

The general guidelines relating to NMVs and pedestrians are:

- NMVs and pedestrians should be treated as modes whose potential should be enhanced and integrated in overall transport planning. It is essential that major new transport investments provide overall community benefits and do not unfairly disadvantage NMVs, pedestrians and low-income groups.
- Active formulation and implementation of low-cost measures that will provide significant benefits to NMVs and other traffic should be vigorously pursued. These should be implemented before traffic volumes increase and all road space is allocated to vehicular traffic.
- Transport and traffic flow models should incorporate the characteristics of NMVs, pedestrians and other indigenous modes in a policy-relevant way to support good decision-making.

Resource mobilization, taxation, pricing and subsidy

In Asia's developing cities, there are many needs for investment within and outside the transport sector. Good data and rational priority setting are needed to take into account all relevant health, environmental and transport benefits and costs.

Pricing and taxation

Private vehicles, including cars and motorcycles, should pay their full external costs. However, in some Asian countries, motorcycle and car ownership is seen as desirable and to be promoted at all cost. Coupled with this perception is the common view that development and support of the automobile and motorcycle manufacturing industry is good for a country's economic development. For these reasons, policymakers often implement policies that artificially lower the cost of vehicle ownership through very low

or non-existent first time and subsequent registration taxes. They may also apply relatively low sales taxes to these vehicles (compared to other goods) and adopt policies that permit motorists to avoid maintaining their vehicles to roadworthiness standards and reduce emissions to desirable levels. Such policies can lead to excessive demand for private transport modes, with consequent external impacts and the erosion of the public transport's viability. Setting prices so that motorists perceive the marginal social costs of their travel decisions is desirable in order to mitigate private vehicle use, but this is often not acceptable.

Comprehensive pricing to manage transport demand is feasible, but has been implemented in only a few cities, such as in Singapore since 1975,¹² and more recently in Hong Kong, China, where the feasibility of ERP was investigated thoroughly from 1997 to 2001. While some cities outside Asia, such as London, are considering the implementation of road pricing, very few Asian cities are expected to assess this instrument over the next decade due to difficulties in securing the high level of community support it requires.

The purpose of a road tax is mainly to raise revenue, while that of transport pricing is to influence the location and time of demand; these purposes are often confused by the public and politicians throughout Asia. As a result, the implementation of transport pricing measures usually faces stiff opposition.

Fuel taxes are a simple and practical instrument which may sometimes achieve some moderation in vehicle travel demand. Fuel taxes cannot address the time and location dimensions of congestion. To date, the main purpose of fuel taxation has been to raise general revenue; however, for environmental purposes there is a valid case to tax both gasoline and diesel fuel use. Policies on fuel taxation need to be evaluated carefully to avoid the possible adverse effects of inter-fuel substitution, and misuse and adulteration of fuels.

In many countries, transport taxes and charges are used as general revenue in part because their tax base is underdeveloped. There is a case for the creation of a special fund—one that uses earmarked revenues raised through levied taxes and charges to

support clearly-defined environmental objectives. These funds can be designed so as not to affect normal revenue-raising. Experience from several countries shows that increased levies, where directly and visibly linked to specific improvements, are acceptable to the public at large.¹³ It appears appropriate that the administration of these special funds should be decentralized.

Subsidies and associated policies for public transport

The long-term viability of public transport operations is crucial for protection against air quality degradation. The ability of public transport operators to provide continuous, high-quality service is necessary to keep the public from shifting to private transport or para-transit modes. Consequently, policies to address various social and environmental aspects of the transport system need to ensure the operator's ability to provide levels of service that maintain and, if possible, expand public transport mode shares. The two areas of particular concern are (i) subsidies for public transport, often provided to keep fares affordable for low-income groups and (ii) mandates on technology choices, which are often justified on environmental grounds.

Subsidies aimed at reducing air pollution from public transport should be based in part on an analysis of the relative net benefits that can be achieved. They may be warranted where they either support vehicle and emissions technology upgrading, and/or maintenance standards. Technology upgrading could also include alternative fuel use such as compressed natural gas, liquified petroleum gas and others. The case for subsidies is strongest where there are poor or non-existent regulations regarding maintenance to reduce tailpipe emissions. Such subsidies should be explicit, and designed taking into account the method of franchising and regulating public transport services. Stringent regulations and standards for ve-

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hicle maintenance and repair, and fleet quality and service levels should be specified and enforced as part of the franchise.

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that are reimbursable by the public transport operator—may be a more effective way of accomplishing the subsidy goal without inducing a degradation in service, maintenance, or air quality. Experience also suggests that transfers or payments directly to the public transport operator can also become internalized into the operator's wage structure and operating costs, providing benefit not to the urban poor, but rather to the often middle-class workers of the public transport operator. Such subsidies (i.e. to keep fares low) could also be aimed at attracting car drivers and so reduce pollution from transport. Because car drivers tend not to be sensitive to the price of bus fares, subsidies for this purpose tend not to be cost-effective. Motorists are more likely to switch to public transport where its speed and quality is greatly increased (e.g., express buses and air-conditioned buses). Since premium bus services would usually command a higher fare they would

not normally require a subsidy, however, high-quality rail services that have higher fixed costs than buses may still need to be subsidized.

Mandates to public transport operators to use a particular technology—or even to meet particular emissions criteria without a specification of technology—may also burden their operations, particularly if their finances are marginal to begin with. Having very clean buses may be a laudable goal, but they will have little impact or even exacerbate urban air quality if the operator must cut service (or not expand as rapidly as needed to meet growing demand) in order to meet the standards. Consequently, any analysis of technology options must include a service-level and demand-side component in order to fully understand the air quality implications.

Maintenance

Inadequate road maintenance may greatly increase vehicle emissions by reducing vehicle speed and hence, increasing congestion. Many cities fail to allocate adequate funds for road maintenance. This is due to an overemphasis on capital works with a corresponding lack of interest in maintenance works and/or where recurrent income, the main source of funds for maintenance, is inadequate. Additional funds for maintenance could be sourced from special funds earmarked from transport charges and taxes.

Other instruments

Scrappage schemes can remove old polluting vehicles from the fleet either with or without vehicle replacement, but they must be carefully designed to minimize possible adverse effects. Other indirect measures have a role in reducing emissions, such as differential vehicle registration taxes to favor cleaner technologies. Implementation of these measures requires accurate data on the vehicle fleet and relevant characteristics of the fleet.

Resource mobilization

There is much that needs to be done and reliance on government action alone is inappropriate. Private sector involvement is important to mobilize additional resources, but requires a careful design of components and the adoption of an appropriate regulatory environment.

By making explicit linkages between GHG emissions reductions and local air quality improvements, policymakers can access funds from the international climate community for advancing local air quality goals.

Transport planning and demand management measures are particularly well-suited to targeting these international resources, because they promote synergies rather than tradeoffs between local and global goals.

To ensure that available financial resources are well spent, economic criteria should be used to set improvement priorities. These criteria should take into account

all relevant health, environmental and transport benefits and costs.

The following general guidelines on transport pricing should be considered:

- Transport pricing should be improved to send clear signals to private vehicle users on the true costs of their motoring to society. For example, fuel taxes and special levies on vehicle registrations should be considered where they could be clearly linked to better maintenance and air quality objectives.
- Support for technical measures to upgrade public transport vehicles (to reduce emissions and improve the quality of operations) should be considered where they support explicit objectives and are designed as part of the regulatory and franchise system.

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- To attract needed resources for environmental improvement, a careful design of programs, projects and their components should aim to involve the public, private sector and international funding agencies. Private financing of projects should occur within a sound, overall framework for the provision of transport infrastructure.

Institutional, legal and implementation issues

Transport planning has multiple objectives that usually include improvements to transport efficiency and safety ahead of air quality improvements. Legislation covering air quality, transport and vehicles is very complex. At times it will be difficult to reconcile competing objectives, even if there is a political will to do so. The organizational structure of many cities does not clearly allocate responsibilities for functions, and many agencies have low technical capacity, with the result that they often work at cross-purposes.

The optimal institutional arrangement for transport planning and air quality management would involve an agency with an integrated transport responsibility. Singapore and Hong Kong, China have such integrated, empowered transport agencies, but few other cities do. Most Asian cities, for the time being, will need to rely on existing agencies and their current division of responsibilities. Regardless, involvement of all stakeholders early in the transport planning process is essential to bring about ownership for successful implementation.

Shared responsibilities for a task rarely result in effective implementation, without strong leadership and effective coordination. Hence, in this environment, effective planning and implementation must be designed to appeal to the interests of each agency in the institutional arrangement. Implementation, therefore, has the best chance of success where project components are designed to be implemented by a single agency.