

# Executive summary

Air quality problems in Asian cities are increasingly caused or exacerbated by emissions from the growing number of motor vehicles. Appropriate vehicle emissions standards for new and in-use vehicles and a well-designed and operated inspection and maintenance (I/M) program are important elements of an overall strategy to reduce vehicle emissions and air pollution.

As part of its Regional Technical Assistance (RETA) project to reduce motor vehicle air pollution, Asian Development Bank (ADB) organized a workshop on vehicle emissions standards and strengthening vehicle inspection and maintenance programs. The workshop was held in Chongqing, People's Republic of China on 7–9 November 2001. *The Policy Guidelines on Vehicle Emissions Standards and Inspection and Maintenance* summarize the most important policy conclusions and recommendations from the workshop.

In setting new vehicle standards, policymakers should be guided by the following principles:

- New vehicle standards must be closely linked to fuel quality requirements, as more advanced technologies are precluded or diminished by certain fuel parameters such as lead in gasoline or high sulfur levels in gasoline or diesel.
- If the air pollution problem is serious, as it is in most major Asian cities, policymakers should strongly consider jumping forward to the most stringent standards possible after examining what quality of fuel could be made available.

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- Short- and long-term plans for adopting vehicle and fuel standards should be developed so that the vehicle and fuels industries have sufficient time to adapt. The long-term goal for each country in Asia should be parity with European new vehicle and fuel standards by 2010 at the latest. Vehicles complying with 2010 United States standards should also be acceptable.
- An active dialogue between the motor and oil industries should be strongly encouraged to ensure that vehicle technologies and available fuels are closely linked.
- As new vehicle standards are tightened, in-use vehicle standards for new models should also be tightened and these in turn should form the basis for routine vehicle inspections. Onboard diagnostic systems (OBD) linked to new vehicle standards can also play a critical role in controlling in-use vehicle emissions.

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Combustion-powered vehicles naturally tend to deteriorate with age and usage, and as a result, emission levels can rise significantly. Good maintenance is required to keep emission levels at or near design levels. Such maintenance is not always performed or performed properly. Targeted I/M programs, however, can identify problem vehicles and assure their repair, thereby contributing substantially to lower emissions and improved air quality. In introducing I/M programs, certain overriding principles have emerged which should guide policymakers in developing and implementing such programs:

- I/M program designs should be comprehensive and must address a variety of important aspects from inception, including:
  - There must be a well-thought out public awareness campaign that explains the public health need for the I/M program, the potential benefits and how the program works.
  - Roadside apprehension or remote sensing programs to intercept vehicles that slip through the system or have problems in between periodic tests must be included.
  - Different pollutants of concern should be carefully accounted for in the program design. These include particulate matter (PM), nitrogen oxides (NO<sub>x</sub>), and smoke from diesel-fuelled vehicles; and carbon monoxide (CO), hydrocarbon (HC) and NO<sub>x</sub> from gasoline-fuelled vehicles.
  - An effective enforcement mechanism to assure motorist participation in the program is essential for success. In areas where motor vehicle registration requirements are routinely and effectively enforced, registration-based I/M enforcement systems have been very effective.
  - Policies should be developed to prevent, root out and penalize any corruption that might creep into the system.
  - Sufficient flexibility should be built in to allow variations in inspection frequency for vehicles with different mile-

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age accumulation rates and with relatively durable emission control systems.

- Quality assurance including covert and overt auditing and quality control.

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- Referee stations are one mechanism for resolving disputes or difficulties with individual vehicles, as owners can get a second opinion and advice about appropriate repairs. Policymakers should carefully consider the provision of one or more referee stations in the overall program design.

- So as not to overwhelm the service sector or create a strong political backlash, I/M stringency should be gradually phased in. The worst 15 to 20% of the vehicle fleet should fail with the periodic tightening of the in-use standards as the service industry and maintenance practices adapt.

## Inspection and maintenance (I/M) structure

- Centralized I/M systems (sometimes called “test only” systems), where the inspection and maintenance functions are separated, have consistently been proven much more effective than decentralized systems, where inspection and repair are combined. It is very difficult to supervise and audit the “test and repair” systems and to prevent corruption and poor quality control. Policymakers must resist the adoption of programs that combine testing with repair and

those that are very unlikely to achieve significant emission reductions.

- A careful and thorough dialogue among all relevant stakeholders including providers, regulators, enforcers/police, vehicle manufacturers, the driving public and media must be facilitated at the earliest stages of program development and subsequently maintained throughout the program implementation.
- While governments should regulate I/M programs, the actual implementation of I/M programs is best carried out by the private sector. Policymakers should assure that a bidding document is carefully designed and prepared in an open and transparent manner, and that all potential bidders are given a fair opportunity to compete for the final contract. Contractor selection should be based on technical merit and ability to perform the services, and the number of contractors selected should be kept small.

## Institutional and administrative set-up

- An adequate fee structure must be developed where the affected vehicle owners pay the full costs of the I/M program. This must include not only the cost of testing vehicles, but also of auditing and oversight, roadside apprehension, data management, nongovernment organization (NGO) capacity building, public awareness campaigns, and others. Such a structure must still allow private sector operators to make a sufficient profit to maintain, replace and upgrade equipment as required.
- Where multiple ministries (e.g., Environment, Police, Transport) or different levels of government (e.g., national and local) will be involved in the program, special care must be taken to assure a full dialogue with all appropriate ministries or departments in the early stages of program design, and full agreement with regard to specific roles and responsibilities.