

TWU-23
Transport in the City of Tomorrow: The Transport Dialogue at Habitat II
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 October 1996

**TRANSPORT IN THE CITY OF TOMORROW
 THE TRANSPORT DIALOGUE AT HABITAT II**

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TRANSPORT IN THE CITY OF TOMORROW THE TRANSPORT DIALOGUE AT HABITAT II

ABSTRACT

The United Nations Conference on Human Settlements (Habitat II) was held in Istanbul in June, 1996. As part of this conference a series of sector and topic “dialogues” were held. The Transport Division of the World Bank organized and managed a dialogue on transport in association with UNCHS and the International Public Transport Union (UITP),

This paper contains:

- i. The background paper prepared by Bank staff which was circulated in advance to all panelists in the dialogue as a guide to the subjects to be discussed, and distributed to all participants;
- ii. The conclusions and recommendations of the dialogue as presented to Committee 2 of the conference;
- iii. The text of the speech made to Committee 2 as introduction to the discussion in committee of the dialogue recommendations.

The main *issues* covered in the dialogue were the meaning of the concept of sustainability for urban transport systems, and the roles of urban form, technological development and public transport respectively in contributing to sustainable urban transport systems.

The dialogue *concluded* that the essence of the problem was that as cities grow bigger and richer there is an inevitable tendency for the demand for road space for vehicles to outstrip its availability. Given the impossibility of rectifying the imbalance by increasing the amount of road space sufficiently other strategies would be necessary, including structured densification of land use, use of cleaner transport technologies and greater use of public transport. In all of these strategic areas establishing the appropriate policy context would be critical. This required careful attention to getting the economics right (including concentration on improving pricing and supply mechanisms); to getting the institutions right (including the creation of multi-modal coordination at the city region level); and to clear and realistic setting of priorities for action (including attention to life and health threatening environmental impacts and to sustainable measures for protection of the interests of the very poor).

TRANSPORT IN THE CITY OF TOMORROW THE TRANSPORT DIALOGUE AT HABITAT II

AN INTRODUCTION TO THE TRANSPORT DIALOGUE

BACKGROUND

Trends in Urbanization

Cities are major growth centers. Urban population is growing at twice the rate of total population worldwide. While in the industrialized world this growth is widely spread amongst cities, in the developing world it is much more heavily concentrated in the “megacities”. In cities of all sizes the motor vehicle fleet is growing at two to three times the rate of population, and motor vehicle usage even faster still. Particularly in the developing countries the process of rapid urbanization has been associated with a low proportion of urban space devoted to roads (for example, 11 percent in Bangkok compared with 20 to 25 percent in most European cities with well-functioning transit systems).

In most large cities there is both an acute appreciation of the impacts of transport on the urban environment and a view that some minimum level of public transport provision is a social imperative. In the developing world the problems are usually accentuated by very mixed traffic composition and an aging and ill-maintained vehicle stock. Income distribution and population locations are frequently so skewed that the poor often find even transport to work unaffordable.

Challenges for the Future

The need to reconcile the inconsistency between the increasing demand for space for personal movement in cities and the relative fixedness of the space available is at the heart of the problem of urban transport for cities in the 21st century and raises three major challenges to which urban society must respond if it is to avoid progressive deterioration of the quality of urban life.

- (i) ***Coping with motorization.*** Increasing motorization generates three types of problem. First, roads tend to be very congested, even where per capita car ownership levels are moderate (for example, Mexico City, Buenos Aires and Seoul are saturated despite having car ownership levels only one-third of those of Western Europe). Second, traffic contributes to a polluted urban environment (again developing country cities such as Mexico City, Bangkok and Tehran have worse conditions than developed country cities of comparable size). Third, the poor normally remain dependent on public transport and have to travel a long way, and pay a high price in relation to their income levels, to get to work.
- (ii) ***Maintaining public transport access and affordability.*** Where increasing income is being used to buy increased residential space and improved residential conditions, the process of suburbanization is also a process of lengthening trips and hence increasing total traffic. As cities expand either in population or spatial extent, transport congestion tends to increase the cost of movement within them in both time and money terms. In higher income countries and for those with higher incomes in developing countries this impact can often be offset by improving the quality of

the private vehicle, or by the use of improved public transport modes. For the poor it is often more difficult to offset the effects.

- (iii) ***Responding to new needs.*** Increasing incomes may generate demand, and willingness to pay, for higher quality public transport service than traditionally offered. Expectations also increase in respect to the safety, convenience and environmental impact of public transport. In many megacities in the developing world population increase is concentrated in peripheral low income settlements, remote from the traditional employment centers and often badly served by the public transport means on which they depend. Not only does this create very long, time consuming journeys to work, but also a higher proportionate money cost of the journey to work (for example, the journey to work in Manila takes twice as high a proportion of the income of poor households than of non-poor households). Failure to satisfy these needs harms the poor, but also harms industrial competitiveness through its adverse effect on labor availability.

The Focus of the Dialogue

Against that background the dialogue will focus on four main issues. First, it will be concerned with transport objectives and the increased emphasis on economic, environmental and social sustainability which will be called for. Second, it will consider the relationship of urban transport policy to the more general issues of urban form and function. Third, it will consider the degree to which the application of modern technology, or likely technological development, can resolve the problems identified. Fourth, it will consider the way in which public transport, generally acknowledged to be critical to handling the problems of increasing urbanization, is to be handled. This background note introduces some critical questions which the dialogue will confront.

SUSTAINABLE TRANSPORT

Issues

The main issues to be confronted on the nature of sustainable transport in the dialogue will include:

- *How can social and environmental considerations best be brought into account in planning for transport in the city of tomorrow?*
- *Should there be global declarations on the environmental and social impacts of transport in the city of tomorrow?*
- *Is economics a hindrance to sustainability?.*
- *What are the respective roles of the technician and the politician in making transport more sustainable?*

The Need to Focus on Sustainability

The historic evidence indicates that all of the problems described above increase over time as urban population and incomes increase. Policies which work reasonably well when cities are small fail as they grow and as environmental and social problems become more pressing. To be effective, urban transport policy in the 21st century must therefore satisfy three main requirements. First, it must ensure that a *continuing* capability exists to support an improved standard of living. This is referred to as *economic*

and financial sustainability. Second, it must generate the greatest possible improvement in the *general quality of life*, and not merely an increase in traded goods. This is termed *environmental and ecological sustainability*. Third, the benefits that transport produces must be equitably *shared by all* sections of the community. This is termed *social sustainability*.

Synergy: Win/Win Possibilities

Economic, social and environmental sustainability are often mutually reinforcing. Road or public transport systems that fall into disrepair because they are economically unsustainable fail to serve the needs of the poor and often have environmentally damaging consequences. Hence, there are some policy instruments which serve all of the dimensions of sustainability simultaneously, generating “win-win” solutions. These include measures to improve asset maintenance, charging for external effects, technical efficiency of supply, safety and public administration.

Trade-offs

However, that convenient synergy does not always hold. Increased mobility, particularly private motorized mobility, typically increases measured GDP but damages the environment. Transport infrastructure improvement may involve involuntary resettlement. More efficient production of transport services in a competitive framework may involve loss of jobs, imposing some social costs and restructuring of prices and services which may hurt some users. Public transport provided cheaply by the informal sector and motorized two-wheelers may meet the transport needs of the poor but be environmentally damaging. All of these “trade-offs” must be faced by governments.

A policy for sustainable urban transport is one which *both* identifies and implements the “win-win” policy instruments *and* explicitly confronts the trade-offs so that the balance is chosen rather than accidentally arrived at. It is a policy of informed, conscious choices. Viewing transport within this general perspective highlights some important lessons. The weight placed on the various components of the general quality of life varies between cultures; hence, countries must ultimately define their own path of development. More motorized mobility is not necessarily a good thing; but equally it must not be regarded as inherently a bad one. It all depends on the relative importance attached to the different components of the quality of life. This varies between stages of development. For example, very low-income countries may best be assisted by provision of infrastructure to improve economic performance, but the attempt to provide for unlimited private mobility as cities grow and get richer will almost certainly begin to create tensions with environmental quality which will generate different relative priorities

The Continuing Importance of the Economic Basis for Sustainability.

Economic development *can* advance environmentally sustainable development, *but does not necessarily do so* if environmental and social considerations are systematically and institutionally ignored in the assessment of projects and policies. That does not mean that economic sustainability ceases to be important. A sound economic base remains fundamental to sustainability. Where transport infrastructure is seriously deficient, development will be hindered. Transport investments should thus continue to be subject to rigorous cost-benefit analysis, albeit expanded to encompass environmental externalities. Ensuring the long-term sustainability of facilities also requires the adequate maintenance of capital assets.

It is critical to the achievement of a successful outcome that aspirations must be realistic. The costs of maintaining excessively ambitious roads and other transport networks or attempts to provide transport as

a subsidized social service frequently impose unsustainable fiscal burdens, particularly in developing and transitional economies.

Getting the Prices Right

Getting the incentive structures right will increase the efficiency with which resources are employed. In addition, for purposes of integrating *economic and environmental sustainability*, user charges should be giving signals which induce: (i) the efficient use of available capacity (including scarce road space); (ii) an efficient choice of vehicles and fuels; (iii) an efficient split of traffic among modes; and (iv) efficient infrastructure maintenance and management. For *social sustainability*, it is usually considered desirable to avoid regressive taxation structures as well as to ensure accessibility for the poor, which may involve providing some facilities and services for which payments by users are less than the real costs.

In practice, the instruments available for charging for road use are limited. Until recently, direct *congestion charges* could only be implemented by a cordon of toll points around the congested area, which has worked well in Singapore but is only suitable when the number of tolling points is small and there is an efficient and scrupulously honest administration for enforcement. Simpler forms of charging vehicles to cross a cordon into the city (motivated by the potential for revenue generation rather than altering behavioral incentives) have been introduced in some Scandinavian cities in the 1990s. New electronic tolling systems, such as that now being introduced in Singapore, will make more complex time-sensitive applications easier in the future, but are not yet proven for implementation in developing countries.

Currently, despite their limitations, *fuel taxes* are the only instrument through which any charge is made for road use in many countries. If there are no other charges for road use then users should pay not only for the resource cost of fuel (generally the international border price) but also for the other costs imposed on society associated with the consumption of fuel, such as externalities. Any taxation over and above resource and externality costs should be imposed on consumption goods but not on inputs to production. Any luxury or sumptuary taxation should be set in ways which minimize the distortion of consumption patterns.

There are numerous problems of evaluation of the cost elements (particularly environmental costs) and their allocation between vehicle categories. It is also clear that fuel price is not a very good proxy for congestion charges in urban areas. Some recent studies in Europe have suggested that, even in Europe fuel taxation lies below the level appropriate to the principles. Recent US studies have mostly identified rather lower benchmarks. In the recent World Bank review of the subject it was concluded that the European levels of gasoline prices may be a more appropriate benchmark for fuel price in developing countries than those current in the US. Few developing countries currently have fuel prices as high as this.

Because the costs of road use and the environmental impacts of transport vary from circumstance to circumstance there is therefore no unique retail fuel price appropriate to all countries and circumstances. It is therefore strategically important that:

- (i) there should be a commitment to the general principles for determining fuel taxation;
- (ii) total road cost accounts should be compiled, accompanied by an analysis of how these costs can be attributed to different vehicle categories.

Revenues from road use and expenditures on roads could also be institutionally linked in a more businesslike way. Because urban congestion charges relate to urban transport system costs, it would be appropriate for revenues from a congestion charge or tax to be assigned to an Urban Transport Fund, to be spent on whatever urban transport expenditures (including public transport investment or revenue support) appear to be most cost-effective in improving the quality of the urban transport system. Clear evidence that the proceeds of a congestion charge were being devoted to improve the situation might help overcome the historic resistance to such new charges. As gasoline consumption is related to the level of air pollution impacts, fuel taxation may be viewed as acting partly as a surrogate for efficient environment charges; some part of the gasoline tax revenue might therefore be allocated to the general urban transport fund. As in the case of Road Funds, the creation of Urban Transport Funds must be associated with appropriate, accountable, institutional arrangements that enable stakeholders representatives to ensure oversight of expenditures.

The Institutional Basis for Sustainability

Realism in aspirations must be based on a secure institutional foundation. In the industrialized countries fiscal and administrative capabilities for addressing the environmental and social impacts of urban transport are usually well developed. Despite the even greater intensity of the problems in the developing world, administrative and fiscal arrangements to handle the problems are often inadequate. In infrastructure, this often results in inadequate maintenance budgeting and follow up, accentuated by governments taking the “soft” option of deferring maintenance during debt crises. In transport service supply, regulated prices have often been set at levels that are too low to provide for the adequate maintenance of equipment, without there being any alternative “non-farebox” revenue source.

Two conclusions follow from that inadequacy. First, solutions applicable in one country may fail in another because of differences in institutional and fiscal capability; policies must be tailored carefully to these capabilities. Second, in the longer term, the sustainability of transport arrangements will depend critically on the development of human and institutional resources for policy development and implementation.

URBAN FORM, TRANSPORT PRICES AND SUSTAINABLE TRANSPORT

Issues

The main issues needing to be confronted on urban structure and transport in the dialogue include:

- *What view should governments take on urban density and structure?*
- *How far should urban governments go in planning land use?*
- *What instruments of land use control are effective, in what circumstances?*
- *What should governments do about urban transport prices?*

Transport and Land Use Interactions

Recognition that transport demand patterns are very closely dependent on the structure of land use has been the traditional basis on which urban transport demand has been forecast. It has also, consequently, been fundamental to the design and provision of transport facilities. The converse effect of transport

provision on land use has also been long recognized. Transport infrastructure can provide access to new areas, thereby enabling land-use patterns to change. However, because the impacts tend to be much more indirect and long term in emergence there has been a tendency for transport planning to be organized to serve land user rather than vice versa. Distortions in land markets, such as existed (albeit for different reasons) in Russia and South Africa until the late 1980s, create excessive transport demands. Breaking free from these constraints of the past will be very difficult.

Not everywhere are the constraints of history so burdensome. Countries such as Viet Nam and secondary cities in many developing and transitional countries that are on the threshold of motorization, have land-use patterns that have not yet foreclosed the option of development structured to maintain a better balance between public and private transport, as well as between motorized and non-motorized modes.

Urban Form, Urban Transport and a Sustainable Environment

The environmental implications of urban form have been subject to increasing attention. Careful research by Newman and Kenworthy has demonstrated a strong inverse relationship between fuel consumption per capita and urban residential density. The close relationship between fossil fuel consumption and most vehicle emissions (although this can be altered through improvements in vehicle and fuel technology), has thus given rise to a school of thought which puts urban form at the center of the argument. The fact that public transport, if well utilized, is less fuel intensive than private transport has led to increasing attention being paid to a search for urban transport forms that are favorable to public transport. Because public transport is particularly suitable for handling concentrated corridor flows the development of a multi-nuclear linear city has been advocated as being particularly desirable environmentally.

The corollary of the strong inverse relationship between residential density and fuel consumption per capita is a strong positive relationship between the level of land rents - and hence the average amount of space consumed per capita - and general urban density. Insofar as residential space is viewed as a good, it may be regarded as a proxy for the quality of the private environment. There may therefore be a trade off to be made between some aspects of the external environment (which would be enhanced by densification) and the internal domestic environment. Some basis has to be found for confronting that trade-off.

The Limitations of Land Use Planning

One approach, widely adopted in OECD countries is the use of directive land use planning. In practice, controlling the growth of urban areas is fraught with problems, which suggests that caution should be used in attempting any rigid control of urban structure. First, master plans typically underestimate urban growth and demand, and controls may prevent densities from growing as they might in some areas while forcing them to be too high in others. For example, the demand for the Calcutta metro has been stifled by regulations effectively limiting development around stations. Second, master plans typically do not succeed in controlling overall urban growth nor do they ensure efficient use of urban land and urban transport. Third, individual preferences for greater living space limits the political attractiveness of plans which are seen to limit residential location unduly.

The answer—particularly in rapidly developing cities where land markets are turbulent and land use can change rapidly—is to recognize and work with the underlying preferences being exhibited in the market. For example, there is a tendency for growth to be concentrated initially in clusters on the major radial

routes around cities. This is generally consistent both with the development of cost-effective mass transit facilities and with varying preferences on residential density. Guidance in this direction is possible through the location of major public sector facilities. This may include the development of a clear strategy on the reservation of right-of-way and adequate space for transport infrastructure, the provision of limited access trunk transport facilities (particularly rail-based systems), and on the structure of public utility extensions (as in city development in Saudi Arabia). While attempting to maintain job/residence balances in clusters will tend to even out directional flows, this will not necessarily reduce the length of most journeys to work. The combination of a well-functioning land market and efficient charging for the use of transport infrastructure is essential in this strategy of working with the market, as it will encourage the use of public transport on the main arterial routes. But where transport prices do not reflect full social and environmental costs, the land market will generate inefficient land-use patterns.

The institutional dimension remains critical. Land use planning depends for its success on the co-existence of a technically competent land use planning agency and an efficient (and uncorrupt) administration. Where either of these is absent the impact of attempts to plan land use may be perverse.

Urban Transport Structure and Public Transport Planning

For urban corridors with high traffic volumes, mass rapid transit (MRT) systems use space more economically and are less environmentally damaging than systems relying on the automobile. Heavy rail metros can handle peak direction flows of 60,000 passengers per hour or more, and may be the only way to handle the heaviest flows in very large conurbations at reasonable speed. In many developed country cities the heavy rail systems formed the skeleton around which subsequent development occurred. In many developing country cities, however, no such rail system exists. For medium and large cities, such as Bogota, São Paulo, Lima and Abidjan, where the bus is the backbone of mass urban movement, special busways, that other traffic is forbidden to use, have proved able to carry high volumes (up to 20,000 persons per hour per lane) at acceptable speed and at a fraction of the cost of metros. Sometimes, however, as in São Paulo, busways have significant local environmental and blight effects which should be taken into account in comparing alternatives. Light rapid transit (LRT), operating at street level and with frequent stops, may have less environmental impact but rarely improves on the capacity of busways. Unfortunately, when cities are small, the corridor flows are rarely sufficient to justify the high initial costs of a metro, while by the time the corridor traffic volumes have reached levels which appear to merit a metro, the urban structure has developed to the stage at which the superimposition of a metro is inordinately costly in terms of land acquisition, system construction and other capital items. This suggests the possibility of a phased approach (as recommended for Karachi) in which rights-of-way are protected at an early stage of development, to be used for either busways or rail-based systems according to the changing level of expected traffic volumes over time.

This approach requires considerable foresight, capacity to plan and willingness to commit to an urban structure. Success is possible, as exemplified by Curitiba, but the danger is that, as in Porto Alegre, subsequent development follows an entirely different and unplanned pattern. Increased emphasis on urban rail thus requires the integration of plans for the rail network into land-use schemes, public support for direct pricing of the external costs of road use and adequate provisions for modal coordination and interchange. The absence of such a comprehensive institutional framework has proved to be very damaging in such cities as Bangkok. Caution is also advised on other grounds. A study of metro systems in developing countries showed that, while they are usually operated fairly efficiently, they have tended to fall short of expectations in terms of finances, traffic and their impact on the urban environment. Their high initial cost inevitably preempts much other desirable expenditure, which may be of much greater value in situations where there are many other very pressing demands. Moreover, the

burden on municipal finances of maintaining a system built at such high costs can be crippling, as shown by the experience of even relatively wealthy cities like Pusan. Nevertheless, while it may not be cost effective to build new metros in straightened circumstances, such as those obtaining currently in central Europe and the former Soviet Union, it will usually be equally inappropriate to allow existing, functioning systems to fall into disrepair.

Transport Prices and Land Use

Except within the most restrictive and dictatorial of regimes transport prices will have a significant effect on land use. Underpricing transport will encourage excessive dispersion of activities. This applies not only to private transport, but also to public transport. Hence where the case is being made for public transport subsidies, either for distributional reasons or as a countervailing distortion to the underpricing of roads, the longer term distorting effects on land use must be carefully considered. It may be better to get all transport prices about right, and to rely on more direct instruments to deal with distributional and modal distortion issues, than to systematically underprice all transport.

THE ROLE OF TECHNOLOGY

Issues

The main issues needing to be confronted on the role of technology in the dialogue include:

- *To what extent will developments in vehicle and fuel technology help to meet solve the problems of transport in the city of tomorrow?*
- *What impact will developments in information technology have?*
- *How can best practice technology be phased in, particularly in developing countries?*
- *What is the best balance between sophisticated and simple technologies?*

Vehicle Technology

Technology has already responded in a number of ways to the need to reconcile the benefits of and demands for mobility with protection of the environment. Fuel efficiency has improved dramatically. Suppression of many noxious emissions at source has been improved, as have means of testing emissions. Vehicle guidance systems permit increased efficiency in the use of a limited amount of infrastructure capacity. And, perhaps as a last resort, vehicles are being equipped to allow their occupants to cope, and continue their social and business activities in comfort from within the car. The typical car user in the richer countries has a very sophisticated product at his disposal.

The same is not true everywhere. The average age of the vehicle fleet in developing countries is almost double that in developed economies. Older vehicles pollute more. In addition, the typical domestically manufactured vehicle in India, China, Eastern Europe and Latin America is only half as fuel efficient as “best practice” vehicles in OECD countries (automobile fuel consumption rates of 17-20 mpg versus 40 mpg). Retrofitting old vehicles with catalytic converters is often not cost-effective in low-income developing countries, both because the gases suppressed are not usually the most health-threatening and because, in the absence of the capability to enforce maintenance of the equipment, it becomes ineffective (though it may have more impact when focused on high mileage fleets of taxis and buses, which can be

more easily monitored). However, in many cases it will be preferable to introduce policies and efficient fiscal incentives to accelerate the *scrapping* of high-pollution, high-usage vehicles such as older taxis, buses and trucks. *Maintenance* control also remains a major challenge.

Motorcycles and other simple motorized means of transport represent an affordable step-up in power, speed and range from the pedal cycle. In many middle-income countries in South and Southeast Asia, intermediate transport vehicles already account for up to three-quarters of the vehicle population. That trend is being replicated in lower-income cities such as Hanoi and Phnom Penh, and may be expected as more people emerge from poverty in Africa. Unfortunately, most of these vehicles are powered by two-stroke engines which emit hydrocarbons and smoke at up to ten times the rate of modern four-stroke automobile engines. Thus, the most polluting vehicles are rapidly replacing the least polluting.

Fuels

Conventional fuels are being improved. Dramatic improvements in air quality can be achieved with existing technology. In the case of *lead*, it is necessary to control the quality of *automotive fuels* that can legally be supplied to consumers. In developing countries, these are generally dirtier than those available in developed countries, with a lead content of gasoline as high as 0.8 to 1.1 gm/liter (compared with 0.15 gm/liter for leaded fuel in industrialized countries). The sulfur content of diesel is in excess of 1 percent by weight, compared to 0.5 percent or less in industrialized countries. Additives to diesel can also reduce particulate emissions. Comprehensive emergency programs, such as that introduced by the Thai government, has introduced lead-free gasoline and low-sulfur diesel, better vehicle inspection and monitoring and high standards for new vehicles.

Many new fuels are also on the horizon. Transport fuel derived from biomass has substantial environmental benefit but is uneconomic when oil prices are below the peak reached in the early eighties. It could also only be a main fuel in land rich countries like Brazil. In contrast, the substitution of liquefied petroleum gas (LPG) and compressed natural gas (CNG) for gasoline may be justified, both environmentally and economically, in a larger number of countries that have local gas resources. Battery and fuel cell technologies and even hydrogen fueling of vehicles are technically possible though still limited in application for various reasons (weight, storage capability, etc.) which have impact on their costs. The introduction of cleaner fuels would also need to be supported by other policies. Adequate infrastructure is also needed. Relative fuel prices must also be adjusted to give efficient incentives to use clean technology and clean fuels.

Traffic Management Technology

Sophisticated technology is also now applied to the management of traffic in most industrialized countries. On-line computerized traffic control, often giving public transport vehicles priority at traffic signals, have increased effective capacity of road systems substantially, as well as allowing traffic to flow at speeds at which emissions per vehicle mile are much lower. Traffic signaling coordination can increase effective road capacity by as much as 30 percent. Traffic management can also protect environmentally sensitive areas or road user categories from vehicular traffic. Electronic charging is also now technically possible, though problems of implementation and political acceptability remain great.

Most of this technology can in principle be applied also in developing country cities. In practice, however, implementation has often been handicapped by a lack of enforcement and by staff who are inadequately trained for designing and maintaining systems. As a consequence, simple management schemes, such as segregated busways or computer-controlled traffic signals, have often been considered

to be more appropriate for developing countries. However, developments in electronics have reduced both initial equipment cost and maintenance needs.

The weakness of relying on reducing congestion for air quality improvement is that the impact will depend on where traffic is diverted and what distribution of traffic speeds results. Moreover, increasing the speed of movement of traffic may simply induce greater volumes of travel, so that, *despite reduced emissions per vehicle mile*, total emissions are not reduced. The past emphasis on accommodating unrestrained growth in vehicular traffic on urban roads may be difficult to sustain. *The new challenge will be to focus on moving people rather than vehicles*

Information Technology and the City of the Future

Developments in information technology may also be significant in shaping the role of transport in the city of tomorrow. Electronic transmission of information can certainly replace the movement of hard copy. And there has also been some development of “telecommuting” in place of the traditional physical movement of people to work. The critical question is how those new technological possibilities will be used. In particular, this depends both on the extent to which telecommunications act as a complement or substitute for physical movement of goods and people, and, where it is a substitute, what new pattern of activities develops.

It must not too easily be assumed that telecommunications will replace physical movement. Modern information technology within transport supply has helped the performance of both vehicles and systems, making them cheaper, more efficient, and hence relatively more attractive. In the freight sector modern information technology has already been instrumental in the creation of globally sourced “just-in-time” production and distribution chains. This has replaced the movement of raw materials by the increase of semi manufactures in the trade patterns of many developing countries but has also, in many spheres, increased rather than decreased goods vehicle movements both by increasing distances and lowering consignment sizes. The need for frequency and reliability of delivery has also shifted traffic to exactly those modes (road and air transport) which are commonly considered to be the most environmentally threatening. Even in personal movement, the car has become a “mobile office”, relaxing some of the disadvantages of congestion rather than necessarily eliminating the congestion itself. Even if it does have some substitution effect it may impact mostly on the richer classes in the richer cities, without ameliorating the lot of the majority.

Simple Technology: The Role of NMT

Reliance on non-motorized transport as the main mode of transport in urban areas, particularly large urban areas, is frequently associated with poverty. Certainly, in many of the cities of the developing world, non-motorized transport, being the cheapest mode, is the transport of the very poor. Much urban transport policy has been directed to providing for the increased personal mobility typically associated with motorization, in which context non-motorized transport has been seen as a nuisance.

Conversely, however, in some of the richer developed countries non-motorized transport, particularly cycling, is experiencing a revival, not merely as a recreational diversion but also as a mode of transport. In particular, as urban road congestion increases and public transport receives increased attention, the bicycle can act as an efficient and environmentally friendly local distributor to reconcile the need for high local accessibility with the inherently courser structure of public than private transport networks. This is particularly apparent in Japan. When associated with attempts to sustain shopping and other services at

the local level, as in the Netherlands, the bicycle can also act as the main mode for a wide range of journey purposes (journeys to work, school and shopping in particular).

PUBLIC TRANSPORT AND THE CITY OF THE FUTURE

Issues

The main issues on the balance between private and public transport needing to be confronted in the dialogue include:

- *How can efficiency and responsiveness to consumer needs best be achieved in the production of public transport services?*
- *What is the social and environmental role of subsidies in urban public transport?*
- *What are the institutional requirements for maintaining a balance between private and public transport?*
- *In what circumstances is there a role for simpler technologies and the informal sector in supplying public transport services?*

The Advantages of Public Transport

Public transport performs a number of important functions in making cities sustainable. Where demand is sufficiently high to secure viable load factors for public transport vehicles (even small ones) it is a more efficient user of space; a more efficient user of fuel (and hence environmentally preferable); and is cheaper than the private car. Most major cities could not operate at their current scale without their public transport networks. Economic, environmental and social sustainability all appear to require the maintenance of healthy public transport systems. Paradoxically, however, the maintenance of public transport systems appears to be increasingly burdensome to public finances, and increasingly under threat. Understanding the reasons for that, and finding a basis for addressing it, is an important challenge for transport in the city of tomorrow.

Pricing and Regulating Private Transport

The critical importance of getting the prices right for private transport in cities has already been mentioned, but should be repeated here. In particular, where the urban problems are primarily associated, either directly or indirectly, with the phenomenon of congestion, the need for a direct means of controlling congestion is central. If that is not adequately handled by price mechanisms then alternative traffic management and restraint mechanisms are essential. Failure to adequately control private transport is the primary reason for the increasing problems of public transport.

Regulating Public Transport

The pressures on traditional public transport structures have several other roots. In some OECD countries (UK, New Zealand, Scandinavia) the reduction of the fiscal burden of transport subsidy has given rise to a search for cheaper ways of making provision. The collapse of public financial capability is likely to lead to similar developments in the transitional economies in the near future. In many developing countries, where supply has been from the private sector without subsidy, unrealistic control of prices

has led to the failure of conventional operators (in many African and some Latin American countries in particular). Even where conventional services have been allowed sustainable prices or other revenue sources, it has been replaced in some countries by informal sector suppliers able to provide service at lower cost or better adapted to what customers demand.

Two critical weaknesses have been apparent in traditional supply arrangements. First, government regulation or direct supply has frequently concentrated on combinations of price and levels of service for which there would be no sustainable financial basis in any event. Second, the absence of competition in supply has enabled management, favored customers and organized labor interests to appropriate part of the potential monopoly profit. Thus, the basis for increasing economic sustainability in public transport is increasingly seen, even in the wealthier OECD countries, to require the withdrawal of government from direct responsibility for operation, the creation of a more transparent basis for the imposition of social objectives on operators, and the creation of competitive pressures to efficiency in supply.

These objectives can be achieved in a number of ways. Competition can occur “in the market” *between individual operators* within a mode of transport, *between groups of operators* within a mode or *between modes*. Even where entry to the market is restricted, it is possible to organize “*competition for the market*,” which may be for the right to service individual *routes*, for the sole right to provide a whole *network* or to undertake particular *functions* as a subcontractor to a monopolist operator. What is important to recognize is that moves to improve the financial sustainability of public transport through competition in supply between private enterprises does not exclude the possibility of managing the market so as to protect the environment or to retain some subsidies for social reasons.

The move to more competitive structures has not always been easy, and there remains much controversy over the best way to proceed. But there is an increasing body of experience which can be exploited to devise appropriate structures to particular national circumstances. Developing exchange of that experience is important to the future of public transport.

Changing the role of governments from having direct control over state-owned enterprises to exercising *indirect guidance* through regulation and pricing policy is likely to put greater demands on institutional capabilities in developing and transitional economies than is immediately available. In some cases (for example, control of vehicle safety and road user behavior), improving regulations is largely a matter of strengthening the existing monitoring and enforcement capability. In other cases (for example, the environmental effects of new infrastructure investment), it involves setting up participatory development and appeal processes. In yet others (control of cartels and anti-competitive behavior), whether there is a need for transport-specific institutions will depend on the way in which these issues are dealt with at an economy-wide level. Identifying and providing for the necessary human and institutional development is thus a necessary precursor of major regulatory change.

Pricing Public Transport

The increasing separation of political decisions from managerial decisions, and increasing involvement of the private sector as suppliers of public transport in environments subject to competitive pressures, are attempts to keep the costs of public transport as low as possible. Improving efficiency of supply in such ways is always desirable. A clear distinction needs to be made, however, between keeping costs low (and hence allowing prices to be low even where costs are fully covered) and keeping prices lower than costs - the issue of subsidies.

Subsidies might be justified either for distributional reasons, or as means of offsetting the adverse effects of the underpricing of road use both on urban congestion and on the urban environment. Ideally, any variation from full cost recovery to satisfy these objectives should be made explicit, both in qualitative and quantitative terms. In practice such justifications may only be crudely quantified. However, whatever judgment is made, the desired level of subsidy should then be strictly tested for **financability**. Anything less than full cost recovery should be contingent upon funding for operational costs and short run equipment replacement needs from a secure source of supplementary funding. Any hypothecation or indirect charging (such as the use of payroll taxes) should be embodied in a statute specifying not only the nature of the source and the principles for determining its level of impact, but also its duration of application and rules for its amendment

In the long run, redistributing income through transport subsidies is not generally desirable both because it tends to discriminate poorly and because it introduces distortions in land use and residential choice. In the short term it may be difficult to reduce the real incomes of even advantaged groups receiving free travel, and there may be redistributions resulting from changes in transport supply structures with distributional consequences which are considered undesirable. In any such case, however, the burden of fare concessions should be taken off the books of the transport supplier both for efficiency and equity reasons. Transferring responsibility back to the sponsoring agencies not only assists the transport suppliers, but also introduces incentives to find more efficient methods of income payment. The distributional justification of all subsidies should be carefully assessed, and steps should be taken to ensure that all those who should pay do in fact do so. In many of the transitional economies where public transit is facing increasing financial difficulty, much of the problem could be overcome by these steps.

The Informal Sector

State-owned public transport operators have often failed to maintain an adequate level of service at prices affordable by the poor and at subsidy levels sustainable by governments. In many developing countries the transport needs of the poor would be better met by ensuring that the informal sector has freedom of operation. The informal sector already plays an important role in public transport in many cities in Latin America, Africa and East Asia, and often provides services that are no longer available from the regulated operator (as in the case of the Blue Cars in Dakar, dolmuses in Istanbul and jitneys in Manila). Encouraging the growth of the informal sector can also have significant effects on reducing poverty directly because of the entrepreneurial and income-generating possibilities that it offers to the relatively poor (for example, it is estimated that over 5 million people depend for their subsistence on the provision of cycle rickshaw services in Bangladesh). The main problem with informal sector supply is that it often involves small and old vehicles which cause congestion and are environmentally damaging.

Public Transport Improvement and Labor Redundancy

Economic sustainability of public transport may be enhanced by improved efficiency. If the output of the enterprise is growing as a result of growth of the economy and diversification in the products being handled, technological improvement can be translated painlessly into increased labor productivity. If this is not so, or if there is a protracted reduction in demand for a mode of transport, large-scale labor redundancy can occur. Although the costs to the national budget of retaining redundant labor in state enterprises may be very high (for example, the deficit of Argentine Railways prior to restructuring imposed a cost of 1 percent of GDP, inability to shed labor may be a serious impediment to reorganization and, particularly, to privatization.

Although eliminating excess labor is of long-term benefit, the short-term effects may be to create a new and concentrated pocket of poverty. Severance of redundant labor should therefore always be preceded by an exhaustive exploration of alternatives. New products (such as premium services) may be produced within the organization. Workers may be redeployed to other public sector organizations. In some cases it may be possible to link private sector development and the process of eliminating redundant labor from public enterprises by transferring assets to employees. In many cases, however, voluntary solutions are not feasible, and the only way to avoid increasing poverty is by a combination of retraining and compensation. Such severance payments have to be financed. Where the cash flow of the enterprise is insufficient to meet the severance obligations, the enterprise may borrow for the purpose or, alternatively, look to government for assistance either through budgetary transfers or domestic borrowing, with recourse to international borrowing appropriate where local capital markets are not able to accommodate the need.

Urban Transport Institutions

The major *institutional* problem is to create the basis for a comprehensive policy that provides for integration both among modes and between transport and land use at the conurbation level. In some cases the problem is excessive fragmentation of powers between small municipalities within a conurbation (common in South America). In others (particularly in the transitional economies), the problem has been the centralization of powers over urban transport at the national level. In the developed countries the integration of public transport at a conurbation level, and its integration within a comprehensive approach to urban transport problems, is not unusual. Those arrangements typically have several dimensions. Responsibilities are explicitly and clearly located, with the local responsibility for execution of functions accompanied by an adequate system of accountability and incentives for efficient performance. Traditional functional rivalries (among land use, public transport, roads and traffic enforcement) are confronted, often by the creation of multi-modal, multi-functional Urban Transport Authorities.

Two resource limitations can subvert efforts to create integrated urban transport planning arrangements. First, if adequately trained administrative and professional staff are not available at the local level, the performance of facilities may actually suffer from decentralization. Second, and most important, the transfer of responsibilities must be accompanied by an appropriate financial basis for implementation. This might take the form of adequate allocation from the central budget, the assignment of a defined tax base, more revenue-sharing between central and local governments, or grants from central government to match funds raised locally. Failure to make such provisions are currently inflicting severe damage on municipal transport in many transitional economies in eastern and central Europe.

DIALOGUE 5: CONCLUSIONS AND RECOMMENDATIONS PRESENTED TO COMMITTEE 2 ON JUNE 11, 1996

Introduction

The transport dialogue concentrated on identifying strategic instruments to create more sustainable transport conditions and on the policy context necessary for the best use of those instruments.

Discussion

Cities differ substantially in character and have differing transport systems and transport related problems. What they have in common is that as they grow bigger and richer their transport problems get worse because the number of motorized vehicles and their level of use grows faster than population and income, while the amount of road space to accommodate that traffic demand grows little if at all. This imbalance between the rates of growth in demand for and supply of road space leads to increasing road congestion, increasing environmental impacts in the form of air pollution, noise, and accidents; and undesirable social implications as the poor suffer disproportionately from the deterioration of public transport. Unfortunately policies which work adequately when cities are small do not retain their effectiveness as city size and income grows.

Several *strategic instruments* can be used to address the problem. *Land use* densification, less rigorous separation of local land uses and multinuclear linear urban forms can all reduce the pressure of private transport demand on road facilities. Despite the difficulty of changing existing urban forms and of exercising detailed control of land use, particularly in developing countries, there are a number of ways of influencing patterns of urban development which can be recommended. A number of *cleaner technologies and fuels* are in prospect, capable of substantially reducing both local and global air pollution impacts. Their introduction will depend crucially on the structure of incentives created by government fiscal policies. The role of *public transport* as a space efficient and potentially less environmentally polluting mode has been inhibited in many cities by its relatively poor performance. In many developing countries the bulk of the population is primarily dependent on either walking, cycling or public transport. Action to improve public transport is thus crucial.

These instruments require an appropriate *policy context*. Vision is an important basis for improving the urban transport situation. But vision requires effective implementation. If systems are not *economically and financially sustainable* they will collapse, and environmental and social objects will also fail to be achieved. The most serious problem in this respect is the undercharging for the use of road space, which encourages excessive total movement and discriminates against public transport. The *institutions* must also be right. The provision of transport services must be organized to encourage efficiency of supply. While increased transparency and local participation in transport planning is desirable, excessive fragmentation, and lack of coordination both between functions and between jurisdictions in the largest conurbations frequently inhibits implementation of a comprehensive strategy. Above all *priorities* must be clearly established, with immediate action concentrated on the most damaging impacts of transport and the most manageable and cost effective instruments of alleviation.

Recommendations

A. *On Strategic Instruments*

1. **On Land Use and Transport Policy**

- Space should be reserved for mass transit in corridors selected for development.
- Authorities should select locations for the development of basic public services (water, sewerage, power) in such a way as to encourage public transport based developments.
- Plans for local travel should include provision for non-motorized transport and walking.

2. **On Technology Policy**

- Research and development of cost effective clean transport technologies should be supported.
- Taxation systems should be structured to penalize more environmentally damaging behavior.
- Simpler, but cleaner, non-motorized technologies should not be penalized.

3. **On Public Transport Policy**

- Road based public transport should be supported by systematic and extensive priorities.
- Reserved routes for public transport should be included in major new developments
- Public transport networks should fully exploit the potential of existing but uncoordinated links.
- Government financing of public transport should be given a stable basis with explicit and secure revenue sources.
- The role of non-motorized transport and the informal sector to transport supply should be explicitly considered in the determination of public transport strategies.

B. *On Policy Context*

4. **On the Economic Basis for Policy**

- Direct charging for congestion and environmental impacts should be introduced as soon as possible
- Where direct charging is not in place fuel taxation policies should reflect the full costs of use on road space - including the environmental and infrastructure costs associated with road use.
- The imposition of low fares for public transport operators should always be accompanied by an appropriate funding mechanism.
- Both in the provision of infrastructure and in that of public transport services competition for the market through concession or franchise arrangements should be used to reconcile the efficiency of competitive supply with environmental or distributional objectives.

5. On Institutions

- Strategic public sector decision making, should be separated from management of operations, which can be undertaken more efficiently if subject to market incentives and disciplines.
- Diversity of public transport supply should be encouraged through more liberal entry into the market.
- Local institutional structures should be arranged in such a way as to secure functional and modal coordination subject to overall transport strategy guidance
- The allocation of responsibilities between jurisdictions should be carefully designed to reconcile very localized input with coordination on a city region basis.
- Transfer of responsibility for implementation of city transport functions to local authorities or agencies should always be accompanied by an appropriate transfer of financial resources or taxing capability

6. On Environmental Aspirations and Priorities

- The elimination of lead from transport fuels, as advocated by the World Bank, is the highest priority.
- Control of vehicle emissions should initially be concentrated on high mileage vehicles such as buses, taxis and urban freight distribution vans.
- Priority should be given to reducing urban road deaths and injuries, particularly in developing countries.
- Where public transport is in decline due to lack of finances comprehensive plans should be established involving simultaneous consideration of possibilities of cost reduction through increased efficiency in supply, of ensuring the funding of social subsidies explicitly from social sector budgets, of direct public financing through multi-modal urban transport funds, of increased cost recovery from the reduction of fare evasion, and of concentration of subsidy provisions more directly to those in most urgent need.

CONCLUSIONS OF DIALOGUE 5: TEXT OF SPEECH BY KEN GWILLIAM TO COMMITTEE 2, JUNE 10, 1996

Mr. Chairman, distinguished delegates, ladies and gentlemen,

Dialogue 5 was organized by UNCHS in collaboration with the International Public Transport Union and the Transport Division of the World Bank, under the sponsorship of Daimler Benz.

Cities differ substantially in character and have differing transport systems and transport related problems. What they have in common is that as they grow bigger and richer their transport problems get worse. This happens primarily because the use of motorized vehicles grows faster than population and income, while the amount of road space to accommodate that traffic demand grows little if at all. This leads to increasing road congestion, increasing environmental impacts in the form of air pollution, noise and accidents. Furthermore, some vulnerable groups, particularly women and poor people living on the periphery of cities often suffer disproportionately from deteriorating urban public transport.

Strategic Instruments

The dialogue concentrated on strategic initiatives which might attenuate these problems. First, in respect of patterns of *land use*, densification was advocated as a means of allowing trip lengths to be shortened. Less rigorous zonal separation of land use was advocated to increase proportion of trips undertaken on foot or by non-motorized means. Multinuclear star-shaped urban forms were advocated to reconcile diversity of residential densities with a higher dependence on space efficient public transport modes. Despite the problems associated with exercising detailed control of land use, particularly in developing countries, it was argued that patterns of development can be beneficially influenced by the protection of reserved space for mass transit in selected corridors; by the strategic planning of extension of water, sewerage and power services; and by attention to planning for local travel by non-motorized transport and walking in safe, attractive conditions.

Second, with respect to *technology policy* a number of cleaner technologies and fuels, capable of substantially reducing both local and global air pollution and noise impacts, were discussed. But their introduction will depend crucially on consumer acceptance which will in turn be significantly affected by government fiscal policies. It is therefore important to structure taxation systems to penalize more environmentally damaging vehicles and behavior. Conversely, the importance of not penalizing simpler, but cleaner, non-motorized technologies was strongly advocated.

Third, it was argued that *public transport*, as a space efficient and potentially less environmentally polluting mode, should be made more comparable in speed with private transport by infrastructure provision and traffic management priorities. Public transport networks can often be improved substantially by identifying, coordinating and fully exploiting the potential of existing facilities. The creation of a more favorable financial and fiscal climate, and better institutional coordination were also seen as important components of a public transport strategy.

Policy context

Having a vision is an important basis for improving the urban transport situation. But vision also requires effective implementation within an appropriate policy context.

First, *the economics must be right*. If systems are not economically and financially sustainable they will collapse, and environmental and social objectives will also fail to be achieved. The most serious problem in this respect is the undercharging for the use of road space, which encourages excessive total movement and discriminates against public transport. In the absence of direct charging for congestion and environmental impacts it is recommended that countries should adopt fuel taxation policies that reflect the full costs of use of road space - including the associated environmental and infrastructure costs, as well as the resource costs of the fuel itself.

Transport services must also be efficiently supplied. In many countries regulatory mechanisms have increasingly protected the interests of suppliers rather than users. Competition has proved to be a powerful instrument for increasing supply efficiency, but needs to be carefully managed to avoid adverse environmental and distributional impacts. Both in the provision of infrastructure and in that of public transport services competition for the market through competitively awarded concession or franchise arrangements can reconcile the efficiency of competitive supply with environmental or distributional objectives.

Second, *the institutions must be right*. While increased transparency and local participation in urban transport policy formulation is very desirable, excessive fragmentation, and lack of coordination both between functions and between jurisdictions, frequently inhibits implementation of a comprehensive strategy in very large conurbations. This highlights the need for careful design of institutional structures to reconcile local participatory input with coordination on a city region basis. In respect of public transport the separation of strategic public sector decision making, from management of operations (which is more efficiently performed by a competitive private sector) is also critical, changing the role of government from that of direct supplier to that of public customer, and requiring the development of new skills in public administration. Political intervention imposing low public transport fares may actually harm the poor if there is no secure source of funding for the deficits and the amount or quality of service declines. This emphasizes the importance of parallel devolution of control responsibilities and financial responsibility and capability.

Third, *priorities* must be clearly and realistically established with immediate priority given to implementable measures to reduce life and health threatening impacts. The total elimination of lead from transport fuels is a high priority because of its proven high health impact and because of its amenability to immediate action. Other high priority areas are the tight control of vehicle emissions by high mileage vehicles such as buses, taxis and urban freight distribution vans, and the reduction of urban road deaths and injuries, particularly in the developing countries. Concerted initiatives are urgently needed in all of these areas.

It is these considerations which underpin the more detailed recommendations submitted by the dialogue, which have been circulated.

Ladies and gentlemen, thank you.