Urban transport in Swedish development cooperation

September 1999

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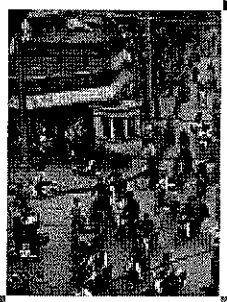

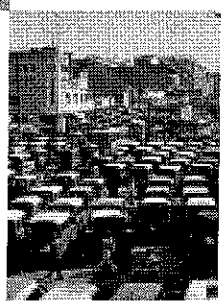

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Background papers

1. Experiences of Swedish Aid in Urban Transport (CONTRANS, 1998)
2. International Experiences and Development Strategies in Urban Transport (CONTRANS, 1998)
3. Urban Transportation – priorities for Swedish aid – a contribution from the Swedish Environmental Protection Agency, 1998
4. Urban Transport in a Road Safety Perspective (Swedish National Road and Traffic Research Institute, 1998)
5. Physical Planning and Sustainable Urban Transport – a Comparative Analysis of Four International Cities (FFNS Arkitekter, 1998)
6. Swedish Competence and Resource Base (Stig Egnell, 1998)

All papers are available in full-text pdf-format at Sida's web site (www.sida.se/urbantransport). They can also be ordered from Sida's Urban Development Division (e-mail: madeleine.goetzinger@sida.se).

Urban transport in Swedish development cooperation – Summary and policy conclusions

The purpose of this policy document is to provide support and guidance for Sida and the embassies in the identification, screening, assessment and preparation of urban transport projects. It should further be a tool for information to interested counterparts in recipient countries and in Sweden on how Sida intends to work with urban transport, what thepriorities are and the criteria for projects to be considered for support. The policy should apply to all forms of development cooperation within Sida.

A general conclusion is that urban transport is an essential element of urban development and a relevant area for Swedish development cooperation on account of its impact on urban poor, the urban environment and the urban economy:

- Efficient, safe and affordable urban transport systems which include disadvantaged areas contribute to the alleviation of urban poverty and promote socio-economic and gender equality.
- Urban traffic is a major environmental problem and only coordinated actions guided by a consistent policy can succeed in dealing with the problems caused by rapidly increasing motorised traffic, polluting engines and inferior fuels.
- Efficient urban transport systems contribute to urban productivity and national economic growth.

Urban transport is further an area for which cooperation partners in developing countries increasingly need and request support and in which Sweden has a well-developed base of considerable know-how including two of the major bus manufacturers in the world.

Sida shall therefore systematically broaden development cooperation in the urban transport sector. The goal shall be as follows:

Sida shall contribute to the development of efficient and sustainable urban transport systems which promote economic and social development, improve the environment and reduce the risks for human life and health.

However, urban transport is a wide concept which includes a number of areas such as physical infrastructure, vehicles, forms of management and organisation, safety, legislation and so forth. It is also closely related to urban and developmental issues such as land use planning, municipal government, environmental policies, private sector development and many other areas.

Based on policy options favoured by Sida, the following five priority areas have been selected within the urban transport sector:

1. *Comprehensive urban planning including land use planning and transport planning with a particular emphasis on public transport, non-motorised transport, traffic safety and environmental control.*
2. *Public transport based on buses and organised to permit competition between private operators while retaining public control through regulatory measures.*

3. *Non-motorised traffic including improved conditions and infrastructure for pedestrians, bicycles and other non-motorised transport vehicles.*

4. *Traffic management to improve efficiency, reduce pollution and improve safety.*

5. *Regulation and monitoring of fuels, vehicles and emissions in order to reduce harmful pollution.*

Institutional development, including policy and legislation, economic and other incentives and disincentives, promotion of public awareness, enforcement of regulations and so forth should be important aspects of any long term cooperation project within the priority areas but may also be considered independently for support.

In all investment projects, be it infrastructure, vehicles or buildings, and irrespective of the form of financing, it is essential that sustainable operation and maintenance facilities are already in place or will be established through the project. This should be specifically assessed before Sida can reach a decision on project support. The fact that environmental problems are often regarded as the main justification for urban transport interventions, underlines the need of comprehensive environmental impact assessments in connection with project preparation.

Needs and prevailing conditions differ from country to country and between cities. It does not seem practical to apply any generalised geographical criteria, but rather to emphasize that it is necessary to assess every project on its own merits. However, long term cooperation programmes including institutional development, will have to be limited to a select number of countries for administrative reasons, and the selection of those countries will depend on several factors. One obvious option is to expand on-going urban or transport programmes, but new countries could also be identified, for example as part of the country strategy process.

Development cooperation will normally have its focus at the city level with a key role for the municipality. Intervention at the national level should not be ruled out, however, if it is needed or provides support for action at the local level.

Transport systems need a long time to develop and experience shows that cities which have been successful in this respect also have enjoyed considerable political consistency and continuity. If such conditions are not in place, Sida should refrain from long term projects or, alternatively and if possible, promote institutional arrangements that may survive political change.

1. Background

1.1 Urban transport in previous Swedish development cooperation

The rapid pace of urbanisation in many developing countries has created increasing needs of transport for people and goods within the cities. Unfortunately, there are very few examples of cities that have been able to create an effective and sustainable transport system that meets the needs. The transport situation in many large cities in developing countries is usually in a state of acute crisis with serious effects for the local environment as well as for economic and social development. The worst affected are often the poor, the women and the children.

Sida's support to urban development, based on the strategy formulated in 1994–1995, has expanded rapidly during recent years. However, development cooperation hitherto in the urban area has only occasionally touched upon the urban transport issue. The same applies to Sida's comprehensive programmes in the transport sector, which, during the past few years, have mainly focused on transport reforms, support to road administrations and rural road construction.

The environmental aspects are given high priority both in Sida's strategy for support to urban development and in Sida's transport support. According to its plan of action for sustainable development, Sida shall draw up guidelines for support to environmentally sustainable urban development as well as a strategy for Sida's transport assistance, adapted to the needs of the environment.

Even if a co-ordinated approach for support to urban transport has been lacking, it can nevertheless be noted that Sweden has financed an increasing number of projects in this sector over the years. The inventory of Swedish aid to urban transport during the 18-year period from 1980 (Background Paper No. 1) to 1998 includes 54 projects within different fields of urban transport at a total cost of SEK 700 million (in 1998 values).

Figure 1: Number of urban transport projects started by Swedish aid organisations (SIDA, BITS, SAREC and Sida) between 1980 and 1998.

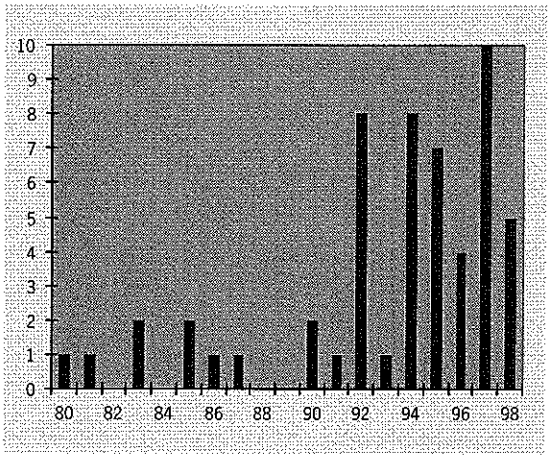
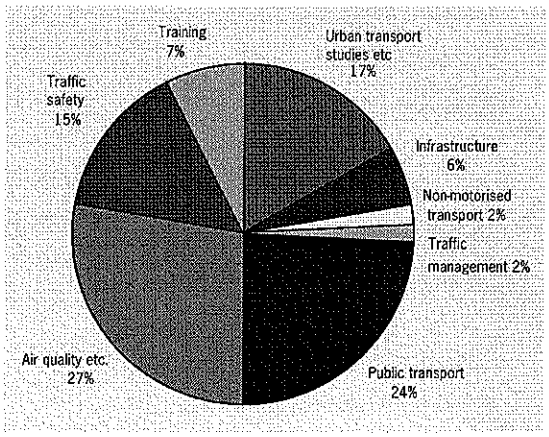


Figure 2: Urban transport projects financed by Swedish aid 1980–1998, distribution according to number of projects of different categories.



The list of projects in the urban transport sector provides a typical sample of the various types of assistance provided by the former development agencies, SIDA and BITS, to short-term projects. Not many of the identified projects have been subject to comprehensive evaluation, and in the cases when project evaluations have taken place, they were, for natural reasons, not made speci-

fically from the point of view of urban transport system. This makes it somewhat difficult to draw conclusions regarding the success of the urban transport components of the projects. Urban transport-oriented goals and objectives were not formulated before the projects started and consequently no attempts have been made to follow up goal fulfilment. The main reason for this is that urban transport has not been defined as a specific development sector. This does not mean that earlier involvement in the urban transport sector has been unsuccessful; only that an evaluation is hard to make.

The new Sida, formed in 1995, offers new opportunities for synergy between sector expertise, working methods and forms of financing. Hitherto, no overall analysis has been made of experience gained, problems and opportunities for development cooperation in the urban transport sector.

Against this background, Sida's Department for Infrastructure and Economic Cooperation (INEC) initiated in early 1998 a policy study with a focus on urban transport development. The purpose of the study was *first* to give an overview of urban transport and its environmental impact in developing countries, *second* to analyse the causes of the present problems and to discuss possible remedies and *third* to outline how Sida can assist partner countries to develop transport systems which are socially, economically and environmentally sustainable.

1.2 Implementation of the policy study

The policy work was organised with the aim of creating a process of learning and transparency which would involve a wide range of stakeholders. An overview of the main activities is provided in Box 1.

1.3 What is "urban transport"?

Urban transport is a broad topic. In this context we have not tried to define the concept and its many elements very precisely. Precise definitions are difficult – there is for instance no single universal definition of "urban". An area which is classified as urban in one country would be rural in another.

This policy document does not exclude any aspect of urban transport, although we have chosen to emphasize some issues because they may be critical from an environmental point of view, particularly relevant for improving the situation of the poor, or because they are considered strategic areas for development cooperation. Swedish experience and know-how or the fact that a problem area has been neglected are other reasons.

Therefore the policy deals more with the public transportation of people and non-motorised modes of transport than, for example, issues such as the transport of goods or parking of

Box 1: The development of Sida's policy on urban transport

- *a half-day seminar in May 1998 with 30 professionals from a wide range of developing countries participating in the course organised by the Swedish Road and Traffic Research Institute (VTI) in Linköping in April/May 1998 on "Environment and Public Transport"*
- *a number of studies carried out by external expertise including a study on international experience and strategies (a list of Background Papers is enclosed)*
- *three half-day seminars in August-October 1998 on the following topics: (i) "Public transport – an area for future Swedish development assistance?" (ii) "Can development assistance contribute to a better environment in cities in developing countries" and (iii) "Physical Planning and Sustainable Urban Transport"*
- *consultations with representatives of other donors and international organisations*
- *a web-page connected in July 1998 to Sida's homepage where all basic documents have been made public and are easily retrievable through the Internet*

private cars. The policy also highlights safety, traffic management and planning and other institutional issues which are not limited to any particular kind of transport.

For obvious reasons there is not scope in a document like this to provide a broad description or analysis of all the various components in the urban transport sector. We refer the interested reader to the background paper on "International Experiences and Development Strategies in Urban Transport", which also contains an extensive bibliography with recommended literature on urban transport.

2. Urban transport: one of the major challenges of the next millennium

2.1 Transportation – a basic need and a serious problem

One of the most powerful trends in the developing world is urbanisation. In 2020, 3,5 billion people in developing countries will live in cities and in Africa alone, it has been projected that the urban population will escalate to 820 million from 177 million in 1985. At that time, Africa and Asia will be predominantly urban in the same way as Latin America has been for a long time. The challenge for the future is to create policies to make this growth sustainable, efficient and equitable. With these types of growth rates, developing countries must increase their capacity to supply and manage their urban infrastructure by at least 75%, merely to maintain the present level of service, which is inadequate anyway.

One of the important urban functions is the transportation system which directly affects the economic efficiency of cities and the well-being of their inhabitants. It is important to note that *transportation is one of the fundamental needs for people,* not least for new settlers in the outskirts of the cities, since it expands their options for work, education, health care, and other amenities.

On the other hand, inefficient *urban transport is a major source of problems* for cities and their inhabitants. Traffic congestion reduces the city's productivity and consumes time. Air pollution from traffic is one of the major environmental problems in a city. Noise is another important environmental stress factor, and little has been done in developing countries to reduce traffic noise which is sometimes unbearable. Investments in urban transport infrastructure such as roads and streets often constitute a substantial drain on the city's economy although in many cases existing facilities could be used more efficiently. Above all, traffic problems and lack of transportation facilities affect individuals at all levels in the society. In a survey made in 1995 in Bangkok it was found that the main worries of local residents were:

Table 1: "Main worries in Bangkok" (source: Allport, 1995).

Factor	*Per cent of the surveyed*
Traffic	44
Cost of living, inflation	20
Poverty, unemployment	7
Air, water, noise pollution	6
Education	5
Crime, corruption	5
Other	13

Bangkok is also a good example of the contradictions inherent in the urban economic development. On one hand, it has been estimated that in Bangkok one third of the city's gross product is lost on account of traffic jams, i.e. USD 4 million per day. On the other hand, Bangkok experienced (until the present crisis) very high economic growth in spite of its traffic problems. It is evident that the relationship between an efficient urban transport system, urban productivity and urban economic growth is complex and not yet sufficiently understood.

2.2 Urban transport – a poverty issue

There is sometimes a tendency to regard urban transport as a luxury for the rich. This may be based on the misconception that urban transport planning is an activity which aims at building more roads in order to create more space for private vehicles. In reality, urban transport has a very strong bearing on poverty and is one of the factors with the greatest impact on the economy of families in low income groups.

New migrants arriving in the cities from the rural areas typically end up on the outskirts of the cities where they have to find shelter. To them, as well as to many other poor peri-urban households, transport is essential to enable them to benefit from the employment, schools and other services available in the city.

But since they travel long distances, cost is an essential factor.

A recent study in Africa found that an average low-income urban family may spend 30–40% of its earnings on transport. Some poor families in Kingston spent almost all of their "disposable income" (after deduction of costs for housing, food and fuel) on transport which shows once again that urban transportation is far from a luxury, but one of the very basic needs of poor families. For the poor, almost all trips are work trips with few school trips and almost no social trips.

For many poor families, walking is the normal mode of transport. In Metro Manila this applies to families below the 30th percentile household income. In some countries the bicycle may be an alternative.

Subsidised public transport has been introduced in many developing countries (as is the standard practice in almost all industrialised countries). There can be good reasons for this, although there are many examples of badly designed subsidies which have distorted the incentives for operators and caused severe inefficiencies. However, projects aiming at improving non-motorised transport, e.g. walking, can have a great impact on the poorer segments of the urban population.

2.3 Must millions more die from accidents in urban traffic?

Every year over 700,000 persons die and over 10 million persons are injured or crippled in traffic. The majority, 67%, of traffic accidents occur in developing countries.

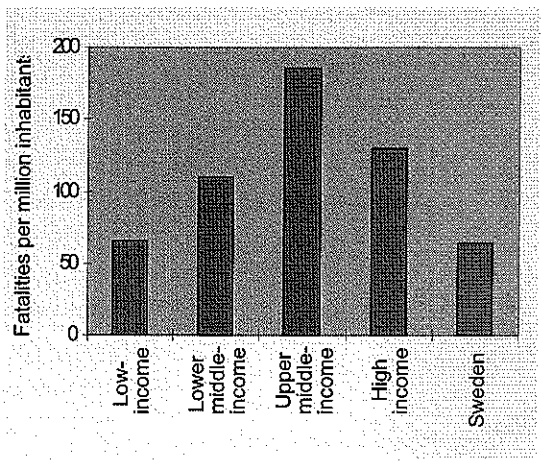
In its 1998 World Disaster Report, the Red Cross/Red Crescent recognises traffic accidents as one of the major threats to human lives and health in an increasingly urbanised future. It projects that by 2020 traffic accidents will be the third most important cause of death and disability, well ahead of war, HIV and other infectious diseases. Together with the social impact in terms of grief and suffering, it is estimated that traffic accidents cause developing countries economic losses of USD 53 billion, about the level of all international aid.

The number of accidents and fatalities is rapidly increasing in most developing countries due to rapid motorisation. In industrialised countries, counter-measures in the form of traffic safety programmes are giving results and the number of fatalities is being reduced despite increasing car usage. Figure 2 illustrates the development of "personal unsafety", measured as the number of traffic fatalities among one million inhabitants.

In developing countries, motorised transport tends to be highest in cities where we also find the highest concentrations of pedestrians and other unprotected road users. In these countries, "personal unsafety" is higher in cities than the national average.

Unprotected road users are over-represented among traffic fatalities in developing countries compared to developed countries. This is mainly due to the larger proportion of pedestrians, cyclists, motor-cyclists etc in poor countries combined with a lack of proper infrastructure to serve these groups of road users.

Figure 3: Traffic accident fatalities by country income group (based on World Bank, 1996).



2.4 Urban transport – a gender issue

Urban transport is essential for both men and women, but there are also clear gender differences in the use of different means of transport. Access to a private vehicle is more limited for women than for men, and women therefore tend to depend more on public transport than men. In Nairobi, 66% of women's trips are made by bus compared to 56% for men. The specific needs of women are rarely considered in the design of public transport systems.

In Pakistan and India, the public transport mode called tongas (horse-driven carts) fulfil a role since they provide an opportunity for women to travel with many children. In some Muslim societies women and men are separated in public buses.

Cycling is a very common form of transport in some Asian and African societies, but its use by women is often limited because of local customs and culture. Traffic risks sometimes have different implications for men and women. Evidence from South America suggests that low-income women from the peripheral areas of cities perceive a high risk of theft and sexual assault, and are therefore reluctant to make bus journeys without an escort. In Kingston and Nairobi, as in many other cities, there is an element of risk in walking home from the bus stop, particularly during late hours.

2.5 Motorisation: a time bomb

The dynamic pace at which urbanisation and motorisation are growing is illustrated in two figures below. Figure 4 shows that not only the number of motor vehicles, but also the use of these vehicles, is growing even faster than the growth of the urban population. As illustrated in figure 5 this trend is very closely linked to economic development. Car ownership rates increase in parallel with increasing income levels, in some countries without any visible limits to growth. Behind these trends lies the fact that, in growing economies in poor as well as in rich countries, households tend to allocate increasing shares of their incomes to transportation.

Figure 4: Estimated global growth in ownership and use of motor vehicles since 1950 (Source: World Bank, 1996).

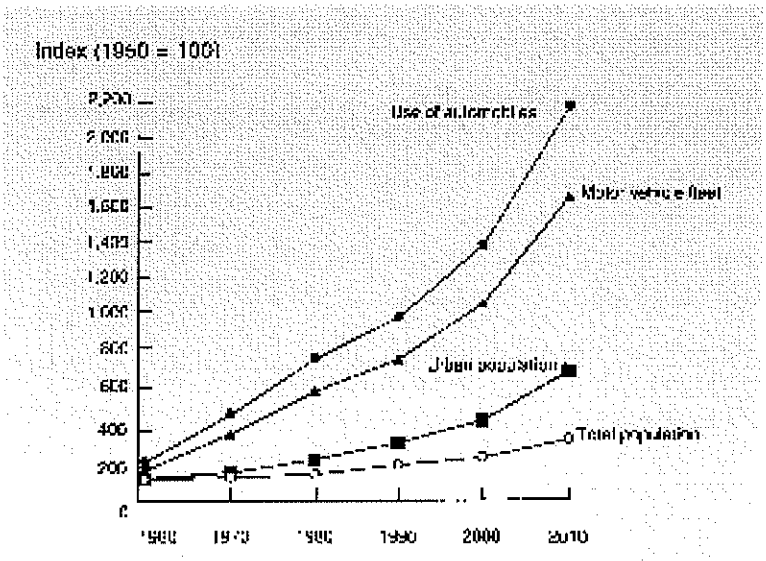
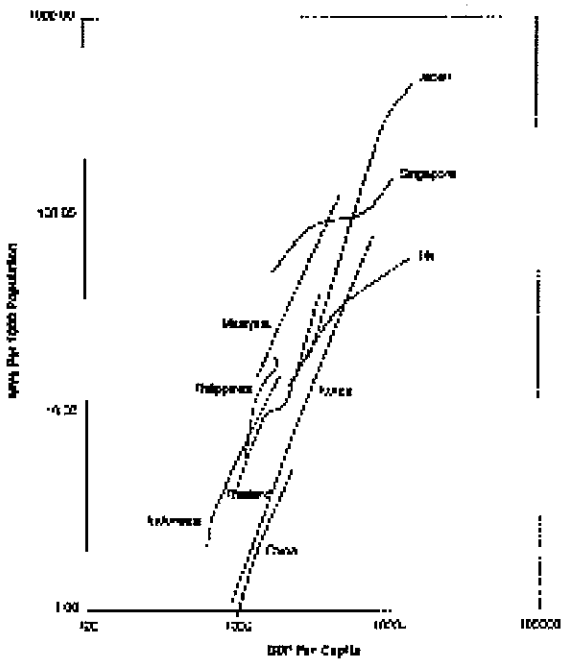


Figure 5: East Asia Motorisation 1960–1990 (Source: World Bank, 1995).



2.6 ... with serious impacts on the local, regional and global environment

Probably no effect of urban transport comes to mind stronger than the environmental impact of motorised traffic. The quiet whirl of bicycles around Hoan Kiem Lake in Hanoi is gone and has been replaced by the noise of motorcycles. Bangalore, once the "Garden City of India", is now characterised by exhaust fumes from traffic.

In some large cities road traffic accounts for 90 to 95% of health-threatening lead and carbon-monoxide emissions and a major share of suspended particulate matter. In Bangkok, it has been estimated that an average child loses 4 IQ points by the age of 7 due to air-borne lead. Motor vehicles are responsible for nearly 50% of the emissions of smog-precursors world-wide.

At a global level, pollution from motor vehicles now produces about 20% of the incremental carbon dioxide in the air arising from human activity. As motorisation gains momentum, not least in the two most populous countries in the world, China and India, an enormous urban population is about to be affected. These effects are not only local, many experts are warning about the serious potential effects of global warming in a world where motorisation is multiplying and is often characterised by bad engines and poor fuel.

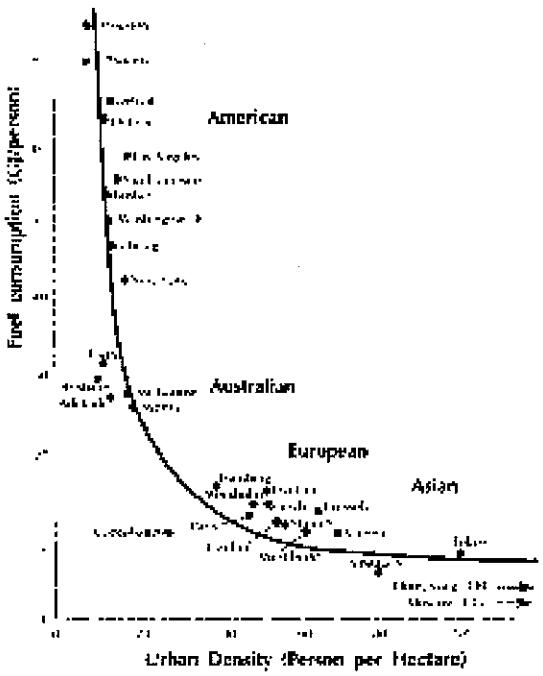
In the general ambition to come to grips with the urban environmental problems, for example in Eastern Europe, it should be recognised that it may be even more urgent to counter and prevent the future dangers of dynamic and irreversible traffic development than to improve a polluting, but more static, industrial sector.

2.7 The development of urban transport – a question of choice?

While there are many parallels between the growth of motorisation in various parts of the world, it is also possible to identify some striking differences in respect of the role that the private car plays in cities in different parts of the industrialised world. In many American cities, the increasing growth of motorisation has interacted with declining public transport services and changes in land-use towards lower and lower population densities ("urban sprawl"). The end result is a situation which could be described as almost total dependence on the private car.

In most European cities, municipalities have exercised a strong public control of the spatial development of the cities and managed to maintain the fairly compact structure of the old cities. An important element of the European model is a high quality public transport system. European cities are characterised by somewhat lower levels of *car ownership*, combined with, and more significantly, much lower levels of *car usage* than American cities. The consequences measured in terms of energy use for transport in cities with similar income levels appear clearly in Figure 6.

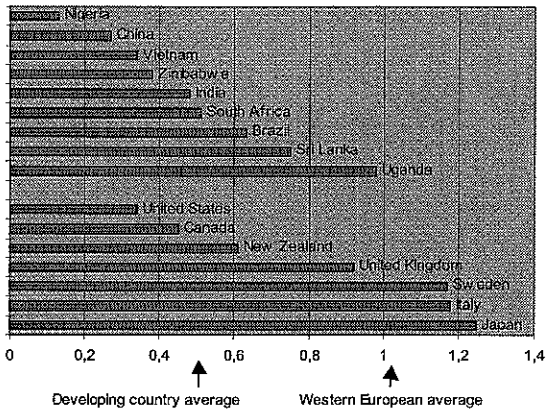
Figure 6: Fuel consumption and urban density in cities world-wide 1980 (Source: Newman, Peter W G and Jeffrey R Kenworthy 1989, Cities and Automobile Dependence: an International Sourcebook, Gower Technical, Aldershot)



From the development of cities in industrialised countries, we can conclude that a number of strategic choices determine the development of cities. Town planning and development control are key instruments of any policy aiming at spatial development of cities which reduces the need for private car transport.

There are also other factors which strongly influence the role of public and private transport, and indirectly, the development of city structures. One major factor is the fuel and vehicle taxation policy, where West European countries generally have much higher taxes than the United States, Australia and most developing countries. The resulting differences in gasoline prices are clearly demonstrated in Figure 7.

Figure 7: Pump prices for premium gasoline (Source: Metchies, G. and Rausch, E., 1996 based on a price survey in December 1995).



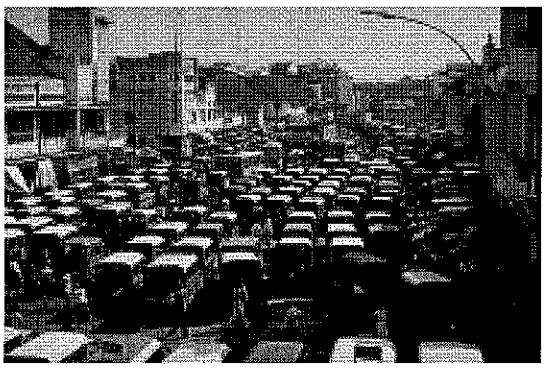
The World Bank transport policy document submitted in 1996 ("Sustainable Transport – Priorities for Policy Reform") included an analysis of public sector pricing and taxation policies that apply in the transport sector. This analysis resulted in a recommendation to "establish road user charges that reflect externalities (road damage, air and noise pollution, congestion, and safety); where fuel taxation is used as a proxy, Western European levels are more appropriate benchmarks than US levels for developing countries on the threshold of rapid motorisation".

Today's policies and decisions have a strong bearing on our future. While motor-vehicles usually last 12–15 years and investments in oil refineries may have an economic life of some 25 years, investments in city infrastructure lead to more or less irreversible changes. Town planning policies interact with policies on public transport and taxation in the shaping of our future cities and transport systems. This underlines the need of long-term visions and consistent policies.

2.8 Vicious circles in developing cities

Many industrialised cities have managed to overcome some of the most obvious negative impacts of the high levels of motorisation with the aid of improvements in traffic management, infrastructure, vehicles and fuels. The situation looks very different in most major cities in developing countries.

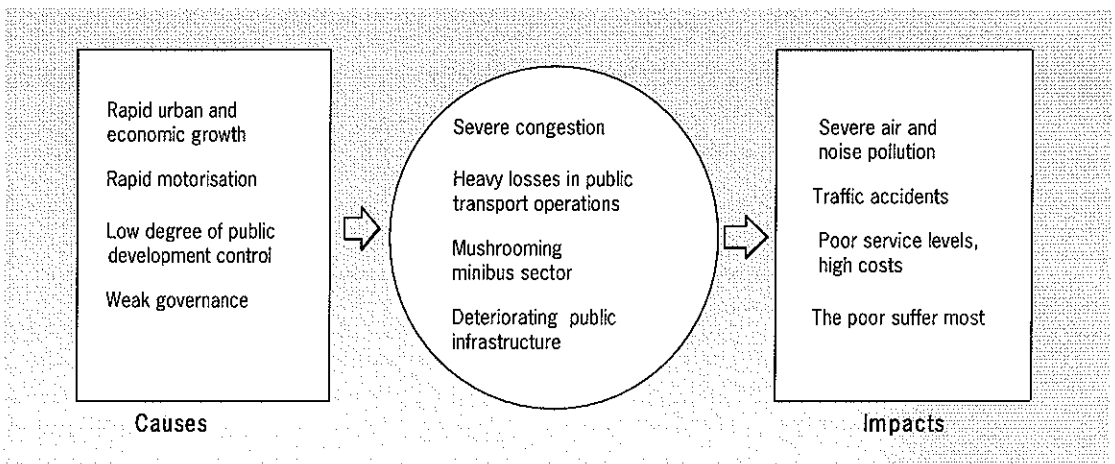
Picture 1: The transport market in Medan, Sumatra.



Despite low levels of motorisation, the traffic situation in most major and many medium-sized cities has developed into what could be described as traffic infernos. Many of these cities have been caught in a vicious circle in which the services offered by organised bus transport gradually deteriorate and are partly replaced by an unregulated fleet of paratransit vehicles (mini-buses, emergency taxies, jeepneys, matatus etc). In combination with increasing levels of private car ownership, this leads to increasing levels of congestion, which in turn undermines the capacity, economy and service levels of organised public bus transport. The resulting break-down of the urban transport system is illustrated in Figure 7.

The traditional response by cities has been to combat the congestion problems with substantial investments in increased street capacity. This may be especially tempting for cities in developing countries where the proportion of urban space devoted to roads is usually much smaller than in European cities. However, history has shown that investments in increased street capacity often result in additional traffic volumes which rapidly end up in even higher levels of congestion[1]. Any solution will have to combine physical investments with measures which effectively manage and regulate private traffic while at the same time create the foundations of a public transport system.

Figure 8: The break-down of the urban transport system.



[1] Anthony Downs was first to describe this mechanism in 1962. It has subsequently been called "the law of congestion" or "Downs' Law" (Zegras, C. in UNCHS, 1998).

3. There are good examples!

3.1 Many problems – but also solutions

A visitor to some of the new megacities of the world can sometimes get the impression that the destructive powers of development are overwhelming, and that nothing can be done to control the exploding urban transport problems. It is easier to identify problems than it is to find good solutions and examples worth following. Still, there are many examples of interesting solutions and successful interventions in cities in developing countries. Often, however, these are on a limited scale and do not encompass the entire urban transport sector. It is rare to find cities which have managed to fully control urban transport and to shape the city in a planned way. (This is not always easy in the industrialised countries either).

The search for good working examples in developing countries is somewhat complicated by the fact that it takes time before long term policies have a full effect on the city's total development. While it is sometimes possible to compare the development of cities which were at a comparable level 30 years ago, some of the successful cases are now no longer regarded as developing countries. Their accomplishments are then sometimes mistakenly explained by the fact that they are now "rich" and therefore not representative of poor cities.

Occasionally, a city stands out for its coherent and consistent policies over a sufficient period of time to give urban transport and the city a character of its own. Although it may not possess a formula which is automatically applicable in other cities, such a city can still serve the important function of being an inspiration to others. Two examples of such cities are provided below – Curitiba and Singapore. These cities illustrate a number of features of high quality transport systems as well as the processes whereby these systems develop.

3.2 The Curitiba story

The Brazilian city of Curitiba is a good example of what can be achieved with limited investments, but with consistent and innovative policies. This development was initiated as early as in the 1960s by a visionary architect/mayor empowered with sufficient authority and resources to implement his vision of an environmentally sustainable city. Today, the two-million capital of the state of Paraná is the target of numerous study groups wanting to see for themselves a city where the bus is more important than the car.

Box 2: The bus system in Curitiba

The main principle in Curitiba is the promotion of an organised public transport system based on buses on dedicated busways. This development started in the 1970s when the city found that it could not afford an urban rail system. In existing central areas, part of the road and street capacity was redistributed from cars to buses, while in new areas new busways were built first of all. Having priority in traffic makes public transport economically efficient and attractive to passengers
– buses in Curitiba operate at the same commercial speed as the New York subway, but at a fraction of the cost.

The bus network is centrally organised and planned as one coherent and integrated system – not as a series of competing routes. System components vary from 300-passenger bi-articulated buses on trunk lines to smaller buses on fast express routes. Route packages are operated by private bus companies and the whole system runs without subsidies.

Basing its public transport system on modern bus technology, Curitiba has managed to create an affordable, environmentally sound and highly popular public transport system, yet without

imposing restrictions on private car ownership which is the highest in Brazil. The success of Curitiba demonstrates the potential efficiency of an organised bus system operated by a private sector competing for a carefully monitored – not "free" – market. It thus highlights the importance of public sector intervention as much as of private sector drive and efficiency.

Picture 2: Characteristic tube stations in the Curitiba bus system.

3.3 Singapore and motorisation

Singapore, the city-state island off the Malacca peninsula, has, like Curitiba, found its own ways and methods of creating a good urban transport system, and the strategies have been partly different. A number of innovative schemes for urban transport have been introduced.
In particular, Singapore has devoted more efforts to control demand by introducing restrictions on both ownership and use of private cars. Through the area licensing scheme, described in Box 3, in combination with other measures (including an attractive and efficient public transport system), Singapore managed to keep motorisation under control in spite of its rapid economic growth.

Picture 3: Singapore's area licensing system.

Box 3: The area licensing systems in Singapore

In the 1970s, the city introduced restrictions on traffic in the sensitive city centre area. Under the area licensing scheme (ALS), a car driver entering the city area during peak hour had to pay a fee, which was adjusted so that no more traffic entered the city than the system could swallow. The low-cost and non-sophisticated, but remarkably efficient, scheme remained in operation for more than 20 years. After proving to be a sustainable concept, the system was replaced in 1998 by the Electronic Road Pricing system (ERP), where payment is automatic.

Singapore's consistent transport policies, aimed at controlling both the number of cars and their use, have resulted in a situation where traffic is controlled rather than seen as a force of nature. The ALS concept has been implemented in other cities, for example in Tehran.

3.4 The environmental potential of the modern bus

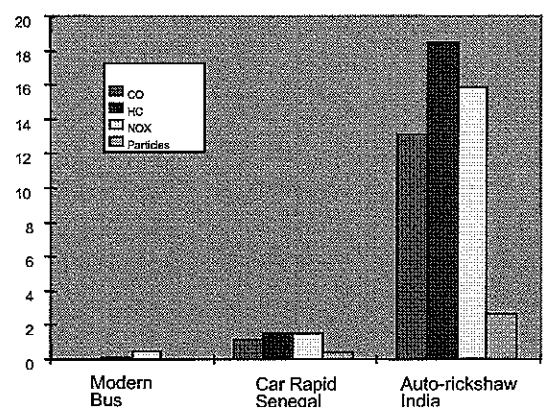
The positive environmental impact of an organised bus system is exemplified in Figure 8, which compares the emissions from a modern diesel bus with a capacity for 100 passengers, a minibus with 30 passengers and a motorised petrol-driven rickshaw (auto-rickshaw) with 2 passengers. Since the comparison is not made between vehicles but between their performance in terms of emissions per passenger-km, the effect of the operating characteristics of different transport systems is visible.

This example illustrates that in many developing countries the public transport system itself offers considerable potential for reducing traffic emissions, namely if passenger trips can be transferred from small, polluting vehicles to modern buses with greater capacity.

It also highlights the impact of vehicle engines and fuel qualities on air pollution. A number of major cities in Asia and Latin America are now gradually introducing stricter regulations with regard to engine standards and fuel qualities.

Thailand, for example, has managed to reduce airborne lead over a five-year period by switching over to unleaded gasoline.

Figure 9: Environmental potential of the modern bus. Emissions in grams per passenger-km (Source: CONTRANS, 1998).



3.5 The bicycles in Havana

Cuba's economic decline resulted in an urban transport crisis in Havana. A massive shift to bicycles became an affordable and feasible way of providing mobility for the population. Previously a bicycle policy was not considered easy to implement in Latin America, for example for cultural reasons. Interest in non-motorised transport has now increased, and bicycle networks are now planned in, for example, Lima, Peru and Cordoba, Argentina.

3.6 Paratransit – from a different perspective

The negative impacts of un-regulated para-transit vehicles which cause congestion and pollution in city centres have been illustrated above. It should be pointed out, however, that this segment of the transport industry nevertheless offers important low-cost transport services to many off-track and poor communities, for which no other type of public transport is available. The paratransit industry is also an important source of employment for thousands of poor drivers. Consequently public regulation must aim at creating an optimal mix of different types of urban transport services.

In South Africa the important role of paratransit in the overall transport system, for example as a provider of feeder services, has been recognised. At the same time, efforts are being made by public authorities to regulate the paratransit industry – a major challenge which will require a high degree of participation by the industry itself.

3.7 "Prevention is better than cure"

Cities such as Curitiba and Singapore have demonstrated the benefits of applying a long-term vision to the planning of a city. There are many medium-sized cities in developing countries where the situation today is still manageable but could rapidly deteriorate and get out of control. In many cases it is possible to introduce preventive measures. China and Vietnam provide many examples of cities where the level of motorisation is still low (with only about 10 cars per 1,000 inhabitants) and where it is still possible to prevent developments which might end up in chaos.

Picture 4: The "urban transport system" in Hanoi, Vietnam in 1993.

3.8 The good examples may be difficult to replicate

Why have few cities in developing countries been able to introduce effective solutions to urban transport problems, in spite of growing public pressure and awareness of possible solutions? Evidently there are forces which may obstruct the replication of positive examples.

First, when the density of a city and the level of motorisation has already reached a certain level,

it is much more difficult to introduce traffic management and organised public transport. When public transport corridors were introduced in Curitiba, the city was in the favourable situation of still having wide land corridors available.

Second, in Curitiba as in Singapore, the reforms had strong political support through long-serving politicians with clear visions for the long-term development of the city. In most developing cities the political situation is unstable with fragile political leadership and frequent changes of power. With weak governance the risk is also much greater that inefficiencies will occur in the regulation of public transport.

Third, as pointed out above, in many cities a large share of the public transport market is dominated by an unregulated flora of small operators, sometimes exercising strong political influence, which may resist the introduction (or re-introduction) of organised public transport. With a fragmented private transport sector, it is also more difficult for cities to find operators that have the capacity to undertake concession contracts for bus lines.

The conclusion which can be drawn from this chapter is that there are some good examples of cities in developing countries which have managed to create efficient and sustainable urban transport solutions. At the same time, there is a need of much more knowledge about the kind of processes of change that are required to develop such solutions.

4. The role of development cooperation

4.1 Development of policy, institutions and competence – a key to success

The urban transport environment is characterised by a high degree of institutional fragmentation with a number of Government ministries and agencies involved as well as many participants at the regional and municipal levels, not to mention the various private parties involved in the sector. At the same time, reforms are usually not possible without close interaction and co-ordination between different parts of the urban transport system. Box 4 gives a concrete example in the form of a project aiming at air quality improvement in Santiago de Chile which includes the introduction of natural gas buses. The project involves a number of public and private actors.

Box 4: Air quality improvement in Santiago de Chile

Public transport corresponds to 60% of total transport in Santiago, one of the worst polluted cities in the world in terms of air quality. Measures to achieve acceptable air quality include improved efficiency in public transport, introduction of natural gas buses, systems for the prediction and monitoring of environmental effects of specific measures and their effects on human health.

Support to this process has been given by the Gothenburg region to the environmental authorities, traffic institutions, the public transport company, and meteorological and medical research institutions. Their Chilean counterpart in the Metropolitan Region is a joint project of corresponding institutions working under the umbrella of the Santiago "Clean Air Act".

What do we know then about the way that donors can contribute to policy reforms? We have learnt two things from the history of development cooperation. First, policy changes which are forced upon developing countries, for example through conditions linked to balance-of-payments support and are not based on true political commitment, have limited prospects of success. Second, models which try to implant external "ready-made" solutions based on traditional engineering studies made by international consultants without proper interaction with local stake-holders, are rarely successful.

In contrast, the type of close cooperation between many different stake-holders which has been applied within the so-called EST-project in Sweden ("Environmental Sustainable Transport") and is now being tried at the level of the European Union, is an example of what is also required in developing countries in order for policy reforms to be successful. Key factors in such processes are: (i) a consensus in the initial problem analysis, (ii) a set of goals that specify what should be achieved, by whom and when and (iii) a work process that involves all stake-holders. In line with the ideas of Agenda 21, local involvement and public awareness are crucial for making reform measures legitimate to the public.

The support that donors could meaningfully provide to such processes of change is quite different from the traditional models of "technical assistance". Instead, through development cooperation, one or several external partners could be linked to local stake-holders in the reform process over long periods of time. This external partner would be expected to (i) provide high quality advice at the right time, (ii) provide targeted training for key staff and (iii) organise study visits and seminars; all as an integral part of a reform process. Given the importance of transparency and public awareness, local and external non-governmental organisations may also play important roles in such processes.

4.2 Processes that range from individual cities...

As demonstrated above, the integration at city level of transport, land-use and environmental planning has been the key to successes such as Curitiba. The establishment of these types of interdisciplinary planning structures and processes is a major challenge, especially when considering the fragmented institutional environments and the short-term political agendas that prevail in many cities.

Does development cooperation have a role to play in such a situation? Given that there is a basic political will and consensus on the need and direction of change, we believe that the approach outlined above is relevant for institutional development in individual cities. This would indicate a form of city-to-city co-operation, a much discussed concept which we comment upon below.

The major functions which are relevant at city level are listed below:

- Overall policy-making within municipal political bodies for urban development and transport
- Land use planning
- Traffic planning and management (including non-motorised transport)
- Organisation and management of public transport systems
- Construction, maintenance and operation of transport infrastructure
- Pricing policies and policies regarding provision of subsidies (if any) to urban transport operators
- Regulating, monitoring and enforcing environmental and other impacts of urban transport
- Local participation and public awareness

Given the need of integrated solutions, in principle all of these functions will have to be dealt with in the development of sustainable transport systems. In the design of a co-operation programme, it appears to be preferable to focus initially on one or possibly a few key problems. A different approach, which might be suitable in the case of reform of the public transport system, would be to focus on a certain part of the transport system or a certain area of the city.

Land use planning, physical planning, town planning – there are many names for this disputed but still necessary activity. Planning and development control are important tools for urban management, without which it is impossible to manage the urban environment and develop a functional transport system. However, planning as practised earlier was often uncritically based on concepts from Western cities. It was carried out by American and European consultants, badly guided by local politicians dreaming of a rosy future, and resulted in nice maps and documents with very little relevance to the actual situation. The impact was limited or even negative when unrealistic plans were legally adopted and became an obstacle to more appropriate development decisions. Planning has since developed and needs to be assessed for what it is today and not for mistakes made 30-40 years ago. Planning today is less technical and more to be seen as part of a broader consultation and participatory process, something which was unheard of in the 1960s.

4.3 ... to the level of national agencies

There are large variations between different countries in respect of the division of responsibilities between central and local government, fiscal powers etc. Although urban transport problems are naturally "owned" by local government, in many cases central government ministries and national agencies are in charge of instruments which determine incentives and set limits for actors in the local arena. Some examples of such factors are listed below:

- General transport policies
- Legislation on physical planning and development control
- Traffic law

- Taxation and (potential) environmental pricing policies for fuels, vehicles and infrastructure
- Policies and legislation for the organisation of public transport services
- Traffic safety (policies, education, regulations, enforcement, etc)
- Vehicle emissions and fuel qualities (regulations, enforcement, testing and monitoring)
- Planning, financing and implementation of major investment projects.

In principle, any of these factors may be relevant components in a programme of policy-oriented donor support. Their relative importance, and the role that donor support may play, will obviously depend on the circumstances in a specific country.

4.4 What can be done in weak or turbulent environments?

In many of the poorest countries the capacity of municipalities is so weak that it is not realistic in a short-term perspective to apply the models for institutional support described above. At the same time recent research shows that by applying low-cost measures, for example for traffic calming, it is possible to radically improve the mobility and safety of pedestrians, cyclists and other types of unprotected road users.

In such situations alternative approaches may be tried which channel resources directly to local community groups. The basic idea is that an organisation with firm roots in the local community identifies the needs of traffic safety measures, requests the approval of the municipality and carries out the improvements without having to rely on the municipal administration. In an environment with an active public debate, successes with fairly small projects could have a sizeable impact by demonstrating to the public and to politicians what is possible to achieve with small means.

4.5 Should investments in physical infrastructure be supported?

As described above, there are many examples of large investments in expanded or new street and traffic infrastructure which have not had any lasting positive impact on the urban transport situation. In many cases it is much more effective to improve the management and maintenance of the existing infrastructure in combination with measures to control and limit traffic volumes in sensitive sections. The conditions for bus transport may be radically improved by introducing reserved lanes or bus streets.

Depending upon the size and density of cities in industrialised countries, modern urban transport systems usually combine several transport modes, including underground metros, which may carry huge traffic flows. Examples of costs and capacities of different types of modes are illustrated in Table 2. The construction of heavy corridor systems requires huge investments and public subsidies which are feasible only in relatively rich cities. They also require a level of coordination and management of feeder systems which is rarely available.

Experience from poor cities such as Calcutta which have invested heavily in the construction of one or two metro lines, shows that the expansion of metro systems is often hampered by financial constraints, while integration with other modes is often lacking. The result is an isolated and expensive sub-system which serves only a very limited part of the population.

Contrary to many other cities, Singapore developed its public transport system step by step. Only when a well-functioning modern bus system had been established was an extension to other modes considered. Today Singapore is equipped with a modern subway and a light rail system is underway.

Table 2: Examples of capital costs and capacity of mass transit solutions (based on a compilation of data from various sources)

Public transport option	Capital cost Million USD per km	Capacity pass/hour
Underground metro	50-100	70,000
Light rail	20	30,000
The Curitiba Metrobus system (incl. Busways, terminals and buses)	5	15-20,000
Bus lane with physical separation	0.05-0.5 *)	5-15,000

*) Cost of vehicles (buses) is not included

Modernisation of existing rail-based systems may be an interesting option especially in cities with long commuting distances, as is the case in South Africa. It is important, however, to consider not only the technical upgrading, but also the future operational and financial conditions.

The logical role for development cooperation will be to support the early phases of the development of mass transit systems in poor cities. Normally this will involve the establishment of a modern bus transport system. The cost of the infrastructure required for such a system is usually small compared to the need of public funding in connection with metros and light rail systems.

We have indicated above that development cooperation should focus on the development of institutions and know-how, rather than investments in infrastructure. The most cost-effective action is usually to use existing infrastructure better. However, in a situation where the implementation of an organised public transport system is blocked by financial constraints at the city level, development cooperation may play an important role by facilitating investments in improved street infrastructure, bus lanes or bus terminals.

4.6 What about support to public transport operators or the purchase of means of transport?

The need for the reform of public transport operations is high on the agenda in many cities. If financial assistance from donors in the form of concessionary or other types of credits is channelled directly or indirectly to transport operations, it must be clearly linked to the objectives of the reform process.

Given the many examples of inefficiencies in public enterprises, there are good arguments for transport operations to be run on commercial principles by private operators. At the same time it has been clearly shown that urban transport markets must be subject to firm public planning and regulation. For this reason, municipalities should endeavour to separate policy and regulatory functions from the ownership and operation of public transport. Such separation could be seen as a first necessary step towards improved governance of existing public transport enterprises. It is also a prerequisite for private operators to be awarded concessions (franchises) for specific parts of the public transport system. Such operators should normally be selected through competition ("for the market").

Subsidies for urban transport services may be justified on grounds of equity and public service obligations or to compensate for the fact that private cars are not charged for road use. Any subsidy should be transparent and designed in such a way that operational efficiency is not hampered. The required level of subsidy may be one of the factors which are considered in the competition for public transport concessions.

The possibility for donors to provide concessionary credits is limited by OECD/DAC within the framework of the so-called Helsinki Agreement. As urban transport projects are not regarded by OECD as financially viable, it is possible to use concessionary credits in connection with the financing of such projects provided that other conditions relating to the country's economic situation etc are fulfilled.

One purpose of the provision of concessionary credits may be to facilitate the introduction of modern and more environment-friendly vehicles.

How should then donors design their financial assistance in a situation when the roles of the public and private actors are being gradually reformed? One way may be to link donor assistance to a "public-private partnership"-scheme, whereby a municipality leases vehicles financed by a donor to one or several private operators who have been awarded transport concessions. It may also be possible to consider an arrangement whereby the ownership of vehicles financed by donors is transferred to private operators within the framework of concession contracts.

In principle the value of the resources financed by a donor should be on-lent by the recipient Government/municipality to the end-user of the resources, i.e. to a transport operator (public or private). It could be assumed that the grant element will be used by the municipality to finance subsidies which may be justified within the framework of the objectives of the donor support. It must be observed that any subsidy scheme must be financially sustainable without donor support in the long run.

Training programmes for key staff in public transport may be supported by donors provided that such programmes are not designed to favour staff from a specific operator.

4.7 Should priority be given to certain types of cities?

Arguments have been raised that Sida should target its support at small or medium-sized cities. So-called mega-cities are rare in most of the main Swedish partner countries, but do exist in the countries where the "reactive" type of development cooperation is applied (see 6.3). Needs and conditions vary from country to country and from city to city. There is no good reason why Sida should introduce any specific limitation with respect to city size. Project proposals need to be examined and justified on their own merits. The country strategy, Sida's general policies for sustainable development, poverty alleviation, gender quality and democratic governance as well as the present sector policy for urban transport provide sufficient guidance and limitations, and other factors such as opportunity, implementation capacity, political will and so on may be more relevant in the selection of projects.

5. A broad resource base and many good examples in Sweden

As a part of Sida's policy study, an inventory was made of the availability of know-how and resources in Sweden in relation to urban transport development in developing countries. This inventory showed that there is a strong resource base and a great interest among a broad spectrum of professionals and institutions in Sweden in cooperating with developing countries in their respective subject areas. In this respect the situation appears to be favourable in comparison with many other cooperation sectors. Box 5 gives examples of the various types of Swedish resources, while Appendix 3 provides a detailed list of Swedish organisations active in the field of urban transport.

Box 5: Examples of Swedish resources of relevance for urban transport development in developing countries

- *several municipalities with internationally recognised experience in physical planning*
- *public authorities with unique experience, for example from introducing environmental and traffic safety regulations and programmes*
- *two of the world's leading bus manufacturers with strong environmental and safety profiles as well as a well established industry with a complete range of systems and products for railway applications*
- *transport operators experienced in competing for urban transport concessions*
- *a number of consulting firms with experience of working in developing countries with physical planning, traffic planning and engineering, environmental planning and monitoring etc*
- *large construction companies capable of winning contracts in international competition*
- *a transport research institute, the Swedish Road and Traffic Institute (VTI), with broad experience of organising courses for developing countries*
- *an international research institute, Stockholm Environment Institute (SEI) with a long experience of research into environmental problems related to energy use and fuels.*

Sweden has been active in developing various kinds of innovative solutions to urban transport problems. Some of these are presented in a publication entitled "Good Examples in the Swedish Public Sector" (Peterson, 1997). Although many of these examples are mainly applicable to industrialised countries, it is obvious that Sweden can offer a number of examples and models of interest to developing countries.

The Swedish experience of involving many different stake-holders in planning processes in municipalities as well as at the national level has been mentioned above. The successful Swedish experience of traffic safety development is one good example of such an approach. Another example is the Swedish experience of engaging private operators, through competitive tendering, to run parts of the public transport system. Finally the systematic integration at the municipal/regional level of the planning of land-use, transport systems and environmental aspects could provide a useful model for municipalities in developing countries. Some further examples from the Swedish Urban Transport Sector can be found in Appendix 4.

Are there any weaknesses in the Swedish resource base? For obvious reasons not many Swedish professionals have experience from working with complex processes of change in developing countries, for example in connection with the introduction of new policies and new forms for the organisation and management of public transport. Language ability may also be a limiting factor for the involvement of Swedish professionals in projects in West Africa and in Latin America.

Sida could contribute, in various ways, to the development of Swedish resources. Sida, for example, may stimulate Swedish municipalities (or public authorities) to create links with similar institutions in developing countries. Such co-operation could cover loose friendship relations to more developed forms for "city-twinning". Sida may also promote research in Sweden on urban transport problems, for example by introducing urban transport as an "invitation area" within SAREC's research programme.

6. Implications for Swedish development cooperation

6.1 Points of departure

Agenda 21, which is the approved action plan of the UN Conference on Environment and Development (UNCED) in Rio de Janeiro, serves as a framework for national policy and outlines general principles and obligations in various areas, including transport. The Habitat II Conference in Istanbul further articulated the transport-specific objectives of the signatory governments in the Habitat Agenda. This set of objectives and principles forms the basis of any Swedish support to urban transport development. An abstract of relevant statements in these documents can be found in Appendix 2.

Swedish development cooperation is governed by a set of objectives defined by the Swedish Parliament. The overriding goal is to *improve the quality of life of poor people in the partner countries.* We have already given a number of examples of the links between this objective and the urban transport situation. We have also exemplified the links between urban transport and some of the important subsidiary goals of Swedish development cooperation, mainly economic growth, sustainable use of natural resources and protection of the environment, and gender equality.

Given these premises, Sida should broaden development cooperation in the urban transport sector. This cooperation should contribute to the *development of efficient and sustainable urban transport systems which promote economic and social development, improve the environment and reduce the risks for human life and health.*

The type of cooperation which may be applied in any specific situation, will primarily be determined by objectives and restrictions stipulated by the Swedish Government for Swedish support to the country in question. For a certain group of "partner countries" with which Sweden has entered into long-term programmes of co-operation, *country strategies* are available. For a larger group of developing countries, short-term projects may be financed from various global and regional aid allocations.

In relation to the dimension of problems and needs which have been described above, the resources available to Sida have obvious limits. Given the fact that core problems are often found in attitudes, policies and institutions, the professional and administrative capacity of Sida and its cooperation partners will often impose a more serious constraint than the availability of funds. This indicates the need to identify areas where Sida and the Swedish resource base have their main *"comparative advantages".*

One example of such an advantage is the ability to cooperate with a *broad range of partners* in a developing country, including different levels of government, the private sector and non-governmental organisations.

Another example is Sida's *flexibility* to choose between different approaches and to apply (combine) various financing instruments in a way that is suited to the specific country, city and character of the project. By strategic targeting of interventions and by selecting the most cost-efficient means of assistance, the support may have a "catalytic" impact.

6.2 Priority areas

Given Sida's limited resources, Sida should focus its professional attention to certain priority areas in the extensive urban transport field. The selection of priority areas listed in Table 3 is based on one or more of three criteria: (i) the relevance of the area in relation to the objectives of Swedish development assistance, (ii) our analysis of the character of the urban transport problems and (iii) the relative strengths of the Swedish resource base.

Table 3: Priority areas for Swedish development cooperation in the urban transport field.

Level	*Priority areas*
I. National level Actors: Ministries (transport, environment, local government, finance etc), public authorities, public and private organisations, financial market actors	· development of policies, laws and regulations regarding vehicle emissions, fuel qualities, taxation (of vehicles, fuels and road use), traffic safety · development of institutions aimed at enforcing and monitoring policy implementation
II. City level Actors: Political bodies, municipal and other authorities (town planning, civil works, transport & traffic, traffic police, vehicle inspection, environmental monitoring etc), transport operators, press, NGOs etc	· development of bus transport systems including the introduction of regulated competition between private operators · institutional and human resource development for town planning and traffic management · investments in infrastructure for public transport · programmes for traffic safety improvement, non-motorised traffic, reduction of vehicle emissions (including impact monitoring) etc
III. Community, households Actors: Road users, owners of motorised and non-motorised vehicles, CBOs, paratransit employees etc	· awareness creation · small-scale improvements of the traffic environment for pedestrians and non-motorised traffic through local initiatives

6.3 Long-term cooperation and institution-building programmes

In most cases institutional development at the municipal or national level requires a long-term perspective. When Sida participates in such long-term processes it must be prepared to play a "pro-active" role by taking part in a dialogue with relevant local stake-holders during the formulation and implementation of the project.

Examples of projects where this kind of approach has been applied are the urban development projects in South Africa where Sida provides support to land-use planning, housing finance and infrastructure improvement. In the field of transport, the support given over a number of years for the development of transport policies and reforms in Namibia also provides an example of a "pro-active approach". It should be noted that it will normally not be possible to enter into this type of cooperation unless the specific sector has been given priority in the country strategy for Swedish assistance.

On account of its capacity constraints, Sida will have to limit the number of broad and long-term commitments of this type. One interesting option may be to extend one or more of the on-going urban development programmes or transport sector programmes into the urban transport field.

To qualify for this kind of support a city or a national institution should demonstrate (i) a clear political interest, (ii) reasonably stable economic and institutional conditions and (iii) preferably also a supporting environment including the potential to raise public awareness and support.

Support to projects of this type would be facilitated if a *capable cooperating partner* could be identified in Sweden. Approaches which are based on "city twinning" or twinning between institutions with similar objectives represent an interesting option. However the limited experience and capacity of Swedish municipalities and other types of institutions will normally limit the possibility of launching full-scale twinning models. Combinations of municipalities and resources from commercial firms may be a more realistic alternative.

Interesting proposals in this respect have recently been presented in a report commissioned by the Swedish Government on the potential for the export of Swedish environmental technology ("Sustainable Sweden", SOU 1998-118). One proposal in this report is to create a basis in Sweden for the development of various kinds of public-private partnerships with developing countries. This proposal is close to the concept of support to *"economic co-operation"* which is currently being developed by Sida. The basic idea is that Sida's role should mainly be a promoter of contacts aiming at creating self-sustaining long-term economic relations. The urban transport sector and especially the field of environmental technology appears to be well suited for this concept.

6.4 Short-term support

Short-term support is usually used in middle-income countries with which Sweden has not established any long-term cooperation programmes. Organisations in these countries often have a better capacity than those in poorer partner countries to define needs and implement projects without active participation by Sida.

In such cases Swedish companies and organisations usually play an active role in the identification of projects suitable for Swedish support, while Sida's own role could be characterised as *"reactive"*. The Contract-financed Technical Cooperation programme and the Concessionary Credit programme are the financing instruments which Sida usually uses in such cases.

The "reactive" approach may be well suited for consultant studies or vehicle investments handled by reasonably capable clients in a good policy environment, but is usually less appropriate for projects which involve complex processes of change. Support to such processes requires careful monitoring and a preparedness to adapt the external support to changed circumstances. This may be difficult to combine with the principle of handling the reactive type of assistance "at arm's length".

6.5 Reaching the poor through community-based projects

An interesting feature of the on-going urban development programmes in Central America is that they are based to a large extent on the involvement of the communities, sometimes through capable local non-governmental organisations. Such institutions may be interested in applying a "bottom-up" approach to small-scale improvements of urban streets in close co-operation with local community groups.
As described above, such interventions may provide immediate and tangible benefits for the safety and mobility of pedestrians and non-motorised transport.

It should be observed that although community work at the local level may give some immediate impacts for poor people, it is not possible to achieve sustainable and city-wide solutions to urban transport problems without the full involvement of the municipal administration.

6.6 Sida's international courses play an important role in the development of professional skills

Sida's international courses contribute to the development of the skills of key personnel in the field of urban transport. The main arguments for organising courses in this way are first that specialised courses are difficult and expensive to organise at the national level, and second that such courses contribute to the creation of professional networks across developing country borders and with the Swedish resource base.

VTI's annual six-week course on "Environment and Public Transport Management" covers central themes in the urban transport area. Their annual traffic safety course as well as the annual course on "Road and Traffic Management" (run by Swedish National Road Consulting, SweRoad) and the course on "Air Pollution Management & Technology" (run by the Swedish Meteorological and Hydrological Institute, SMHI) do not focus directly on urban transport, but incorporate elements which are clearly relevant to this sector.

An interesting extension of the "International course" concept is courses on a regional basis. It would then be possible to invite a somewhat larger number of participants from each country and to create training environments where representatives of different professional fields are trained in cross-sectorial team-work. This type of exercise appears to be well suited to the needs in the urban transport sector.

It is recommended that various options to further develop Sida's programme of international courses in the field of urban transport should be considered.

6.7 More research is required on urban transport problems in developing countries

There is an obvious lack of relevant research on urban transport problems in developing countries. Given the importance of research for knowledge and human resource development, Sida should look for ways to stimulate such research, and to strengthen research capacity in this field. If this could be done through co-operation between a university or research institution in Sweden and corresponding institutions in developing countries, positive side-effects may occur in the form of strengthening the Swedish resource base in the urban transport field.

This is related to the broader question of higher education. The capacity and quality of education at university level in technical areas is already low. The capacity to train specialists in urban transport management and related subjects is even more limited. Most probably a specialisation of this kind can only be efficient if developed on a sub-regional basis.

The rapid growth of motorisation in developing countries is an area which has hitherto not been the subject of any extensive research. Sida should consider the possibility of supporting such research in cooperation with the World Bank which has expressed an interest in this research field. Issues relating to road, fuel and vehicle taxation policies would play an important role in such research.

6.8 Benefits of international cooperation

The history of international development co-operation provides many examples of how co-ordination problems decrease the value of aid in cases where several donors support the same sector or programme. This is due not only to duplication of effort and procedures, but also to the fact that donors may have diverging opinions about key policy issues in the sector.

For this reason Sida should encourage active co-operation with other donors in the field of urban transport. This implies that Sida should participate in relevant initiatives for policy development and dialogue organised by organisations such as the World Bank, UNDP, UNCHS/Habitat and the European Union. Furthermore, Sida should actively participate in and support coordination efforts at sector and project level. Although the urban transport sector may not easily lend itself to a more advanced form of "sector programme support", several of the elements in this type of approach are clearly also relevant to more traditional types of donor coordination.

As can be seen in the background paper on international experience (CONTRANS, 1998), there were conflicting views some years ago between different donors on what constituted "good policy" in urban transport, especially in relation to the role of competition in the urban transport market. The document "Sustainable

Transport – Priorities for Policy Reform" which was issued by the World Bank in 1996 represented an important step towards new thinking in relation to urban transport.

Since the Habitat II Conference in Istanbul a considerable degree of policy consensus seems to have emerged between the major international actors. This consensus was clearly demonstrated at the CODATU VIII Conference in Cape Town in September 1998 which was based on the main theme "Urban Transport Policy – a Sustainable Development Tool".

6.9 Professional networking – new possibilities for knowledge development

A positive aspect of international cooperation is the creation of networks between professionals in developing countries and developed countries. One example of such cooperation in which Sida participates, is the "Sub-Saharan Africa Transport Programme" initiated by the World Bank. This programme includes a special Urban Transport Component sub-programme which receives support from, among others, France, Holland and Sweden. It has a certain bias towards French-speaking countries in West Africa, but also incorporates several countries in Eastern and Southern Africa. It has also interesting links to research institutes in West Africa.

An interesting initiative has been taken by VTI aiming at the development of a professional network between traffic safety professionals (including previous course participants) in a selected group of countries. The proposal includes the establishment of an information resource centre, development of an information data base, launching of an Internet-based communication network, provision of tailor-made training programmes and the possibility to initiate distance education programmes. Links are to be created to Swedish institutions and experts.

6.10 A coordinated approach to urban transport within Sida

Although an increasing number of urban transport projects have been financed by Swedish international development cooperation funds since the early 1980s, these projects have generally been implemented and followed-up in an ad-hoc manner. It is recommended that, in the future, the urban transport sector should be subject to a coordinated policy approach and a higher degree of organised learning from experience.

This means that focal point for knowledge development in the field of urban transport should be created within Sida's Department for Infrastructure and Economic Co-operation. The main functions will be (i) the preparation and monitoring of urban transport projects, (ii) systematic learning from experience gained from Sida's urban transport projects, (iii) policy development in the field of urban transport including participation in international fora, (iv) an internal advisory function, and finally (v) promotion of networks with institutions and individuals in Sweden and in developing countries.

Appendix 1

References and selected bibliography

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Washington, 1996

WORLD BANK
Urban Transport. A World Bank Policy Study.
Washington, 1986

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World Resources Institute, UNEP, UNDP, World Bank
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Oxford University press 1996-97

UNCHS
The Missing Link - Towards Sustainable Urban Transport
Habitate Debate 1998, Vol. 4 No. 2
Nairobi, 1998

UNDP
Sustainable Human Transport (about to be launched)
New York, 1999

Appendix 2

Agenda 21 and Habitat II on urban transport

Agenda 21, signed at the Earth Summit in Rio de Janeiro, included several objectives specifically related to urban transport:

7.53.(a) Integrate land-use and transportation planning to encourage development patterns that reduce transport demand (number of trips and trip distance);

7.53.(b) Adopt urban-transport programs favouring high-occupancy public transport in communities, as appropriate;

7.53.(c) Encourage non-motorised modes of transport by providing safe cycle-ways and foot-ways in urban and suburban centres in countries, as appropriate;

9.12.(d)...promote economic mechanisms, including pricing, which, *inter alia*, seek to discourage large, fuel-consuming and polluting vehicles, and encourage the development and use of alternative fuels;

9.12.(e) Develop or enhance, as appropriate, mechanisms to integrate the transport planning strategies and urban and regional settlement planning strategies, with a view to reducing additional needs for transport.

The Habitat II Global Plan of Action outlined a number of measures relevant to urban transport:

147. Transport and communication systems are the key to the movement of goods, people, information, and ideas, and to the access to markets, employment, schools and other facilities and land use, both within cities and between cities, and in rural and other remote areas. The transportation sector is a major consumer of non-renewable energy and of land and is a major contributor to pollution, congestion and accidents. Integrated transport and land-use policy and planning can reduce the ill effects of current transport systems. People living in poverty, women, children, youth, older persons, and people with disabilities are particularly disadvantaged by the lack of accessible, affordable, safe, and efficient public transport systems.

148. Developments in communications technologies can have a significant impact on economic activity and human settlement patterns. It is important for the potential impacts to be addressed so as to ensure that maximum benefits accrue to the community and to reduce any adverse outcomes in relation to access to services.

149. Managing transport in human settlements should be done in a way as that promotes good access for all places of work, social interaction and leisure facilitates important economic activities, including obtaining food and other necessities of life. This should be done while reducing the negative effects of transport on the environment. Transport-system priorities should be given to reducing unnecessary travel through appropriate land-use and communication policies, developing transport policies that emphasise mobility alternatives other than the automobile, developing alternative fuels and alternative fuel vehicles, improving the environmental performance of existing modes, and adopting appropriate pricing and other policies and regulations.

150. Non-motorised transport is a major mode of mobility, particularly for low-income, vulnerable and disadvantaged groups. One structural measure to counteract the socio-economic marginalisation of these groups is to foster their mobility by promoting affordable, efficient and energy-saving modes of transport.

Actions:

151. In order to achieve sustainable transport in human settlements, Governments at the appropriate levels, in partnership with the private sector, the community sector, and other relevant stakeholders should:

(a) Support an integrated transport policy approach which explores the full array of technical and management options and pays due attention to the needs of all population groups, especially those whose mobility is constrained because of disability, age, poverty or any other reason;

(b) Co-ordinate land use and transport planning in order to encourage spatial settlement patterns that facilitate access to basic needs such as workplaces, schools, health care, places of worship, goods and services and leisure, thereby reducing the need to travel;

(c) Encourage the use of optional modal composition of transport including walking, cycling, and private and public means of transportation, through appropriate pricing, spatial settlements policies and regulatory measures;

(d) Promote and implement disincentive measures that discourage the increasing growth of private motorised traffic and reduce congestion which is damaging environmentally, economically, socially and to human health and safety, through pricing, traffic regulation, parking, and land-use planning, traffic calming methods, and by providing or encouraging effective alternative transport methods, particularly to the most congested areas;

(e) Provide or promote an effective, affordable, physically accessible and environmentally sound public transport and communication system giving priority to collective means of transport, with adequate carrying capacity and frequency that supports basic needs and the main traffic flows;

(f) Promote, regulate, and enforce quiet, use-efficient and low-polluting technologies, including fuel-efficient engine and emissions controls and fuel with a low level of polluting emissions and impact on the atmosphere and other alternative forms of energy;

(g) Encourage and promote public access electronic information services.

Appendix 3

List of Swedish institutions and companies in the field of urban transport

Public sector

Trafikutskottet, Riksdagen
100 12 Stockholm
Tel 08-786 40 00
www.riksdagen.se/debatt/utsk/tu

Miljödepartementet
Ministry of the Environment
103 33 Stockholm
Tel 08-405 10 00
Fax 08-21 96 28
www.miljo.regeringen.se

Kommunikationsforskningsberedningen, KFB
The Swedish Transport and Communications Research Board
Box 5706
114 87 Stockholm
Tel 08-459 17 00
Fax 08-662 66 09
www.kfb.se
Authority under Ministry of Transport and Communications funding research, development and demonstration projects

Banverket
Swedish National Rail Administration
781 85 Borlänge
Tel 0243-750 00
Fax 0243-44 50 09
www.banverket.se

Naturvårdsverket
The Swedish Environmental Protection Agency
106 48 Stockholm
Tel 08-698 10 00
Fax 08-20 29 25
www.environ.se

Vägverket
Swedish National Road Administration
781 87 Borlänge
Tel 0243-750 00
Fax 0243-758 25
www.vv.se

Miljöförvaltningen, Göteborg
Box 360
401 25 Göteborg
Tel 031-61 26 10
Fax 031-61 27 67
Air pollution monitoring and modelling, noise control

Stadsbyggnadskontoret, Göteborg
Box 2554
403 17 Göteborg
Tel 031-61 10 00
Fax 031-71 14 21
www.stadsbyggnad.goteborg.se

Trafikkontoret, Göteborg
Box 2403
403 16 Göteborg
Tel 031-61 37 00
Fax 031-711 98 33
www.goteborg.se

Gatukontoret, Malmö
205 80 Malmö
Tel 040-34 10 00
Fax 040-34 37 66
www.gatukontoret.malmo.se

Stadsbyggnadskontoret, Malmö
205 80 Malmö
Tel 040-34 10 00
Fax 040-34 35 63
www.stadsbygg.malmo.se

Gatu- och fastighetskontoret, Stockholm
Box 8311
104 20 Stockholm
Tel 08-508 260 00
Fax 08-508 267 11
www.gfk.stockholm.se

Stadsbyggnadskontoret, Stockholm
Box 8314
104 20 Stockholm
Tel 08-508 260 00
Fax 08-508 271 70
www.sbk.stockholm.se

Research institutions and similar

CTS, Centre for Research on Transportation and Society
Högskolan Dalarna
781 88 Falun
Tel 023-77 85 00
Fax 023-77 85 01
cts-nt1.du.se

Statens Institut för KommunikationsAnalys, SIKA
Swedish Institute for Transport and Communications Analysis
Box 17213
104 62 Stockholm
Tel 08-506 206 00
Fax 08-506 206 10
www.sika-institute.se
Authority under Ministry of Transport and Communication

Föreningen för de Oskyddade Trafikanterna, FOT
Chalmers Tekniska Högskola,
Sven Hultins gata
412 96 Göteborg
Tel 031-772 23 91
Fax 031-18 97 05
www.ntf.se/fot

Institutet för Transport Forskning, TFK
Transport Research Institute
Box 760
781 27 Borlänge
Tel 0243-734 26
Fax 0243-734 30
www.tfk.se

IVL Swedish Environmental Research Institute
Box 210 60
100 31 Stockholm
Tel 08-729 15 00
Fax 08-31 85 16
www.ivl.se
An independent research institute in the environmental field

Statens Väg- och Transportforskningsinstitut, VTI
The Swedish Road and Transport Research Institute
581 95 Linköping
Tel 013-20 40 00
Fax 013-14 14 36
www.vti.se

NTF Bohuslän
Box 14033
400 20 Göteborg
Tel 031-63 52 16
Fax 031-35 95 90
www.ntf.se/bohus
Information activities on traffic safety aiming at the Swedish 0-vision

Universities

Chalmers Tekniska Högskola, CTH
Department of Road and Traffic Planning
412 96 Göteborg
Tel 031-772 10 00
Fax 031-772 38 72
www.vsect.chalmers.se

Kungliga Tekniska Högskolan, KTH
Institutionen för Infrastruktur och samhällsplanering, Avdelningen för trafik och transportplanering
Department of Infrastructure and Planning, Division of Traffic and Transportation
100 44 Stockholm
Tel 08-790 80 05 Fax 08-21 28 99
www.infra.kth.se/ttp

Lunds Tekniska Högskola, LTH
Institutionen för Teknik och samhälle
Department of Technology and Society, Traffic Planning and Traffic Engineering
Box 118
221 00 Lund
Tel 046-222 91 25
Fax 046-12 32 72
www.tft.lth.se
Education and research re design and analyses of traffic systems focusing on safety and environment

Luleå Tekniska Universitet
Institutionen för Samhällsbyggnadsteknik,
Avdelningen för Trafikteknik
Department of Environmental Engineering, Division of Traffic Engineering
971 87 Luleå
Tel 0920-91 000
Fax 0920-913 99
www.sb.luth.se/tft
Focus on traffic safety and economy

Umeå Universitet
Kulturgeografiska institutionen
Department of Social and Economic Geography
901 87 Umeå
Tel 090-786 50 00
Fax 090-786 76 29
www.umu.se/soc_econ_geography
Applied research, planning and administration

Göteborgs Universitet
Department of Economics
Environmental Economics Unit
411 80 Göteborg
Tel 031-773 10 43
Fax 031-773 25 03
www.gu.se
Specialized in environmental economics research and training including policy instruments for transport

Göteborgs Universitet
Department of Peace and Development Research
Box 700
405 30 Göteborg
Tel 031-773 49 37
Fax 031-773 49 37
www.gu.se

Public transport operators and distribution companies

Svenska Lokaltrafikföreningen, SLTF
Box 1108
111 81 Stockholm
Tel 08-788 08 60
Fax 08-788 08 78
www.sltf.se

Göteborgsregionens Lokaltrafik AB
Box 405
401 26 Göteborg
Tel 031-15 47 27
Fax 031-15 62 33
www.glab.se

Linjebuss AB
Box 1820
171 24 Solna
Tel 08-629 50 00
Fax 08-29 00 96
www.linjebuss.com

Länstrafiken Örebro
Box 8013
700 08 Örebro
Tel 019-15 39 00
Fax 019-10 06 08

Stadstrafiken Göteborg
Box 2403
403 16 Göteborg
Tel 031-61 37 00

AB Storstockholms Lokaltrafik
120 80 Stockholm
Tel 08-686 10 00
www.sl.se

Älvsborgstrafiken
Box 1085
462 28 Vänersborg
Tel 0521-27 38 00
Fax 0521-27 38 10

BK Tåg
Box 28
574 21 Vetlanda
Tel 0383-196 50
Fax 0383-147 57
www.bktag.se

Transportledet
Skenvägen 8
281 43 Hässleholm
Tel 0451-477 00 Fax 0451-126 18
www.transportledet.com

Consultants and individual experts

BEP Kollektivtrafikkonsult
Skogvaktarevägen 6
131 50 Saltsjö-Duvnäs
Tel 08-718 45 33
Fax 08-716 11 65
Consultant on public transport

Bilprovningen International AB
Box 508
162 15 Vällingby
Tel 08-759 21 00
Fax 08-759 54 24
www.bilprovningen.se
Motor vehicle inspection company, subsidiary to AB Svensk Bilprovning, offering international consulting services and know-how

Bjerkemo Konsult
Hubertusvägen 29
226 53 Lund
Tel 046-211 51 00
Fax 070-611 20 81
Consultant on traffic and transport planning, urban and regional planning

Bo Blide Trafikkonsult
Fregattgatan 12
426 74 Västra Frölunda
Tel 031-29 57 42
Fax 031-29 57 42
Senior transport consultant

Bohlin & Strömberg Management Consultants AB
Box 6732
113 85 Stockholm
Tel 08-522 560 00
Fax 08-522 560 01
www.bs.se
Management consultants

Complan AB
Bovägen 23
181 43 Lidingö
Tel 08-765 10 98
Fax 08-765 10 98
Consultant in urban and regional planning and development

Conexor Sensus AB
Ehrenstralsvägen 30
168 51 Bromma
Tel 08-37 11 44
Fax 08-87 71 41
www.conexor.se
Consultant in the field of environmental protection

Contrans AB
Tallboängen 65
436 44 Askim
Tel 031-28 38 35
Fax 031-28 48 57
Consultants in urban transport

Ecotraffic Research & Development AB
Box 5671
114 86 Stockholm
Tel 08-614 50 56
Fax 08-614 50 08
www.ecotraffic.se
Consulting company in the transport sector with specialities in engine technology, motor fuels, emissions and environmental management

EFEM Arkitektkontor AB
Brogatan 2
413 01 Göteborg
Tel 031-17 84 60
Fax 031-13 32 94
Consulting planners and architects with focus on energy and environment

EnEn Miljökonsult AB
Toppvägen 36 A
177 40 Järfälla
Tel 08-580 345 06
Fax 08-580 345 06
Consultant on environmental urban management and transport

GBT Consulting AB
Bröstorp
713 91 Nora
Tel 0587-921 01
Consultant in various fields of transport (public transport, ambulances, refuse collection)

Granberg Consulting Halmstad AB
Karolinergränd 1
302 35 Halmstad
Tel 035-13 01 75
Fax 035-13 01 75
Consultant in traffic and transport planning

Hifab International AB
Box 19090
104 32 Stockholm
Tel 08-674 66 00
Fax 08-673 56 60
www.hifab.se
Consulting company in the field of project management and procurement

Ingemansson Technology AB
Box 276
401 24 Göteborg
Tel 031-774 74 00
Fax 031-774 74 74
www.ingemansson.se
Consulting company in the field of acoustics, noise and vibration

Inregia AB
Box 12519
102 29 Stockholm
Tel 08-737 44 00 Fax 08-734 44 60
Subsidy to Stockholm County Office.
Consultants in strategic analysis and forecasting in the fields of transportation, environmental assessment and regional economics

KM AB
Box 92093
170 07 Solna
Tel 08-555 230 00
Fax 08-555 230 10
www.km.se
Consulting engineering company

MTC AB
Box 223
136 23 Haninge
Tel 08-500 656 00
Fax 08-500 283 28
www.mtc.se
Motor test centre. Subsidiary company to AB Svensk Bilprovning, specialising in engine emission testing and studies

Nordic Consulting Group AB
Västmannagatan 81
113 26 Stockholm
Tel 08-610 02 95
Fax 08-32 88 70
Consultants in transport planning, administration and human resources development

Scandiaconsult AB
Box 4205
102 65 Stockholm
Tel 08-615 60 00
Fax 08-702 19 13
www.scc.se

SL Konsult
AB Storstockholms Lokaltrafik
120 80 Stockholm
Tel 08-686 19 00
Fax 08-686 19 50
www.slkonsult.se
Analysing and consulting department within SL on route network planning, passenger surveys and interviews

SMHI
601 76 Norrköping
Tel 011-495 80 00
Fax 011-495 80 01
www.smhi.se
Governmental agency with a commercial consultant division. International consulting on environmental impact regarding air quality

Solvicom AB
Livbåtsgatan 4
426 71 Västra Frölunda
Tel 031-29 55 10
Fax 031-69 44 76
www.solvicom.se
Consultant in public transport organisation and management

Stig Egnell AB
Urban Management Consulting
Barnhusgatan 13
411 11 Göteborg
Tel 031-15 27 40
Consultant in comprehensive urban planning and management

Stockholm Konsult AB
Box 9611
117 91 Stockholm
Tel 08-785 85 00
Fax 08-785 85 12
www.stockholmkonsult.se
Consulting company specialising in urban planning and housing

Strateco Utveckling AB
Box 90
136 22 Haninge
Tel 08-745 55 69
Focus on natural gas vehicles

SWECO AB
Box 34044
100 26 Stockholm
Tel 08-695 60 00
Fax 08-695 66 10
www.sweco.se
Consulting company with broad competence including the complete field of urban transport

Swedcon KB
Box 1269
141 26 Huddinge
Tel 08-772 19 00
Fax 08-642 47 87
www.swedcon.cc
Consultants in private sector development, urban planning etc

VBB-VIAK AB
Box 2203
403 14 Göteborg
Tel 031-62 75 00
Fax 031-62 77 22
www.vbbviak.sweco.se
The Gothenburg branch specialises in public transport and comprehensive planning

Swederail
Klarabergsviadukten 78
105 50 Stockholm
Tel 08-762 37 80
Fax 08-10 62 43
Consulting company fully backed by the Swedish State Railways (SJ) and the National Rail Administration (BV)

SweRoad
Box 4021
171 04 Solna
Tel 08-799 79 80
Fax 08-29 46 89
Subsidiary to Swedish National Road Administration
www.sweroad.se

Thoreb AB
Gruvgatan 37
421 30 Västra Frölunda
Tel 031-49 69 10
Fax 031-47 39 85
Company developing IT-based tools for public transport information and control

TRANSEK AB
Solna Torg 3
171 45 Solna
Tel 08-735 20 20
Fax 08-735 20 30
www.transek.se
Consultants in transport planning and evaluation

Transportidé i Uppsala AB
Kälkvägen 10
756 47 Uppsala
Tel 018-59 12 90
Fax 018-591 291
Consultant in bus transport planning and management

Trivector AB
Annedalsvägen 9
227 64 Lund
Tel 046-38 65 00
Fax 046-38 65 25
www.trivector.se
Consultants in traffic planning including traffic safety, public transport and environment

VTI Utveckling AB
Box 426
581 04 Linköping
Tel 013-13 69 39
Fax 013-12 61 62
www.vti.se
Consulting company, subsidiary to VTI Public Research Institute. Training and education regarding traffic safety, environment and public transport management.

Lars Örtenholm
Trafikplanering AB
Svärdsvägen 4B
192 73 Sollentuna
Tel 08-754 88 90
Fax 08-754 66 66
Consultant in traffic studies and infrastructure design

Manufacturing industry

Scania Sverige AB (Busses)
151 87 Södertälje
Tel 08-553 810 00
Fax 08-553 810 37
www.scania.se

Volvo Bussar Sverige AB
405 08 Göteborg
Tel 031-66 01 00
Fax 031-66 41 08
www.bus.volvo.se

ABB ADtranz
Östra Ringvägen 2
721 73 Västerås
Tel 021-32 20 00
Fax 021-18 25 74
www.adtranz.se

Siemens AB
Johanneslundsvägen 12-14
194 87 Upplands Väsby
Tel 08-728 10 00 Fax 08-728 11 28
www.siemens.se

Appendix 4

The Swedish way – examples of innovations in urban transport

Introduction

Sweden has been active in developing various kinds of innovative solutions to urban transport problems. Some examples of Swedish experience, that are also considered to be of interest in an international context and which focus on developing countries, are briefly described below.

Obviously, there is a strong interrelationship between the different issues concerned. Hence the development of an efficient public transport system requires an integrated transport and land-use planning approach and contributes to a better environment. Concerns for non-motorised traffic and traffic management result in improvements to road safety and the environment.

The continuous development of knowledge and methods is supported by research activities at universities and other public and private research institutions.

Transport policy

A transport policy document for urban transport describes the objectives of urban transport from a number of aspects such as the desirable role and standard of different means of transport for people and goods in relation to transport demand. Other important elements of a transport policy are safety, environment, energy consumption, regional balance and economy.

Sweden has considerable experience of formulating transport policies at the national level, policies which can be broken down and applied at the local community level. According to a proposal presented to Parliament in 1998, the general objective of the Swedish transport policy is to provide a sustainable and efficient transport system for all members of the society, business and industry.

If transport planning is based on a clearly formulated transport policy, conflicts of interest between different objectives will be revealed and priorities can be made in order to achieve a proper balance. The application of a transport policy in both general and detailed transport planning is a standard procedure, although not necessarily formalised.

Integrated transport and land use planning

Each Swedish city is required by law to prepare a comprehensive land use plan for the area under its jurisdiction. The relationship between land use and the transportation system is by tradition a key issue in comprehensive urban planning. The general focus on transportation issues as an important element in an efficient and competitive urban area and the strong position of urban comprehensive planning have formed the foundation of the development of considerable Swedish know-how in integrated transport and urban planning. Important planning objectives are to minimise travel time and costs, and to improve accessibility to work and public facilities for all groups of urban residents.

During the 1960s there was a great focus on automobile traffic systems and infrastructure. Today, however, the emphasis is on public transportation and the need to improve the situation for cyclists and pedestrians. Road safety is also very much in focus. Moreover general attempts are being made to minimise the negative impact of traffic on the urban environment in favour of sustainable development.

Public transport

New solutions in the field of public transport are being continuously implemented in different parts of Sweden. One common characteristic is the holistic approach, from planning and organisation to procurement and operation.

A comprehensive transport service is provided in each Swedish county by an organisation which has the overall responsibility for both local and regional public transport. The services are procured in competition which results in workable private/public sector partnerships.

Efficient route networks and schedules, comfortable buses and attractive bus-stops are being developed and alternative environment-friendly fuels are being introduced in several towns. Traffic control and real-time systems are being developed which will offer information to passengers and give priority to bus and tram services.

The existence of a Swedish motor industry, including the production of buses, facilitates a comprehensive approach to urban public transport needs.

Non-motorised transport

One important objective of urban land use planning is to offer basic services such as schools, shops and recreation facilities and public transport connections within reasonable walking or cycling distance from the home. In smaller Swedish towns workplaces can also be reached in this way.

Measures have been taken in most Swedish urban areas to facilitate, give priority to and stimulate non-motorised transport and to improve the safety of unprotected street users. These include separated and differentiated traffic systems, car-free zones, traffic signals and speed limits. Special lanes and road networks for bicycles and pedestrian-friendly design of streets in residential and shopping areas have also been introduced.

Traffic management

Management systems for public mass transit facilities have a long history, but recent developments using modern information technology have provided efficient tools for managing traffic, for communication and for providing information to the public. Such systems exist and are being developed in both Stockholm and Gothenburg.

Traffic restrictions and zoning regulations, co-ordinated signal systems, giving priority to public traffic, speed limits etc. are traditional methods of traffic management.

The use of the Global Positioning System (GPS) and other modern technologies opens up a number of new possibilities. It could provide drivers with instructions on how to reach their destinations as efficiently as possible. It could control traffic in general as well as individual vehicles. It could also be used to charge fees to motorists travelling in certain areas during certain periods of time. Research and development in this field is taking place both in Sweden and abroad.

Even simple systems and approaches might be useful. Information on the traffic situation over the ordinary radio network could be better than a more sophisticated system. Other examples of simple, but useful, measures to improve traffic flow which have been put into practice in Sweden include mobile patrols to assist traffic and report traffic problems. Information about parking regulations and their enforcement serves the same purpose.

Traffic safety

A large proportion of road injuries occur in urban areas. Pedestrians and cyclists are the main victims. In Sweden a new approach known as "Vision Zero" has been introduced. Here the emphasis is on adapting traffic systems to road users instead of the reverse. Vision Zero has had to accept that preventing all accidents is unrealistic. The long-term objective is a transport system which permits human error but does not lead to serious injuries.

The problem of road accidents and subsequent fatalities and injuries has long been recognised

in the western world. Road, street and vehicle design and other devices and regulations which affect road safety have been studied and improved considerably over the years. Today the accident rates in Sweden are among the lowest in the world. There is also considerable know-how on how to improve road safety. This includes engineering, education and enforcement - aimed at the vehicles, individual road users, road design and environment. Examples are special road networks for bicycles, pedestrian-friendly design of streets in residential and shopping areas, measures to reduce driving under influence of alcohol and compulsory vehicle testing.

Environmental concern

Urban transport is one of the most important environmental factors of all since so many people are exposed to its negative effects. Swedish experience proves that a strategy for environmentally sustainable urban transport must be comprehensive and address all relevant environmental issues.

Noise and air-quality control systems, regular vehicle inspections etc. have been introduced for monitoring the environmental impact of traffic.

Studies show that transport demand, lorry traffic and fuel consumption can be reduced by planning, co-ordination and management measures. The introduction of environmental zones with traffic restrictions for certain vehicles and/or during certain hours reduces the negative effect of traffic in sensitive city areas.

An efficient and attractive public transport system is given priority in order to reduce private traffic while retaining accessibility. Other important elements in the reduction of traffic emissions are the development of new engines and vehicles and the introduction of alternative fuels, such as ethanol and biogas, in combination with financial incentives. Sweden is playing a leading role in applying this new technique to heavy vehicles such as buses. New pavement materials have been developed to reduce traffic noise in residential areas.

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