

Transport and air pollution

The problem

Asia is undergoing a rapid increase in urbanization. The region's megacities are getting larger and rapidly suburbanizing. Its small- and medium-sized cities are also growing quickly. Urban growth is largely unplanned in many cities due partly to the speed at which such growth is occurring, and also because of the lack of technical capacity and mechanisms to direct and manage growth. Transport plays a fundamental role in the functioning of cities and their connecting hinterlands, but inappropriate transport policies impose severe costs on cities and their citizens.

Transport's contribution to urban air pollution is a serious and growing issue because:

- transport or mobile sources contribute the majority of most pollutants in urban areas, particularly when viewed in terms of human exposure;
- transport contributes the vast majority of increases in levels of urban air pollution;
- emissions per vehicle of most pollutants² greatly increase as vehicle speeds fall;
- Asia's large cities are plagued by growing traffic congestion, with a temporal and geographic expansion of that congestion; and
- previous studies have shown that without sound transport planning and management to reduce vehicle speeds, many of the gains made in reducing total emissions will be eroded.

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Air pollution and health

There are several pollutants of concern as discussed in the Appendix on Adverse Health and Environmental Effects from Vehicle Emissions. In Asia, studies confirm that one of the main pollutants, particulate matter (PM), especially very fine PM,³ has serious and proven health impacts. Some cities such as Bangkok, Thailand have an emerging problem with ozone that is formed by the reaction of volatile organic compounds and NO_x in the presence of heat and sunlight. Transport sources in urban areas are significant producers of greenhouse gas (GHG) emissions such as carbon dioxide. The share of GHG emissions from transport is growing rapidly. The volume of GHG emissions produced depends on the amount of traffic congestion, intensity of vehicle use, and the amount of fuel consumed.

Even though air pollution may have regional and global implications, its most severe impact is on human health and these impacts are highly location-specific. For example, in Asia, where high levels of human activity in and around transport corridors are commonplace, the incidence of people suffering health damage is very high.⁴ In smaller cities, or within pockets of larger cities, roadside buildings at street level can trap the most severe air pollution (i.e. the urban canyon effect). As cities get larger, air pollution grows and spreads.

Noise from transport sources is also an issue in many Asian cities. Due to its seemingly transient nature, noise (commonly defined as “unwanted sound”) is often not regarded seriously by politicians and senior technical staff of responsible agencies. Yet noise interferes with sleep and effective human interactions, and can cause physical damage to human hearing. Noise is especially high in the vicinity of transport corridors.

Asian transportation context

Until the mid-1990s, most countries in the region experienced over a decade of strong economic growth that raised income lev-

els by around 70%. Associated with that growth was a rapid increase in motorization, generally greater than 10% per annum in both rich and poor countries. Although motor vehicle—car and motorcycle—ownership levels vary greatly throughout the region and between urban and rural areas within countries, motor vehicle ownership in Asia is generally low compared to developed western countries. Even where the per capita vehicle ownership in Asian countries (e.g. Malaysia and Thailand) approaches that of western countries (e.g. United States, United Kingdom and Australia), this is due to the high levels of motorcycle ownership that comprise the majority of the vehicle fleet. Asian motorcycles typically have small engine sizes, around 100 cubic centimeters (cc), and are relatively inexpensive compared to cars; consequently, motorcycles are the first motorized vehicles affordable to many individuals and families.⁵

Asian cities have diverse motorization experiences, but the general trend is that consumers prefer private motorized transport. Individuals tend to regard car and motorcycle ownership as a status symbol. Decision makers often see economic growth as associated with vehicular traffic growth, and this prevailing mind-set encourages motorization and a bias for motor vehicles in existing policies. This same mind-set regards nonmotorized transport as inferior, degrading, or a relic of the past.

Asian cities have a wide variety of public transport modes with incredible variety both between and within cities. These public transport modes include existing urban sections of generally old interregional rail systems; new urban rail or mass transit systems; small and large buses with or without air conditioning; van transport operating on fixed routes, point-to-point or on non-fixed route bases; taxis; small motorized two- and three-wheeled vehicles, including motorcycle taxis; and nonmotorized vehicles (NMVs) providing access to trunk line bus and rail systems. These

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individual modes provide a variety of qualities and levels of service and charge different fares, thus, catering to different market niches.

Within cities, the variety of vehicles and road users, including pedestrians and NMVs, have diverse needs that frequently conflict. In this environment, appropriate traffic management poses special challenges for transport agencies. Several Asian cities have implemented traffic management measures with mixed success, and even when schemes are

initially successful, they require active management and associated technical capacity to sustain them. In many cases, there are inadequate resources to maintain these schemes and, thus, they are abandoned.

The 1997 Asian economic crisis greatly affected the economies of the region, and the present global economic slowdown continues to affect the region. In times of economic stress, decision makers often give environmental concerns a low priority. Resources for the maintenance of transport systems and emissions-measuring equipment are often sacrificed.

There is a lack of local knowledge on how best to address motorization and the special challenges faced by transport professionals in Asia's cities. To date, there has been a reliance on western experience that needs to be adapted or replaced by local approaches, methods and tools.

Purpose of transport planning policy guidelines

These *Transport Planning Policy Guidelines* aim to provide practical guidance on how to establish sound and acceptable transport planning, travel demand management and transport systems management programs in Asian countries. In particular, these guidelines target air quality and transport planning practi-

tioners and the executives they report to, in order to provide a better understanding of how transport planning may affect air quality and of effective measures to mitigate mobile source air pollution.

A key challenge in transport planning is identifying measures that are technically sound and acceptable to the public and politicians. Hence, the guidelines stress that the improvement measures considered should be proven to be efficient, effective and feasible in the local context.

The terms “transport planning”, “travel demand management” and “transport systems management” programs are defined for the purposes of these policy guidelines in Box 1.

Box 1 Definitions of transport terms

Transport planning is the objective analysis of travel demand, and the socio-economic or land use factors giving rise to that demand; the formulation of improvement alternatives that address explicitly-stated improvement objectives; the development of a recommended set of activities to realize stated objectives; as well as the regular monitoring and evaluation of those objectives and activities.

Transport planning is multi-disciplinary in nature. Its objectives include ensuring that recommendations support sustainable development, such as improved air quality, and ensuring access to jobs, goods, and services that people need. To ensure that development is sustainable, it focuses on enhancing accessibility to goods, services and the markets they need, not mobility or removing congestion.

Transport plans involve large investments, so they must be economically efficient, effective, and realistic in the context of local institutional and financial resources.

Travel Demand Management (TDM) aims to influence demand and, indirectly, supply, to manage congestion and minimize vehicle-kilometers of travel in the short and long term. Ideally, TDM should be integrated in all aspects of transport planning. In so doing, it needs to address appropriate roles for buses, cars, nonmotorized vehicles, and other modes of transport.

Transport Systems Management (TSM) aims to make the best use of existing infrastructure and concentrates on managing person-movements rather than vehicle flows. TSM is usually implemented in tandem with TDM. In the context of promoting efficient goods transport, it also involves the creation of an appropriate regulatory environment and efficient interface between port, rail, road, sea and air terminals.