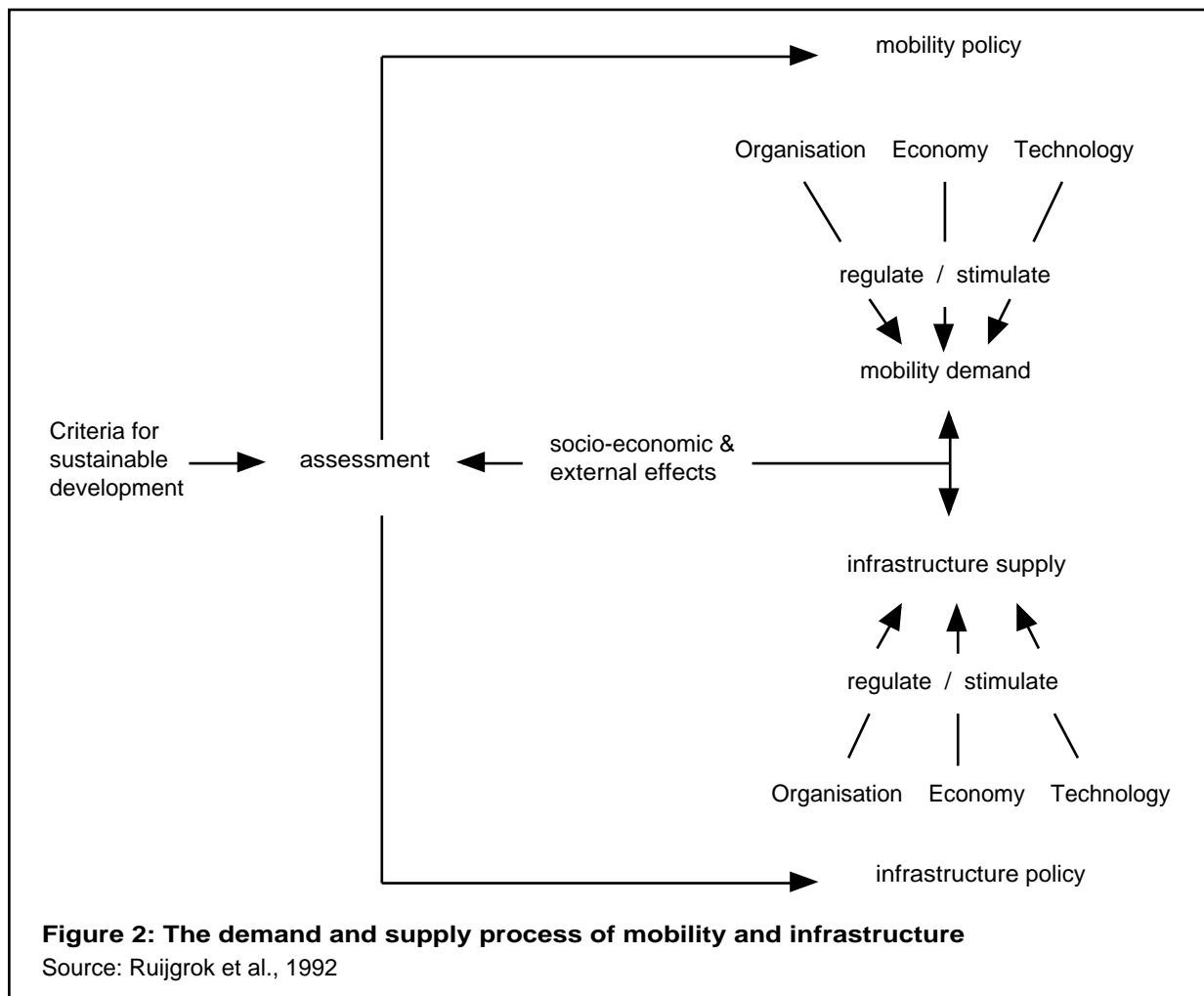
sustainable transportation system. Deen (1995) defined the three main categories of approaches as:

- the ad hoc approach;
- the accounting approach; and
- the scenario approach.

The ad hoc approach involves the discussion and analysis of environmental impacts of transportation systems and how to investigate them. This is basically the traditional predict – provide – manage approach shown in Figure 1.

The accounting approach involves identification of desirable limits to transportation related impacts on the environment, and setting of standards for design and operation of transportation facilities and vehicles. The combination of the ad hoc and accounting approaches seems to be the technique favoured by transportation agencies in many countries.

Finally, the scenario approach involves definition of some sustainability criteria, prediction of the expected future transportation demand scenario, and specification of a transportation system which will



**Figure 2: The demand and supply process of mobility and infrastructure**

Source: Ruijgrok et al., 1992

meet the sustainability criteria as well as the expected transportation demand.

This approach is quite similar to the one proposed by Ruijgrok *et al.*, (1992) and the approach used by Novem (1989). Ruijgrok's proposed approach is summarised in Figure 2, whereas Figure 3 describes the approach used by Novem.

In the approach described in Figure 2, a sustainable transportation system is regarded as a resultant of a combination of the traditional equilibration of demand for transportation, the supply of infrastructure (see for example Manheim (1979)) and sustainability criteria. It seems to represent the balanced solution for the conflicting needs and opportunities for economic and technological development, together with concern for the utilisation of scarce resources.

The approach involves comparison of the socio-economic and external effects of the existing mobility and infrastructure network with the criteria for sustainable development. In the approach, a traditional transportation model can be used to develop an alternative policy on mobility and infrastructure, as well as strategies that will change the demand versus supply equilibrium along with the socio-economic and external effects. Furthermore, the demand for transportation is considered to be a derived demand, which is linked to mobility policy. It is noteworthy that in this approach, mobility is regarded (traditionally) as the demand for infrastructure, which can be influenced, by mobility policy (regulatory measures and incentives with an economic, organisational and technical nature). In addition, the physical infrastructure is seen as the

supply implemented through an infrastructure policy.

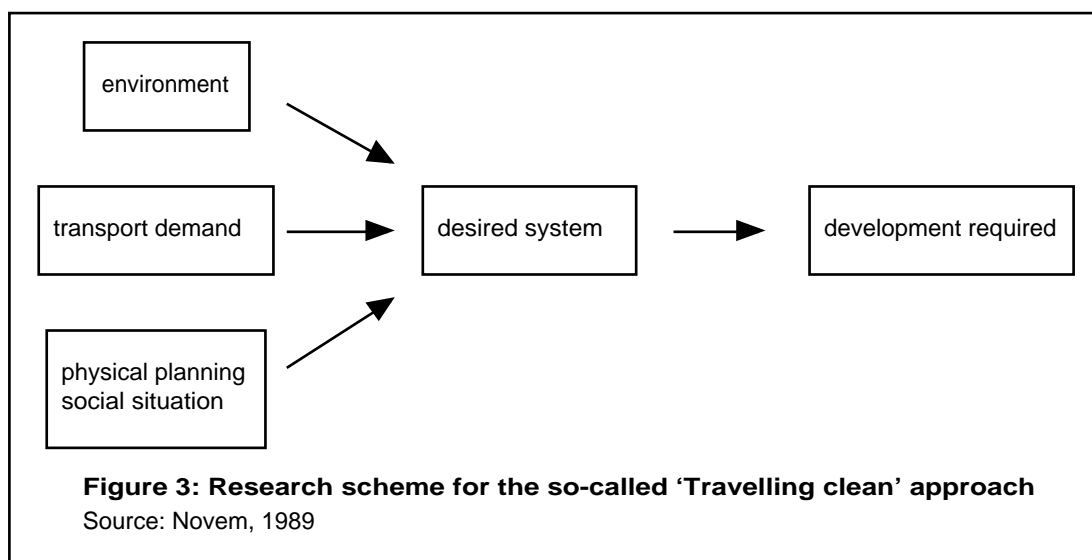
In the research scheme of Figure 3, first the target figures for emissions, energy consumption, space consumption, etc., are defined. With this data and the characteristics of the various modes of transportation, the maximum acceptable amount of traffic as well as modal split are determined.

With these current approaches, it is also unclear whether a sustainable transportation system is equivalent to a system, which is compatible with the ideas of sustainable development. According to Akinyemi (1998a), experiences in many African countries indicate that a transportation system, which meets sustainability criteria is seemingly not the same as one that satisfies the needs of the people. A sustainable transportation system is currently represented as a system which is compatible with the existing economic and other conditions, rather than a system which improves (or will improve) conditions in society.

In the following sections, the basic requirements for a transportation system which is compatible with both sustainability and development objectives will be presented. In addition, an approach for arriving at such a system will be described.

#### *Proposed approach to the problem of sustainable transportation development*

The preceding discussion shows that current approaches address the issues that result from the notion of sustainable transportation. However, it is proposed that the focus should be on a sustainably developed transportation system. This, as defined earlier, is a transportation system that meets people's needs, i.e. in terms of mobility, accessibility and



**Figure 3: Research scheme for the so-called 'Travelling clean' approach**

Source: Novem, 1989

safety, within the available or affordable environmental, financial and social resources. This implies that the problem that is to be addressed is how to move towards such a system, that is, how to develop a transportation system, that will maximise the levels of essential mobility, cost and safety of travel by people in an area without exceeding the available or affordable scarce resources of that area. The approach proposed for addressing this problem is summarised in Figure 4.

In this approach, the transportation system design problem is basically a mathematical programming problem, with the scarce resources as the optimisation constraints and a combination of essential mobility, cost and safety of travel as the objective function to be optimised.

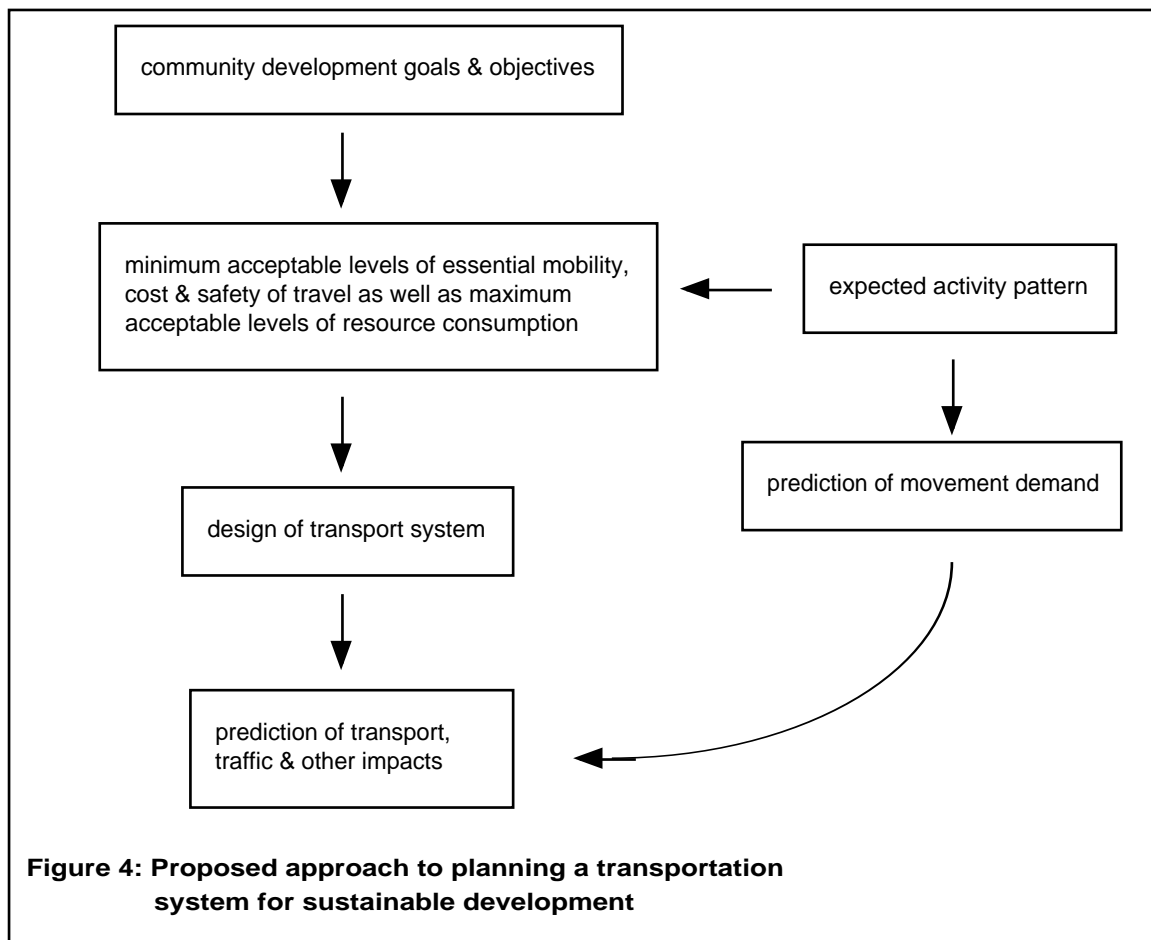
Community development goals and objectives

Environmental quality, mobility, livability and accessibility are descriptions directly related to the quality of life and the social as well as economic well being of people. Policy makers and planners often set the goals and objectives for community development. This can be at local, national and international level.

The Rio Declaration and Agenda 21, for example, describe some development goals and objectives at a global level. On a national level these goals are also defined, for example the Dutch Second Transportation Structure Plan (Ministry of Transportation, 1990), where target scenarios are defined (and quantified) in terms of (amongst others) improving accessibility, managing mobility and improving environmental amenity. Many municipalities have their development goals and objectives set at a local level, for example target reductions in accidents, land-uses, etc.

Transportation service and resource consumption limits

The overall community development goals and objectives have to be translated and quantified in terms of acceptable levels of essential mobility and resource consumption limits. Accordingly, transportation engineers and transportation planners can use these criteria and limits in the development (or adaptation) of the transportation system in the area. An example of a resource consumption limit of national level is that ‘emissions of nitrogen oxides and



unburned hydrocarbons by road vehicles will be at least 75% lower in 2010 than in 1986' or 'the use of fossil fuels and the emission of carbon dioxide by road vehicles will not increase, despite the increase in traffic' as described in the Dutch Transportation Structure plan (*ibid.*).

Transportation service criteria can be defined as the minimum desirable needs for the community, for example in terms of mobility and accessibility. The Dutch Plan continues for example 'the trunk-road network will provide for more or less direct links between 40 centres in the Netherlands and with other countries' and 'within city regions it will normally be possible to reach the main employment areas in not more than 45 minutes'. In general, current thinking is that resource consumption limits should include financial and environmental capacity as well as the amount of land available for transportation facilities.

#### Expected activity pattern

Another constraint in the design of a transportation system is the activity pattern in terms of the totality of social, economic, political and other transactions (or activities) taking place over space and time in an urban area. Consequently, in the proposed approach the design of a transportation system will be carried out based on information about the expected or desired activity pattern in the area.

#### Design of the sustainable transportation system

The actual design of the sustainable transportation system is the core part of the proposed planning approach. In this block the optimisation problem will be addressed. The minimum acceptable levels of essential mobility, cost and safety of travel as well as the resource consumption limits are the constraints in the model. Furthermore, a performance function, which reflects the needs and which, has to be optimised (maximised) subject to the different constraints, has to be defined.

This approach implies that mobility is treated as a supply variable, rather than as a demand variable. Instead of being the actual travel or trip-making characterised by measures such as kilometres per trip made by a person, number of trips made per day or year by a person, etc., mobility is defined as a qualitative term representing the ability or capacity of a group of people to travel easily in an area by various modes of transportation (Akinyemi, 1998b). Mobility accordingly becomes dependent on both the availability of modes of transportation to the group (people's travelability) as well as the ease with which members of the group can travel by the

available modes of transportation (network productive capacity).

Accessibility is also regarded as a supply variable. It is defined as a qualitative measure of the ability of a group of people to reach a specific location from another location, instead of the traditional definition of being the ease of interaction between two locations in terms of travel time or cost (Akinyemi, 1998b). In this definition, accessibility between two locations is dependent on two variables, i.e. the generalised cost of movement between two locations as well as the productive capacity of the network between two locations. Furthermore, safety is treated as a variable, which is dependent on the supply characteristics of the system.

#### Conclusions

Based on the analysis in this paper, a number of significant conclusions can be drawn. The first is that sustainable transportation development is not the same as the development of a sustainable transportation system, which is the current focus of many activities. Sustainable transportation development should be regarded as a process for harmonising the sustainability and development requirements of transportation.

The second conclusion is that the process of harmonisation, which is currently not adequately addressed, requires the development of a new planning model. This planning model should enable transportation professionals to internalise the concept of sustainable development in transportation. The main output of the model will be a set of system characteristics which are compatible with the available or allowable resources, and which can be used as criteria for the (re-)design of urban transportation systems. The process of development of the model is expected to consist of

- specification of the mathematical programming problem;
- solution of the programming problem;
- determination of types and characteristics of facilities and devices which can actualise the solution of the programming problem; and
- validating and testing the model with case studies.

These tasks are currently part of ongoing research.

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# Sustainable Transport - A Comparative Analysis of Israel, the Netherlands and the United Kingdom

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## Abstract

In recent years 'sustainability' has become an important issue in policy discussion and decision making, especially with regard to transportation. Here the role of 'sustainability' and the forms of its incorporation into transportation policy is surveyed and compared for Israel, the Netherlands and the U.K. In particular, comparisons are made and discussed across these countries based on several factors, including existence of plans (strategic and integrative), specific objectives and targets, institutional arrangements, environmental impact assessment processes, implementation tools, and political and public commitment and involvement. The comparisons highlight two major tenets of the Israeli system that present obstacles to the establishment of transportation and environmental linkages. The first involves the lack of transparency in the planning process and the corresponding dearth of political and public participation, consensus and commitment to plans. The second is the existing institutional structure.

## Keywords

Consensus building, integrated transport-environment-land use policy, Israel, Netherlands, sustainable transport, United Kingdom.

## Introduction

'Sustainable development' is a concept that has gained widespread currency in political discourse in the developed world. The World Commission on Environment and Development (1987) set out the idea in the Brundtland Report (*Our Common Future*). Although the term is still not well-defined in theoretical and operational terms, it indicates an emphasis on long-term thinking about development and the environment.

Transportation is one of the main sectors in the economy influencing both development and

environmental conditions. The transportation system impacts on the economy, regional development and patterns of consumption and production. But at the same time it is a major consumer of resources (energy, land) and also has potentially harmful effects such as inducing urban sprawl and environmental pollution. The external environmental costs of transportation have been well-documented (Button, 1993; Whitelegg, 1993). At the local level, such costs include noise, congestion, community severance, visual intrusion, air pollution (CO<sub>2</sub>, CO, NO<sub>x</sub>, PM<sub>10</sub>s, VOCs, etc.), and traffic accidents. Increasing concern about climate change and acid rain are also related to transportation pollution. All these issues have motivated the increased interest in 'sustainable transport (or mobility)' as an essential element of 'sustainable development'.

Israel is a small and densely populated country, which has experienced a very rapid rate of growth in population since its Independence in 1948. In the period 1990 to 1992 alone the population grew by almost 10% as a result of the most recent wave of immigration. Scarcity of water, limited land resources and a dearth of natural resources, together with rapid economic growth, have led the country to utilise its resources in a highly intensive manner. The prevailing practice in Israeli transportation policy is still focused on the 'predict and provide' approach, that is, to provide sufficient road capacity to meet expected growth in transport demand.

From the Israeli perspective, 'consumption' of open land by transportation facilities and the increased accessibility that transportation infrastructure provides for development of open spaces for residential, commercial and industrial uses may be the most crucial issues of sustainability, since many land uses are irreversible.

The real challenge for Israel in the 21<sup>st</sup> century is how to establish the transport-environment link



without damaging prospects for economic development. In this paper we will examine how different components of 'sustainability' as understood and defined in the planning literature and by policy makers are incorporated in transportation policy in Israel, with comparison to two other industrialised countries, the United Kingdom and the Netherlands. First we will review concepts of 'sustainability' as currently used in policy debate and discussion. We identify the specific components and criteria for assessing 'sustainability', and we then use these for the cross-country policy comparisons.

### **Sustainable Transport**

'Sustainable' development, transport, and mobility are concepts that have by now penetrated public debate and consciousness as well as academic research. However, it is interpreted in different ways by various people.

The most commonly-cited definition of sustainability appears to be that of the World Commission on Environment and Development (1987, p. 43):

'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'

Clearly this is too vague a definition to serve as a realistic guidepost for policy or decision making. Many attempts have been made to spell out the conditions under which 'sustainability' can be said to prevail. Most commonly, these take the form of stipulating critical levels of activity, quality standards, carrying capacity, vulnerability, etc. (Munn, 1989; Nijkamp & Vleugel, 1995). According to this approach, the constraints are derived from the environment and are applied to both consumption and production processes. However, there seems to be a lack of data on the present state of the environment and its sensitivity to these processes. The quantitative basis for the sustainability debate is still lacking. (Salomon, 1999). Other researchers propose a range of principles and goals that may serve as guidelines for planning and policy decisions (Blowers, 1993; Davis, 1996; Haughton & Hunter, 1994; Jacobs, 1993). These principles may be summarised as follows:

- planning should be 'environment-led', e.g., preventing or reducing processes that pollute or degrade the environment
- planning should be 'objective-led'
- planning should be supply-limited rather than

demand-driven

- planning should promote the principles of equity (inter-generational and intragenerational)
- planning should promote the principle of 'the polluter pays'
- groups and individuals must be empowered to participate in policy development

One obvious difficulty is that there are contradictions and tradeoffs among these assorted and worthy goals. For example, 'making polluters pay' in fact could mean making the consumers of the products produced by that polluter pay, and these might be poorer or lower-income consumers, hence adversely affecting the equity goal.

Emerging from the above principles is the idea of a dynamic planning process through which a community selects a long-term strategy for achievement of pre-specified goals (Nijkamp, 1994). This process is dynamic because it responds to changing economic, environmental and social pressures and thus necessarily varies across communities and over time. This process is not a neutral 'value-free' dynamic, and so one of the most serious challenges is to create political and institutional systems or planning processes within which strategies, programs and policies for sustainable development can be tested (Haughton & Hunter, 1994).

All of the above comments apply to transport 'sustainability' as well. Transport sustainability, like general sustainable development, is thought to be based on principles of 'environment-led', 'polluter should pay', equity, and so on. Specifically, it emphasises the use of regulation, market mechanisms and incentives to ensure that users pay the full social and environmental costs of their transportation decisions. It seeks to develop modes of transportation that are more environmentally friendly, while accelerating technological developments in this direction, e.g., electric vehicles and alternative fuels.

The literature debate over sustainable transport is generally detached from more general discussion of 'sustainable development'. Discussion of sustainable mobility or transport mainly focuses on externalities, especially air pollution and congestion, on energy consumption, and on the ways in which regulation and market mechanisms can redress them. In addition, proposals for Transport Demand Management (TDM), where the goal is to reduce travel in private cars, encourage use of public transit and promote investment and usage of less polluting transport modes, are often an integral part the discussion. Encouraging expanded

use of telecommunication is also regarded as a component of ‘sustainability’ (Banister & Button, 1993; Black, 1996; Davis, 1996; Plaut, 1999). Land use planning is considered to be another element that influences transport uses; it is found that the more intensive urban land use, then the shorter the travel distance and the greater the use of public transit (Newman & Kenworthy, 1991).

Many of these transport-related proposals were generated by planners and economists long before the advent of the debate over ‘sustainability’, and these existing tools have been adopted by advocates of sustainable transport. While the technical tools have existed for many years, the added dimension brought to transport policy by the debate on sustainability is the commitment on the part of the political system and the public at large to the urgency of guiding economic growth into channels that are compatible with improved environmental quality.

### The Israeli Context

Israel is a small, congested country in which most of the population is concentrated in a narrow band in its centre and along its coast. 93% of the population is concentrated in the central region constituting 40% of its land, wherein the density averages 493 people per km<sup>2</sup>. The rapid pace of development and the necessity of integrating large numbers of immigrants in a relatively short time increases the importance of physical and transportation planning in the economic

development process. From Israel’s Independence 50 years ago to the present, the population quintupled, GDP rose 23-fold, the number of transportation vehicles rose 50-fold, and the number of privately-owned vehicles rose by a factor of 200. The number of vehicles per 1000 residents and the number of kilometres travelled each are 30-times what they were in 1948. Air passengers grew 60-fold and maritime tonnage grew by a factor of 22. (Ha’shimshoni, 1998)

Historically, economic growth and population dispersal within the country have been coupled as the main goals of national planning. These goals manifested themselves in construction of a national highway grid reaching into all peripheral areas. It was only in the 1990s that there was growing public and governmental recognition of land shortages, and that continuation of existing development trends would result in damage to the country’s remaining open spaces as well as in more general environmental degradation.

Table 1 provides a time-series for selected transportation parameters in Israel.

Clearly, transport in Israel has grown significantly over the past twenty years, with motor vehicles and personal car use having the fastest growth. As elsewhere in the developed world, there are structural phenomena in Israel that cause the role of transport to increase, including rising standards of living, increased leisure time, expanded participation

|  | 1961   | 1970   | 1980   | 1985   | 1990   | 1995   | 1996   |
|--|--------|--------|--------|--------|--------|--------|--------|
| Population (thousand)                          | 2,234  | 3,022  | 3,922  | 4,266  | 4,822  | 5,619  | 5,758  |
| Population density                             | 104    | 141    | 182    | 198    | 224    | 261    | 268    |
| Road length (km)                               | 6,675  | 9,290  | 11,810 | 12,760 | 13,199 | 147    | 15,065 |
| Motor vehicles (thousands) total               | 80     | 266    | 539    | 776    | 1,015  | 1,459  | 1,543  |
| Of that, private cars (thousands)              | 29     | 148    | 410    | 614    | 803    | 1,112  | 1,174  |
| Vehicles per 1000 residents                    | 36     | 88     | 137    | 182    | 211    | 260    | 268    |
| Number of drivers (thousands)                  | n.a.   | 439    | 1,049  | 1,316  | 1,669  | 2,222  | 2,334  |
| Kilometres driven per year (millions) total    | 2,174  | 5,892  | 10,943 | 14,058 | 18,668 | 30,633 | 31,656 |
| Of that - in private cars (millions)           | 925    | 2,845  | 6,424  | 8,886  | 12,170 | 18,682 | 19,444 |
| Average 1000 kilometres driven per private car | n.a.   | 19.3   | 15.9   | n.a.   | 15.4   | 17.3   | 17     |
| Injured in traffic accidents                   | 11,162 | 19,526 | 17,881 | 18,709 | 27,668 | 38,524 | 46,534 |
| Of that, number of fatalities                  | 244    | 529    | 434    | 387    | 427    | 550    | 517    |

Sources: Central Bureau of Statistics, Statistical Abstracts of Israel, No. 40 (1989) , No. 48 (1997)

by women in the labour force, etc. These have been accompanied by changing patterns of consumption, urban sprawl, increased mobility and other factors inducing greater travel. By the end of 1998, Israelis owned 277 motor vehicles per 1000 residents, lower than the levels in Western Europe and the United States, but in the Tel Aviv metropolitan area the level is considerably higher (roughly 450, for example, in the Tel Aviv suburb of Hertzlia it is 458). The projected population for the year 2020 is 41% higher than in 1995, with the labour force growing by 54% and the number of motor vehicles per 1000 population rising by 70%. Of that, the number of privately owned cars per 1000 people is projected to grow by 145% (National Ground Transportation Plan, 1998).

As a consequence of the rapid growth in these factors, travel and freight demand is also expected to grow rapidly, indeed more rapidly than population growth, as shown in Table 2.

The above projections are based on a 'closed border' scenario, in which movement from Israel to its Arab neighbours is restricted. In this case, the demand for travel is projected to increase by 83% relative to 1995. An alternative scenario in which borders are open was investigated, and in that case travel demand grows by 137%, reaching 448,000 trips during the morning rush hour. Truck trips would more than double. Such rapid increase in travel would necessitate a dramatic increase in transportation development and infrastructure in Israel. This increase in travel holds serious implications for environmental issues; transportation for example is regarded as the main source for emissions of CO<sub>2</sub>. Allotment of land for roads and parking will also grow in tandem.

### Comparative Framework

International comparisons play an important role in providing an assessment of the range and effectiveness of transport planning approaches available in different countries and the dissemination of information regarding best practices. Transport policy and planning in the U.K. and the Netherlands will be used as comparative yardsticks for exploring transport sustainability in Israel. The rationale for selection of these two countries for comparison is size, population density and limited land resources in the case of the Netherlands, and the historic links between British and Israeli planning. In all

three countries there are similar institutional planning structures.

The Netherlands has an area of 33,936 km<sup>2</sup> and a population of about 15 million. It is densely populated, with 442 persons per km<sup>2</sup>. The population of the Netherlands is expected to rise to 16.5 million by 2015. Britain has an area of 227,400 km<sup>2</sup> and a population of about 55 million with 246 persons per km<sup>2</sup>. Israel has a current population of 6 million projected to rise to 8 million by the year 2020 within its limited land area of 21,501 km<sup>2</sup>. (This is the land area of pre-1967 Israel plus the Golan Heights. The Administered Territory of the West Bank and Gaza total 6,249 km<sup>2</sup>. In the event of peace between Israel and the Palestinians, some portion of the Territories is likely to be annexed to Israel, but this would only marginally reduce the population pressures.) Already denser than Britain, its average population density is 279 persons per km<sup>2</sup>, with a density of 372 persons per km<sup>2</sup> projected for 2020. However, 93% of Israel's population lives in an area that covers only 40% of the state's land.

The legal basis for planning in the State of Israel is the 1965 'Planning and Building Law'. This legislation is based on the British Mandate Town Planning Act of 1936 which remained in force until 1966. Since its promulgation the Law has been amended some 44 times (ISOCaRP, 1996), and although some of the changes have been quite significant, the legacy of British planning remains strong. In the Netherlands, the government, as in Israel and the U.K., controls the land development process (Badcock, 1994) and urban form is decisively moulded by physical planning in the Randstad (Clark & Kuijpers-Linde, 1994; Faludi, 1994; Priemus, 1994). Other analogies making the Dutch situation particularly pertinent to Israel include population

| Year                     | 1995    | 2020    | Ratio<br>2020/1995 |
|--------------------------|---------|---------|--------------------|
| Population (thousands)   | 5,619   | 7,930   | 1.41               |
| Employed (thousands)     | 1,968   | 3,030   | 1.54               |
| Private cars (thousands) | 1,112   | 2,700   | 2.43               |
| Trips per traveller*     | 189,000 | 346,000 | 1.83               |
| Truck trips*             | 5,000   | 10,700  | 2.14               |

\* Interurban Travel during Morning Rush Hour  
 Source: National Ground Transportation Plan, Israel Ministry of Transportation, 1998.

growth pressures (encompassing uncertainty in forecasting immigration figures) with limited land resources, concern with construction of new residential areas, and an overall central concern for national environmental policy planning (only now emerging in Israel). The British and Dutch approaches to sustainable transport are sufficiently different to provide two benchmark approaches for comparison. The British and Israeli approaches are more road-based (although the U.K.'s new 1998 policy is a step towards multi-modal) while the Dutch is considered to be more multi-modal oriented. However, the Netherlands already has a very developed road and highway infrastructure, with 2200 kilometres of highways and another 1400 kilometres planned. The Dutch have long been policy leaders with their integrated approach to transport and the environment. They have published a number of strategic policy plans, such as the National Environmental Policy Plans (NEPPs) and the Second Transportation Structure Plan. In contrast, the U.K. has only recently published a White Paper (1998) emphasising integrated transport, and Israel, as yet, has no equivalent strategic policy plan for all modes of transport.

All three countries are faced with the problem of maintaining environmentally damaging transport activities within environmental limits without incurring economic losses. In the Netherlands, the Port of Rotterdam has become one of the largest in Europe, while Schipol Airport plays an important role in the transport of passengers and goods. Israel still functions as an isolated 'island' due to political obstacles. Some borders are now open but there is very limited traffic between Israel and its surrounding Arab countries. However, if the peace process succeeds and borders are reopened, Israel may become more similar to the Netherlands, and play a more central role as a transport and transit centre for the region.

In the next section criteria for assessing aspects of sustainable transport are presented and compared across the three countries: the U.K., the Netherlands and Israel.

### **Structured Comparison: Israel, United Kingdom and the Netherlands**

We have structured the comparisons around the following components:

- existing plans (strategic and integrated),
- explicit objectives and targets,
- institutional structure,
- environmental impact assessment process,

- implementation tools, and
- political and public commitment and involvement.

The criteria of analysis represent those typically raised in the debate over sustainability with the hope that tackling these components in combination will help lead to the successful achievement of sustainable transport. The comparisons are summarised in Table 3, and then elaborated on below.

#### *Component 1: Existing plans*

Strategic and integrated plans play an important role in the implementation of sustainable development. They ensure that the whole range of alternatives are considered, that transport problems are dealt with adequately and with minimal impact on the environment. Here we explore two elements, the existence of national strategic and comprehensive transportation plans, and integrated land use-environment-transport policy and planning.

#### **United Kingdom**

The U.K. currently has no overall strategic development plan, but as of 1998, *A New Deal for Transport, Better for Everyone – The Government's White Paper on the Future of Transport* outlines a new comprehensive approach to transportation policy. It 'reflects the Government's commitment to giving transport the highest possible priority' (John Prescott).

The focus of the White Paper is on integrating transport with other aspects of Government policy. It sets the framework within which the detailed policies are to be developed. Integrated transport is defined broadly and specified as:

- integration within and between different types of transport;
- integration with the environment;
- integration with land use planning; and
- integration with policies for education, health and wealth creation.

Until 1998, on both the policy and implementation levels, the British approach was often characterised as ad-hoc problem solving rather than comprehensive strategic planning (Banister, 1994; Haq, 1997).

Early attempts to develop an integrated transport policy in the U.K. (the first notable one was developed in 1966 in the Buchanan Report, which stressed the connection between transport and land use), were increased during the late 1980s and 1990s when policy makers began considering the wisdom of an integrated approach and government thinking began to consolidate transport, environment and land

**Table 3: Comparisons of ‘Sustainability’ Components – Israel, UK and the Netherlands**

| Criterion  | Israel   | UK  | Netherlands  |
|--|--|---|--|
| <i>Existing Plans</i>                                    |  |   |  |
| Strategic National Plans                                 | Exist  | Do not exist  | Exist  |
| Integrated Transport-Environment-Land Use Plan           | co-ordinated, not integrated                                       | Exist, in the form of policy guidelines   | Exist  |
| Integrated Transport Plan                                | Only ground transport, non-statutory (1999)                        | Exist (1998, Integrated Transport White Paper)  | Exist  |
| <i>Existence of</i>                                      |  |   |  |
| Objectives   | Exist, but not consistent among sectors                            | Exist,  | Exist, explicit  |
| Targets  | Do not exist   | Exist, very few explicit; in the process of formulation (post-1998)                       | Exist, well defined, ambitious, with direct measures   |
| Orientation of Transport Planning                        | Road-based   | Road-based until 1998*; emerging multi-modal  | Multi-modal  |
|  | Problem-solving, demand driven                                     | Problem-solving, demand-driven  | Integrative transport-environment  |
| <i>Institutional organisation of transport</i>           | Dispersed; Privatisation beginning                                 | Dispersed; Privatisation, renewed emphasis on government intervention                     | Dispersed but co-ordinated (DOE); Privatisation  |
| <i>Environmental Impact Studies</i>                      | Environment Impact Statement (EIS); Mandatory for air and seaports | Environment Impact Assessment (EIA); Mandatory for all transport infrastructure           | Strategic Environmental Assessment (SEA); Mandatory for all transport infrastructure   |
| <i>Implementation Tool Packages Connected to Targets</i> | Do not exist   | Beginnings: 1994-95 Transport Policies and Programme bids, reinforced by 1998 White Paper | Exist  |
| <i>Political Commitment</i>                              |  |   |  |
| International  | Earth Summit**   | Earth Summit  | Earth Summit   |
| National   | commitment does not permeate all levels                            | Declared commitment (1998) aimed all levels   | horizontal and vertical commitment across government   |
| Public Participation                                     | Minimal and only as opposition in the late planning stages         | Minimal   | Widespread participation in planning at all stages, policies are the result of extensive networking and consensus building, approach characterised by negotiations |

\* 1998 White Paper on Integrated Transport changes the orientation, too early to assess impact.

\*\* One of the treaties prepared for the Earth Summit was The Convention on Climate Change. Developed nations are to return to ‘earlier’ emission levels by the year 2000, set national emission limits and report on progress. Specific commitments to limit emissions of carbon dioxide were diluted to more general non-specific wording immediately prior to the Rio Conference (Susskind, 1994). To date there are over 150 signatories among them the U.K. & the Netherlands. Even given the diluted commitment to carbon dioxide reductions, Israel is not a signatory to the treaty.

use. The Department of the Environment's (DoE) 1990 White Paper, *This Common Inheritance*, set forth a number of policy guidelines for localities that made explicit the interconnection of land use planning and transportation, and examined the potential for reducing CO<sub>2</sub> emissions.

Since the 1990 White Paper, the U.K. has been attempting to encourage and integrate transport and land use planning in practice. This change is outlined in *Sustainable Development: the U.K. Strategy*, where the government again emphasised the necessity to minimise the need to travel. In March 1994 the government published further planning policy guidance (PPG 13) on transport to meet its commitments. The newest 1998 Integrated Transport White Paper heralds a radical change in British transport policy encompassing a vision of a transport system that supports sustainable development and calls for revisions in the planning guidelines. It is too early to evaluate its impact and implementability, although some critics are already pointing to inaction.

#### The Netherlands

In the Netherlands transport has become an integral part of environmental and land use planning and policy. Here, different strategic national plans exist. There is a Land Use Plan (*Vierde Nota Ruimtelijke Ordening*), an Environmental Policy Plan (*Nationaal Milieubeleidsplan*) and a Second Transportation Structure Plan (*Tweede Structuurschema Verkeer en Vervoer*). These plans together form an integrated Transport-Environment-Land Use Plan. Planning in the Netherlands is transparent and plans are used as policy guidelines. The statement of national planning policy, formulated in 1960, was followed by three national physical planning reports. The doctrine behind this planning is cumulative and progressive with conceptual consistency among plans, and is based on public and political consensus (Faludi & Van der Valk, 1994). However, until the early 1980s environmental policy here also took an issue-by-issue approach (De Jongh, 1996). A process begun in 1985 led to the passing of the National Environmental Policy Plan (NEPP) in 1989, followed by NEPP+ in 1990. This was the beginning of integrated environmental policy planning. The national policy plans for different sectors are comprehensive and detailed.

During the process of environmental plan conception, which was co-ordinated by the Ministry of the Environment, themes, defined as areas of environmental problems, were identified:

acidification, eutrophication, waste generation, dispersion/toxication and disturbance (local hindrance, noise, etc.). Integrated analysis of these themes was required, under the direction of senior level theme co-ordinators. Four economic sectors were targeted as the most likely to affect and be affected by the policies to be developed. Transport was one of the target groups, along with agriculture, energy generation and refineries (De Jongh, 1996). After the NEPP was published, many public and private institutions started to develop their own Environmental Policy Plans, often as a translation of the NEPP to fit the setting of the specific institution. The timeframe for strategic plan renewal and update is four years. NEPP was followed by NEPP-2 (1993) and NEPP-3 (1998). NEPP-3 sets the broad policy to be pursued for the period 1999 to 2003 inclusive, taking as its horizon the year 2010. The major policy innovations of NEPP-3 are in the areas of the interrelationship with and dependence on international (European) policies and the realisation that reaching some of the Dutch environmental targets will result in a relative slowdown in economic growth unless co-ordinated with other European countries.

In the area of transport, the Second Transportation Structure Plan was among the documents approved by government in the early 1990s. In the year 2000 a new national transport plan is to be published. A preliminary document which sketches some policy options for the future is presented in a 'perspectives memo' which was compiled by multiple stakeholders (Ministry of Transport, Public Works and Water Management, 1999).

#### Israel

Integrated planning in Israel was spurred by the fact that the country found itself unprepared from the standpoint of planning when approximately one million immigrants arrived from the former Soviet Union in 1989. The last physical land use plan had been published in 1951, and was already obsolete by the mid-1960s. Until the 1990s there was no integrated planning; plans were primarily physical and sectoral. During the 1990s three comprehensive plans were initiated: one long-range master plan to guide the development of comprehensive national statutory plans through 2020 (Technion *et al.*, 1997), and two statutory National Outline Schemes (National Board for Planning & Building, (NOS 31) 1993 & (NOS 35) forthcoming).

There were many sectoral national plans in the

thirty year interim, each of them stemming from demand-based projections in the specific field it covered (water, tourism, coastal zones, sewage, etc.). Two of them, Distribution of Population (NOS 6, 1975) and the Road System (NOS 3, 1976), formed the foundation of the first comprehensive five year National Outline Scheme (NOS 31, 1993), which dealt with the subject of mass immigration during a short period of time in an integrated way, looking at physical, economic, social and organisational issues. In some sense, this first comprehensive plan is less integrated and performs more of a co-ordinating function between the various sectors which, until now, were presented in separate national outline schemes. One of the many volumes which make up NOS 31 is on Sustainable Development. It is notable that 'sustainability' was NOT integrated into the general plan, but rather is presented in the form of a separate chapter, as an additional sector to be addressed. The proposed Trans-Israel highway, which is intended to function as a national axis route promoting the development of the periphery by providing a rapid traffic connection with Israel's centre, was promoted separately in NOS 31A (1996).

The Israel 2020 project was officially launched in May 1991 and completed in 1997 for the purpose of preparing comprehensive and non-statutory strategic documents, which will form a framework for national plans for the next 30 years. Special teams were set up to study separately environmental and transportation issues. Ten critical planning areas were targeted, among them environmental sustainability, transport and telecommunications. An assessment of the sensitivity of open space was an important element in formulating the preferred alternative (Feitelson, 1995; 1996b).

The forthcoming National Outline Scheme (NOS 35), which is to be the successor of NOS 31 but still in the final development stages, is concerned with development and building. The focus of the plan is to define those lands to be developed by the year 2020 and those which should be preserved. Here the term 'sustainability' is integrated into the plan's concepts (not a separate chapter), although no operative definition is offered. Separate teams are working on issues of transport and environment.

As well as being represented in the long range master plan ('Israel 2020') and comprehensive National Outline Schemes, transportation is covered in separate sectoral national plans, including NOS 23 for Railroads (1986), NOS 3 for Roads (1976), NOS 15 for airports (not yet approved) and NOS 4 for the Ben

Gurion Airport (1969). There are numerous plans and updates of transport networks, each resulting from either new demand-projects or local problem-solving needs. As a result of the decade-long period of public debate and planning for Israel's Trans-Israel Highway, one of the main concerns voiced has been that the highway was not planned, nor its impact assessed, within the broader context of a national multi-modal transportation master plan (Garb, 1997). Indeed the absence of such a strategic plan has greatly weakened the relatively new metropolitan transport plans which have been written during the 1990s. These metropolitan transportation plans were prepared in a vacuum – detached from the metropolitan area physical land use plans. (For instance, the Transportation Master Plan for Metropolitan Haifa was completed in 1994, while the Haifa Regional Land Use Development Plan, initiated in 1996, has yet to be completed.) In 1998 a comprehensive and non-statutory Ground Transportation Strategic Plan was published. While it is the first multi-modal document, it looks solely at roads and rail, for a timeframe of 25 years hence.

#### *Component 2: Objectives and Targets*

Clear objectives and targets provide a tangible commitment to take action. They set specific end-points against which policy can be evaluated and progress assessed. The focus of this section is on objectives and targets concerning transport and environment.

#### United Kingdom

Government transport policy in the U.K. has very few explicit objectives and targets and has failed to be integrated sufficiently with other environmental and land use policies. The general objectives that have been articulated are the reduction of energy consumption, easing traffic congestion and reducing air pollution. Other objectives include maintaining and managing the road network in a cost effective manner, while making the best use of the existing network.

The Department of the Environment's 1990 White Paper, *This Common Inheritance*, examined the potential for reducing CO<sub>2</sub> emissions. Following this, policy guidelines were published: *Development Plans and Regional Planning* (PPG 12) by the Department of Environment in 1992; *Reducing Transport Emissions Through Planning*, a joint publication with the Department of Transportation in 1993, and the 1994 *UK Sustainable Development Plan*. Taken as a whole, these policy statements and the associated detailed guidelines encourage local planning authorities to

pursue policies that promote the use of public transport in identifying areas for new or intensified development. They conclude that land use planning can contribute to reducing demand to travel and hence CO<sub>2</sub> emissions, and that planning policies in combination with transport measures could reduce projected transport emissions by 16% over a 20-year period. A 10-15% saving in the use of fuel, and hence reduced emissions from passenger transport, might be achieved through land use changes at the city region scale over a 25-year period (Haq, 1997, p.70). However, no specific targets were set to realise these goals.

In March 1994 a further planning policy guidance (PPG 13) was published. Its aim is to ensure that local authorities co-ordinate land use policies and transport programs, to reduce growth in the number and length of motorised journeys and to encourage alternative modes of transport with a lower impact on the environment. Local authorities are establishing targets for restraining motor traffic and increasing modal share of public transport, walking and cycling (Davis, 1996). The year 1993-4 was a turning point in transport objectives, from single (roads) to multi-modal policies. A circular on Transport Policies and Programme Submissions directed new proposals to include public transport, traffic management and parking restraint, in addition to roads. The government, however, has failed to set a significant number of definite targets. The one targeted objective set by the government relates to safety and aims to reduce the casualties by the year 2000 by one-third from those reported in 1987 (Haq, 1997). The U.K. *Sustainable Development Plan* acknowledged the need to set environmental quality objectives and targets to guide policy, which 'should be based on sound science and cost-benefit analysis' (DoE, 1994, p.16). The Royal Commission on Environmental Pollution has produced two comprehensive reports on reducing transport impacts on the environment and proposed targets to drive the process.

To date the British government has become more articulate in presenting policy guidelines with integrated messages, aimed at developing a more sustainable transport system, and its policies are beginning to be led by objectives (e.g. the new strategic aim and new objectives for the Highways Agency which call for giving a higher priority to better maintenance and use of existing roads and a greater emphasis to environmental and safety objectives). The need for clear and challenging targets has been taken up by the 1998 White Paper on Integrated Transport A

*New Deal for Transport: Better for Everyone*. It is unclear whether the government will still be wary of setting actual targets which, in the words of the former Secretary of State for Transport, Brian Mawhinney, in 1995:

'cannot be achieved... Such demand targets would carry the risk of failing to meet them – a problem which my Dutch counterparts are now facing' (quoted in Haq, 1997, p.83).

#### The Netherlands

The Dutch have made considerable progress towards defining sustainability, setting ambitious targets and taking measures within the environmental field. The Dutch approach to transport and the environment provides a contrast to that of UK. It has tended to be based on explicit targets and direct measures, and integration with other main national policies, e.g. environment, physical planning, nature and water management, and negotiated solutions (Haq, 1997).

The objectives are clear and strategic, and were developed around the analyses of the various themes. These analyses determined that, given the economic developments, both actual and projected, emission reductions of 70-90% were necessary for almost all environmental themes. In terms of transportation, numerous policy documents point to efficiency, fairness, safety and environmental protection as the guiding considerations for development. All costs relating to transport, including external costs, would have to be charged to the transport system user in order to avoid biased travel choices. (Nijkamp, 1994). Investment policy and regulation are other instruments.

Specific and ambitious targets in the areas of mobility, accessibility and environmental protection have been set to reduce levels of transport pollutants; for example, by 2010 NO<sub>x</sub> and HC is to be 25% of the 1986 level, CO<sub>2</sub> emissions will be set at 90% of the 1986 level, road deaths and injuries are to be halved over the 25 year period (Rietveld, 1993), and a 35% reduction in the predicted growth of vehicle kilometres travelled by 2010 (Haq, 1997). An evaluation of Dutch Transport Policy done by the Ministry of Transport, Public Works and Water Management in 1996 has shown that out of 36 total targets, 18 will or are being met, 9 will not be met and the fate of the remaining 9 is unclear (Haq & Bolhuis, 1998). For the new emerging transport plan, objectives and targets are under discussion. A major question, still being debated, is the way in which objectives and



targets will be presented, quantitatively or qualitatively, framed in a more general or specific fashion. For instance, the notion that emission reductions of 70-90% are necessary for almost all environmental themes was too generally formulated in the current plan (Peter Gerbrands, *pers. comm.*, 1999).

#### Israel

Overarching strategic objectives (including sustainability considerations) feature prominently in Israeli planning documents. For example, in both the Israel 2020 master plan and the most recent National Outline Scheme (NOS 35) the language of 'sustainability' and environmental quality and protection is clearly manifested (Feitelson 1998). These plans contain the overall objectives of preservation of natural resources and environment, landscape, history and archeology, as well as efficient use of land resources. The plans are then divided into sections, including demography, economic development, agriculture, environment and infrastructure. The environmental chapter, presented towards the end of the plan, mirrors the environmental objectives included in the overall goals. It asserts that the comprehensive alternatives to be chosen will be those which are most environmentally sustainable across sectors. However, sustainability is not defined, and, when it comes to evaluating alternatives, environmental criteria do not have priority.

The only reference to transportation involves the overall goal of encouraging public transport preference and reducing private vehicle use. However there are no more specific objectives or goals for the transportation sector. The transportation approach is based on projected travel demand and the options required to meet it. In the main, this is by road construction and, when construction of new roads or expansion of existing ones are no longer possible, rail is seen as an option. The transport objectives mentioned in the environmental chapter of the plan, are not reflected in the objectives of the transport chapter. Beyond the general objectives of sustainability, there are no targets whatsoever.

Underlying the objectives of the 1998 Strategic (non-statutory) Ground Transportation Plan is a semi-articulated assumption that growth in demand is inevitable and should be provided for. There are no specific transportation-directed environmental targets and no consideration of the need to deal with the negative environmental externalities.

#### Component 3: Institutions

The institutional arrangement is a fundamental factor affecting the ability to create and implement cohesive and sustainable plans. The focus here is on the degree to which the institutional framework in each country promotes integrated environmental transport planning and implementation.

The institutional structure of planning in all three countries is similar. It is the product of deeply rooted national planning processes, which historically have been highly centralised, hierarchical and statutory. Three administrative levels dominate, ranging from the national to the regional/metropolitan to the local. Each level has different responsibilities for the provision of transport infrastructure and physical planning. A number of bodies exist at each level that work specifically within the area of physical planning.

#### United Kingdom

In the U.K., the two dominant levels of planning are the central and local governments. The regional level is currently not significant, although there is a growing emphasis on regional liaison by development plan authorities. The local level is administered as a two-tier system of counties and districts, but is evolving towards adaptation to a unitary system of metropolitan districts (Greed, 1996). Institutionally, transport, land use and environmental policies have been carried out by separate entities, and the lack of integration was heightened by the ambiguous relationship between the Department of Transport and the Department of Environment:

'In the past land use planning has tended to have little effect on transport programs. The failure to develop a responsive inter-departmental relationship has resulted in policies being pursued which have encouraged greater use of the motor vehicle' (Haq, 1997, p.68).

The Department of Transport and the Department of the Environment merged to form the Department of the Environment, Transport and the Regions (DETR) when the new Labour Government came into power almost three years ago. More recently, the DETR has initiated a number of publications spelling out policies in the 1998 Transport White Paper, e.g. *A New Deal for Trunk Roads in England*, trying to integrate transport with environmental objectives.

In the 1980s and 1990s the U.K. underwent extensive privatisation of transport industries and the establishment of new regulatory regimes to allow greater competition between operators. The objective

of privatisation was to introduce greater efficiency in transportation and reduce levels of public funding for both capital investments and revenue support (Banister, 1993). The 1998 White Paper recognised that privatisation, deregulation and competition, which were the key features in transport policy in the late 1980s and 1990s have failed to deliver an integrated transport system and called for increased governmental intervention on all three levels – national, regional and local.

On the national level, the White Paper calls for a new independent Commission for Integrated Transport as well as a new Strategic Rail Authority. The regional level is to be strengthened by reforming the Regional Planning Guidance to include a regional transport strategy, and invigorated Regional Development Agencies. The centrepiece of the White Paper is the development of new 5-year local transport plans. The rationale is that these plans will be key in delivering integrated transport on the local level. They will cover all forms of transport and provide a basis for an integrated approach, closely linked with Local Agenda 21 strategies and will implement the transport aspects of development plan strategies. (*A New Deal for Transport: Better for Everyone*, 1998).

An additional outcome of the White Paper is the Transport Bill of December 1999 whose aim is to give effect to the government strategy of integrated transport – on national air traffic and local passenger transport services, as well as to reduce road congestion and pollution. The Bill defines local transport authorities whose duty it is to produce the local 5-year transport plans. (Transport Bill, 1999)

#### The Netherlands

Three administrative levels also exist within the Netherlands: the national level, the twelve provinces of the provincial level, and the municipal level. Here, the central government has a co-ordinating role. For the central environmental plan, the Ministry of the Environment has the lead, for the more specific transport plan, the lead is taken by the Ministry of Transport, Public Works and Water Management. The existence of different ministries and plans is not seen as an obstacle to the development of integrated plans with comprehensive targets (Gerbrands, 1999). The national government is responsible for the main road infrastructure and rail infrastructure. The rail company, Nederlandse Spoorwegen (NS), is a private organisation that has the right to exploit the rail network for several years.

There is an ongoing discussion about the tendering policy (especially with respect to the new high speed rail link from Amsterdam to Brussels). Investment in main infrastructure – motorways – comes from the central government, which uses tax revenues as a financing mechanism (the issue of imposing more user-related taxes is under discussion). Non-main infrastructure is financed jointly by local and central government, the trend being toward greater decentralisation to local government. (Gerbrands, 1999).

Institutional responsibility for transport is dispersed even at the national governmental level. Despite this continued dispersal, plans for environmental protection have been achieved. This is due in great part to the assignment of the Department of Environment as co-ordinator (in 1985) for environment and land use planning, and the assignment of the Ministry of Transport, Public Works and Water Management for integrated transport planning. In both cases, the Ministries are responsible for co-operation among the different ministries, departments and stakeholders.

In the area of transport, institutional change was proposed in 1993 to introduce the concept of transport regions. These regions, consisting of co-operating municipalities, were supposed to carry out the co-ordination and implementation of regional transport plans. The plans cover various issues such as parking policy, infrastructure planning and public transport (Rietveld, 1993). However, this concept was replaced by a new law on the (partial) decentralisation of planning and budgeting for transportation infrastructure.

#### Israel

In Israel as well, the administrative framework regulating public and private building and land use activities does so within a three level hierarchy – national, district and local. Over the last decade, with changes in political power and coalitions, responsibility for both physical planning and transportation has shifted from ministry to ministry, according to political considerations. The recently elected government (1999) is now presenting its reforms to governmental organisation. With regard to planning and development, the planning institutions (national, regional and local Planning and Building Boards) will move from the Ministry of Interior to the Office of the Prime Minister, along with the Israel Lands Authority (which manages nationalised land). Responsibility for ground transportation is currently

distributed among various agencies, including the Public Works Department, Israel Railroads, the Trans-Israel Highway Company and the public transport companies, and ministries (such as the Infrastructure Ministry and the Transport Ministry); these have recently come under the single umbrella of the Transportation Ministry. This reform changes the historical separation of transport policy from road planning and construction. There still remain numerous agencies with residual responsibility for aspects of transport (e.g. Ministry of Finance for fuel and vehicle tax, Ministry of Environment for air pollution emissions).

Israel is also going in the direction of privatisation of transport facilities, although this is still in the initial stages. Semi-governmental road agencies are responsible for some of the country's major transportation projects. Discussion of the bus privatisation is in advanced stages, and some local services are being operated by private operators.

#### *Component 4: Environmental Impact Studies*

Environmental Impact Assessment (EIA) has become a popular tool to assess the potential impacts of development projects in all three countries. Nevertheless the tool has a number of deficiencies. The EIA often comes too late in the planning process, does not always evaluate all possible alternatives, and examines impacts in isolation from one another. In the U.K. and the Netherlands, EIA is required for all transport infrastructure, including roads (national, regional and urban), rail and airports. In Israel Environmental Impact Statements are mandatory only for airport and seaport transport facilities, although they have been requested for many road projects.

With regard to road transport, for example, once a decision has been made to build a road, alternatives considered are normally concerned with the different alignments of the road or other design changes, and not with a comparative evaluation of non-road alternatives. (In Israel the new standard economic appraisal procedure for transport investment recommends consideration of planning alternatives to the proposed project, but this is seldom performed.) These limitations have been recognised in all three countries and Strategic Environmental Assessment (SEA) explored on various levels. The idea behind SEA is that it is necessary to integrate environment and development and that, under the assumption that planning is a rational, chronological process, the integration of environmental considerations should be scoped at the stage of conception. SEA as a tool

provides a framework for assessing the synergy of long term impacts of social, physical and environmental policies. In the Netherlands strategic environmental assessment has been implemented, in the U.K. policy guidelines have been issued, and in Israel policy makers in the Department of Environment are aware of the limitations of the current EIS system and discussion about necessary changes has begun. Given the goal of sustainable development, there is a need to assess the environmental implications of policies, plans and programs at the beginning of the planning process, which is one of the major benefits of SEA over EIA. Some form of SEA has been used in a number of countries such as Australia, Finland, Germany, Hong Kong, Japan New Zealand, California in the U.S.A. and the Netherlands (Haq, 1997).

#### *The Netherlands*

Three major differences between the EIA process as it occurs in the U.K. and Israel, versus the Netherlands, have a significant impact on its effectiveness for transport evaluation. The first is that in the Dutch EIA Act, several types of alternatives must be included in each environmental impact statement – the do-nothing option, alternatives to the proposed activity and the Best Environmental Alternative. The do-nothing option provides a description of the existing baseline conditions of the environment and the expected development, and serves as a reference point against which the magnitude and significance of predicted impacts can be measured. The Best Environmental Alternative gives priority to environmental protection over economic development.

The second major difference is that the Dutch assessment is initiated in the preliminary stages of the planning process with public participation an inherent part of the plan formulation and impact assessment. The third factor that distinguishes the Netherlands is the existence of the EIA Commission, which assists with the scoping phase in identifying the environmental parameters that the development may affect, and reviews, along with the public, the quality and content of the Environmental Impact Statement before passing it on to the relevant competent authority, who with reference to the public consultation process, make a decision on whether or not the project should proceed (Haq, 1997). There is no comparable EIA Commission in either the U.K. or Israel, which is one of the reasons why the quality of both the British and Israeli impact statements vary greatly.

## United Kingdom

In the U.K. *This Common Inheritance* (1990) concluded:

‘There is scope for a more systematic approach within Government to the appraisal of the environmental costs and benefits before decisions are taken. The Government has therefore set work in hand to produce guidelines for policy appraisal where there are significant implications for the environment’ (DoE, 1990 para 18.6, quoted in Haq, 1997, p.144).

The guidelines were published in 1991 and enhanced in 1994. To date no assessment of the effect of these guidelines on government policy has been undertaken. The 1998 White Paper recommended that Transport Impact Assessments will be incorporated in the process of assessing the environmental implications of all relevant Government policies and major location decisions. A New Approach To Transport Appraisal (NATTA) has been developed to appraise transport projects. Five criteria have been adopted for the review of trunk roads including integration, safety, economy, environment and accessibility. The White Paper recommends that NATTA, once finalised, be applied to all transport projects, including proposals for all road schemes.

## Israel

The Israeli Environmental Impact Statement (EIS) is an eight-stage procedure (MoE, 1992; Brachya, 1993). After the Planning Commission determines that an EIS is required, the Ministry of Environment (MoE) prepares guidelines for the EIS, which need to be approved by the Planning Commission requesting them. The EIS, prepared by the developer, must pass a review by the MoE, which often requires corrections. The EIS is then submitted, together with the MoE review, to the Planning Commission, which decides how to proceed with the plan.

The main advantage of the transfer of EIS methodology to Israel is that almost all changes in land use must obtain planning approval, and are thus potentially subject to environmental assessment. However, since the statutory stage is near the end of the development process, a major drawback is that such plans are submitted after all structural alternatives have been evaluated. Only the chosen alternative is brought before the Planning Commissions.

Application of EIS methodology differs with differences in land uses. Of the 158 cases for which an EIS was submitted between 1982 and April 1994, 32%

were for transportation facilities even though Statements for transport facilities are not required by law. Nearly all of the rest were divided among waste water treatment facilities and landfills, quarries, industry, power facilities (between 11 and 15% each) and others. Only two EISs were submitted for residential development. Thus, where applied, the EIS process slows the development of transportation infrastructure (i.e. roads), while not affecting residential development which is responding quickly to private demand. This creates a spatial imbalance. Residential development moves ahead and, adds strain to existing infrastructure, leading to, among other impacts, worsening congestion on transportation arteries. In many cases, when road infrastructure proposals are submitted they face considerable opposition from the new neighbourhood groups (Feitelson, 1996a).

## *Component 5: Implementation Tools*

One of the characteristics of a transport policy which takes environmental impacts into consideration is the ability to develop and implement cohesive tool packages in order to achieve the desired objectives and targets. These should be directly tied to the policy objectives and targets. In all three countries such tools exist, though often are haphazardly formulated and sporadically applied. Here, however, we examine whether tool packages have been shaped to be consistent with sustainable policy and targets.

Policy tools for achieving integration of transportation and environment targets can be described in five categories:

- regulations,
- market mechanisms,
- technology ,
- management, and
- physical planning.

In each category, some of the tools are demand-oriented aiming at changing travel behaviour; others are supply oriented, constituting measures which serve to improve the capacity and quality of the transport system (Nijkamp, 1994). Emission standards are the most popular form of regulations, other examples being parking and permits. Fuel taxes, road pricing and user charges are examples of market mechanisms, with fuel being used most frequently. Technological innovations include advances in vehicle technology and infrastructure design for engines and vehicles, zero emission vehicles, catalytic converters, electric cars, vehicle route guidance systems, etc. Management techniques might include measures such

as special car pool or public transit lanes on highways, right turns on red lights, and speed control.

Components of physical planning are concerned with the spatial location and redistribution of human activities and have a structural impact on mobility patterns in society. Components include:

- co-ordinated transport-environment- land use planning (for example, building permits for offices nearby terminals of public transport,
- discouragement of peripheral shopping malls without accessibility to public transit),
- integrated transport-environment-land use policy (compact city design, suburban concentration, parking allocations),
- expansion of physical infrastructure, and
- improvement of public transport.

#### United Kingdom

The White Paper emphasises a need for tool packages at all levels of transport planning (national, regional and local). In this document are listed all the feasible techniques discussed above. It emphasises the use of economic instruments such as pricing and taxation to send clear signals about wider social and environmental implications of travel decisions. Tightening and setting new standards (e.g for air quality, noise, fuel and vehicles) are also recommended as well as planning guidance for transport. The proposals from the White Paper have yet to be fully implemented. However, land use and urban policies seem to have been the dominant means recommended in the policy guidelines from 1993 onward. New industrial and commercial developments are encouraged to locate near public transport facilities in urban centres rather than on the periphery. Policies encourage development of urban centres as opposed to peripheral development by restricting the availability of parking, especially for locations which are adequately served by other modes of transport, and for peripheral commercial development which may disadvantage urban centres. In addition, parking is given special attention as an effective restraint measure of private vehicle usage. Included in the guidelines are the use of parking charges and tightening parking standards to restrict car use and encourage use of other modes, the provision of facilities for pedestrians and cyclists, traffic management and park and ride schemes.

'Package-oriented' funding for highway authorities began in 1994-95 with the introduction of the annual Transport Policies and Programmes bids which placed an emphasis on comprehensive

transport strategy in preparing road bids. The packages may include improvement to alternatives to the car, such as bus priority, pedestrianisation, local safety schemes, restricted parking, park and ride centres, etc. – so that highways are now only one component of the bid. (Davis, 1996; Haq, 1997)

The White Paper emphasis on the need for policy packages combined with the trend toward local-level districts, may help prod the central government to adopt cohesive tool packages to support the local initiatives and to achieve better defined targets.

#### The Netherlands

Unlike the U.K., selection of implementation tools in the Netherlands are negotiated and based on consensus building in reaching targets (NEPP+). It is also recognised that a mix of policy instruments is necessary. The overall emphasis is on structural changes in production and consumption processes (National Institute of Public Health and Environmental Protection, 1988).

Three types of policy instruments were adopted:

- general regulations setting standards for emissions, products, etc.;
- financial provisions, including subsidies, tax-reform, levies, tax-relief, etc. (Rietveld, 1993 mentions a proposal whereby firms become partly accountable for the total mobility which they generate, for example); and
- social actions, like education, public campaigns, ecoteams, environmental care systems, etc.

In past years, examples of measures in these broad categories included:

- reduction of tax deductions for commuter traffic,
- greater investment in public transportation,
- postponement of road construction in favour of attention to road maintenance (use of noise absorbing asphalt, road safety and improvement of existing road networks),
- technical fixes for improving fuel efficiency of cars,
- regulative measures directed towards providing tighter standards for noise and emissions and lowering speeds,
- education,
- parking tariffs, and
- a major shift of investment from road to rail.

Current discussions focus on three future directions (Ministry of Transport *et al.*, 1999):

- Better use of existing infrastructure
- Pricing policy (user related prices, in which

external costs are included) to achieve more efficient use of existing infrastructure.

- Investment in essential missing infrastructure links.

### Israel

In Israel, we can find examples of tools in all of these broad categories. However, they are chosen and implemented by different national and local governmental institutions with different objectives and policy agenda, and are directed at solving isolated problems. In many cases the policies to which the tools are applied are detached from transportation and environmental considerations (MoE, 1998). At times, the objectives and the tools conflict with one another. For example, in Israel, the Finance Ministry actively supports taxation policies that encourage employers to provide employees with private cars in lieu of salary hikes. This reinforces an increase of private car usage which is contrary to the objective of encouraging public transportation over private vehicle usage. This, one of many examples, is a direct result of the lack of integrated transport and environmental targets.

### *Component 6: Political and Public Commitment and Involvement*

Political commitment to sustainable development, at the level of heads of states, was given for the first time at the 1992 United Nations Conference on Environment and Development (also known as UNCED, the Rio Conference, or the Earth Summit). Nearly 100 heads of state attended. Participating governments committed themselves to developing national sustainable development strategies. Agenda 21 is the text of agreements negotiated by the participating governments to the Rio Conference which proposed strategies for coping with environmental issues. It states that

‘Environmental issues are best handled with the participation of all concerned citizens... and the opportunity to participate in decision-making processes.’ (Earth Summit, Agenda 21, Principle 10, p.10)

In the last few years there have been many studies that support this premise and view the development of consensus as a prerequisite to developing effective strategies for complex and controversial matters of growth and environmental policy and management. Consensus building is a valuable co-ordination technique for growth management, but through a horizontal and self-managing process rather than a top-down exercise of power (Innes, 1996).

The U.K., the Netherlands and Israel all

participated in the Summit and are all politically committed to the concept of sustainable development. The level of commitment varies according to the specificity of objectives and targets of each country. However, the Netherlands is clearly in the vanguard with respect to the participatory/consensus-building component of this commitment it has demonstrated over the last two decades.

### United Kingdom

The 1998 White Paper recognises that the public debate on the balance between development and environment will provide critical input to transport sector policies. It mentions that local authorities will prepare the 5-year local plans in consultation with local people, businesses, transport operators and community groups. With regard to the new – to be developed railway system, it is stated that statutory passenger representative bodies will be given greater responsibilities. At this policy level, the concept of participation is voiced, although specific mechanisms are not defined.

### The Netherlands

The Dutch NEPPs are striking examples of long-range policy-making in environmental management at the national level. They set out ambitious policy goals, cutting across administrative boundaries, economic sectors and levels of activity from the local to the international. The policy is the product of extensive networking and consensus building, an approach characterised by negotiations with important agents of economic change and oriented towards market forces, while safeguarding the future of the environment as a national interest. (De Jongh & Captain, 1999). The concept of preserving the environment as a national interest has broad political and public commitment, a notion which has been nurtured over the last 15 years. Dutch citizens feel that planning in the Netherlands has been effective (Faludi & van der Valk, 1994); plans are implemented, not shelved. One of the keys to this success is that planners see their role as consensus builders:

‘planners are not the passive recipients of the values on which they base their plans, but rather organise consensus on issues regarding their work... to organise consensus is a political role’ (Faludi and van der Valk, 1994, p.12)

The public consensus building process which was undertaken, led both to plans and to institutional change. The Department of Environment developed the structure for integrated environmental policy

around the themes and economic sector target groups. For each target-group a senior level target group manager from the Department of Environment was assigned to nurture and maintain working relationships with the group and to co-ordinate all the policies and negotiations which may affect it. In 1992 the organisational structure of the Department of Environment was changed to coincide with the target group structure. (For more detailed analysis of this process, see De Jongh, 1996. Paul De Jongh spent 20 years in the Dutch Environment Ministry, served as project leader of the first NEPP and as Deputy Director General for the Environment.)

Both the process and outcome of this dialogue lead to a more general strategic approach to promote the involvement of all stakeholding economic sectors and represent a drift away from the original idea of a more prescriptive strategic plan (NEPP+, 1990). In terms of the emerging strategic transport plan, the broad dialog led to a more general strategic plan, drifting away from its prescriptive predecessors.

In NEPP+ (1990) it was also decided that the overall mechanism of implementation would take place via negotiated agreements and covenants as opposed to regulations. Under a covenant, business leaders cannot claim that government is setting unreasonable terms, because they have signed an agreement accepting these terms. Covenants also require company executives to put their own credibility on the line. De Jongh, when assessing the impact of covenants to date, believes that these have

- led to greater progress than could have been expected using only traditional regulatory means,
- built strong working relationships among environmental organisations and companies, and
- encouraged better communication resulting in the achievement of quite ambitious targets (De Jongh & Captain, 1999, p.169).

Between 1985 and 1999, almost 100 industry covenants have been signed. Among them are covenants on

- the Transport Sector (1995),
- Netherlands Railways (1997),
- Air pollution from trucks and buses (1987),
- Clean-up of contaminated soil of petrol stations (1991),
- Waste transport (1987), and
- Environmental measures for road transport (1989) (De Jongh & Captain, 1999, appendix).

While preference is given to a process of self-

regulation as opposed to top-down imposition of regulations it was recognised that some sectors are more open or prone to self-regulation than others, and that a mix of policy instruments would therefore be necessary.

The Netherlands' Second Transportation Structure Plan reflected this emphasis on participation. It was presented to the public and advisory bodies to obtain recommendations and develop discussions which, among other achievements, led to the covenants with the Transport Sector and Netherlands Railways. This involved key figures within the transport field and included user groups, industry and trade unions. Consultation was seen as providing the basis of agreement with organisations and individuals, building consensus to enable the implementation of policies. The consultation process resulted in two further reports – Part B: public consultation responses and Part C: recommendations from expert groups.

### Israel

In contrast, in Israel, public participation takes place according to the 'Planning and Building Law' of 1965. The law requires planning authorities to publicise projects and hear public opposition. This occurs after alternatives have been chosen, and the projects have been crystallised and are waiting for final approval. The public which is eligible to object at this stage is defined as those who can prove a direct connection to the land in question. In addition, the Society for the Protection of Nature in Israel, an environmental NGO, also has the right to present opposing arguments at this time. This procedure (of 11<sup>th</sup> hour objection by directly affected parties) results in participation being, by definition, negative, and is seen by localities and developers as an obstacle to progress.

Public objections before the final stage of project approval often result in project delay but very rarely result in significant changes to, or cancellation of, plans. Because of the lack of transparency during most of the planning process, plans are developed without public knowledge, participation and certainly without consensus. This results in plans which are often technically and professionally impressive, but which for the most part are not implementable.

In the last year, the Israeli Ministry of Environment, with United Nations funding and Dutch guidance, launched a project aimed at building consensus about sustainable development among professionals in key sectors: industry, energy, tourism, agriculture, the urban sector, and transport. Thus far,

preliminary papers have been published (Ministry of Environment, 1999) but there are no conclusions or final agreements. Should consensus be forged in some or all of these working groups, the MOE's hope is that the government would adopt and implement the policy. Given the lack of consensus on sustainable development targets on both the national and grass roots levels, the MOE decided that for Israel, perhaps consensus building might catch on first with mid-level professionals involved in targeted sectors. As the project enters its second year, time will tell.

### **Conclusions: Implications for Israeli Transport Policy**

The concepts of sustainability in general and sustainable transport specifically are appealing but elusive. In this article, tangible components of environmentally sound transport planning have been identified and compared among Israel, the U.K. and the Netherlands. Taken together, the categories used in the foregoing analysis may help policy-makers conceptualise and implement sustainability more concretely, and locate decisions on particular transport projects within the context of overall environmentally sound policy.

Israel currently has an arsenal of updated comprehensive plans through to 2020. Sustainable objectives are incorporated into these plans. Thus, the concepts of preserving open spaces and increasing urban densities highlight the concern with spatial location of land uses, human activities and its affect on mobility patterns. Transportation plans are beginning to focus on multi-modal policies and privatisation is under consideration.

Despite this progress, the comparisons highlight two major tenets of the Israeli system that present obstacles to the establishment of transportation and environmental linkages. The first tenet involves the lack of transparency of the planning process and the corresponding dearth of political and public participation, consensus and commitment to plans. The second is the existing institutional structure.

Israeli planning is prescriptive and not negotiated. Participation in policy and planning is very limited and by law, it is characterised by opposition to plans as they are presented in their final stages. There is not only a lack of public consensus on growth issues but there is a lack of political consensus and commitment to sustainability at all levels. This results in plans with no clear targets to meet plan objectives. And more importantly, it results in plans that, instead of being implemented and used as guidelines, are shelved, while policy decisions are taken on an ad hoc basis, in

a reactive way.

The second major limitation of the Israeli system is institutional. Plans and policies, as in the U.K. and the Netherlands, are made at many different levels and by many different bodies. What the Netherlands structure offers, in the co-ordinating role of the Ministry of Environment, and the U.K. may offer in the future with the tendency to a unitary system of metropolitan districts, is lacking in Israel. This results in two major drawbacks. The first is an inability to integrate transportation programs with land use development consistent with environmental goals. The second is the inability to develop comprehensive transportation policies and packages aimed at reaching predesignated, comprehensive targets, that would include multi-modal elements, pricing and regulation strategies, emissions standards, technology components and management techniques.

The changes called for in broadening participation and developing a framework for co-ordination among institutions can be achieved within the existing legal structure. Empowerment and consensus elsewhere has either been initiated by the top levels of government (as in the Netherlands), by citizen grass root demands (as in the U.S.A.) or by local governmental pressures (as is beginning in the U.K.). In Israel, none of these sectors has wholeheartedly embraced such an effort.

Israel's land scarcity, combined with the projected growth in economic activity and demand for transport means that difficult choices will have to be made. Sustainability means a reduction in consumption, changes in land use trends and a higher price for travel. This cannot be achieved without initiating processes of public participation and consensus building leading to targets and integrated implementation packages.

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