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Low and Middle Income Countries' Urban Air Pollution Solutions

Air Quality

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Featured Region(s): **Africa, South and West Asia, East, Southeast Asia & Oceania**

This is a guide to reducing air pollution in low- and middle-income countries (LMICs). It identifies actions to improve air quality management in cities and, through their influence, at the national level. This includes air quality monitoring, determining the sources of emissions that contribute to local air pollution (source apportionment), and interventions to tackle pollution from these sources which are appropriate for LMIC cities, particularly in sub-Saharan Africa and South Asia. The guide explains the key steps, entry points, best practices and case studies from LMICs about efforts to address air quality challenges.

Getting started

Solutions to mitigate air pollution should be implemented as part of an overall air quality management (AQM) system. Cities without a prior history of air quality management should start by establishing an AQM system to assess the current levels, impacts, and sources of air pollution. The system should include, at minimum:

1. **Air quality monitoring** to measure and characterise current air pollution levels and sources, and to track air quality improvements after interventions.

2. **Health assessments** to quantify health risks from air pollution and reduced cases of disease from air quality improvements.

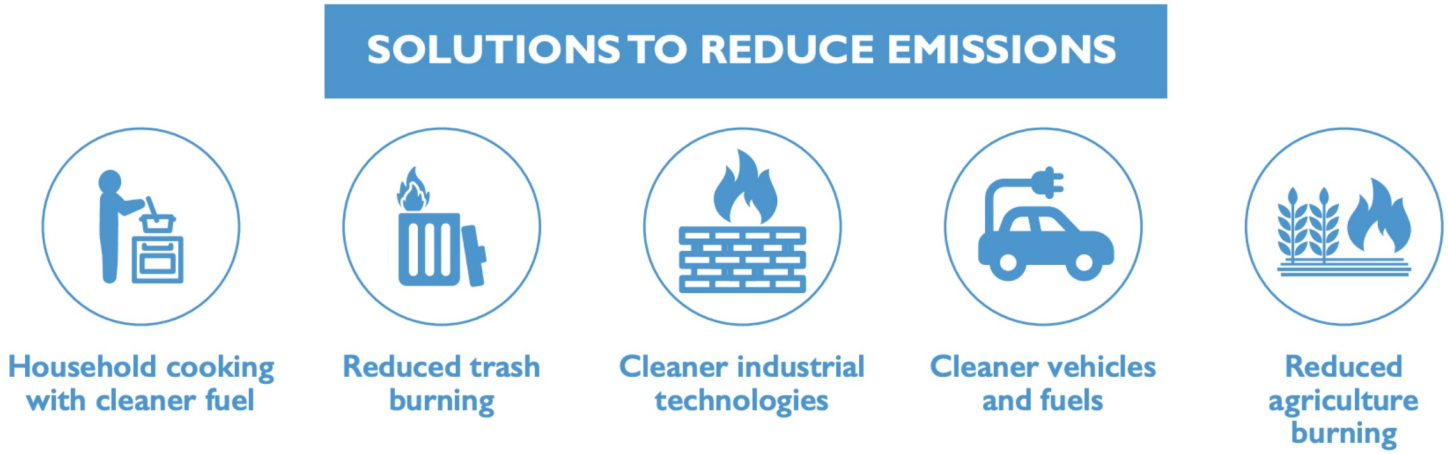
3. **Emissions and source assessments** to identify effective interventions and inform policy.

Cities should also review existing planning documents (such as national plans, local transport or health plans) for solutions which have already been identified. Where no such plans exist, initial planning can use existing, imperfect data and examples from other cities to begin implementing a small number of priority, achievable measures, aiming to improve data over time.

Chapters 2 and 4 explain in detail how to build these components of an air quality management programme, including the different approaches, options, data sources and tools available. Academic institutions often make good partners as they may have, or be well-positioned to acquire, the technical skills needed to support monitoring, modelling and other activities.

Actions to reduce leading sources of air pollution in LMIC cities

In Chapter 3, the guide identifies and explains five priority solutions:



- **Transitioning to cleaner household fuels.** This means switching away from burning biomass in all its forms, including firewood, charcoal, crop residues or dung, and replacing these fuels with clean household energy sources such as electricity, liquefied petroleum gas (LPG), ethanol, biogas or (high standard) pellets. Increasing the availability of these fuels can also help to create new jobs, including in the distribution and servicing of cleaner fuel and technologies.

- **Transitioning to cleaner brick kilns.** This is particularly relevant in South Asia, where 300,000 brick kilns are a major source of air pollution in the region. New brick production technologies developed in the aftermath of the Kathmandu earthquake now exist in the form of 'zig-zag' fixed chimney brick kilns, which are earthquake resistant, energy efficient, worker friendly and lower emission. They also reduce fuel consumption, increase production of grade A bricks, and are less capital-intensive, making them economically competitive. Most kilns in Kathmandu valley have been re-built after the earthquake with this technology, which is can also be adopted by cities and states elsewhere in the region. In India, for instance, the Environmental Protection Agency of Punjab Province released a directive in 2018 to convert all kilns to zigzag technology.

- **Reducing the burning of waste.** This is caused mainly by the lack of systematic waste collection. Read *Collection of Municipal Solid Waste in Developing Countries* for guidance on establishing waste collection, and *Why every city needs universal waste collection and safe disposal* for more information. As well as improving waste collection and landfill management, cities can also ban open burning – as the city of Accra did in 2018 – and bans on plastic bags to reduce plastic waste (the burning of which releases toxic pollutants).

- **Moving away from open burning (agricultural, forest and peat burning).** This is another major source of air pollution for cities downwind of agricultural fires from the open burning of forests and/or crop residue. As this burning happens outside of a city's boundaries, often hundreds of miles away, tackling it requires cities to work with partners including national and regional governments, as well as international partners. This also links to the point about transitioning cleaner household fuels, as reducing dependence on charcoal will help to reduce open burning for charcoal production.

- **Focusing on innovation that reduce transport sector sources.** This includes driving a shift toward electric private vehicles and electric bus fleets, and also improving public transport such as buses, and improving walking and cycling.

Invest deeply, not broadly

Initial investments can target known priority sources, particularly where they are already identified in planning documents. Early work might focus on one or two sectors, such as household heating and cooking (e.g. transitioning to clean household fuels), local industrial sectors (e.g. improved brick kilns) or civic and urban issues (e.g. reduced open trash burning). Later investments might target improved air quality monitoring, data management and training, communications planning, as well as industrial source emission standards, enhanced vehicle standards and more.

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