The IPIECA Urban Air Quality Management approach

The preparation and application of pollutant emission inventories: exploring the capacity of the IPIECA Toolkit

AIRNET
A Thematic Network on Air Pollution and Health

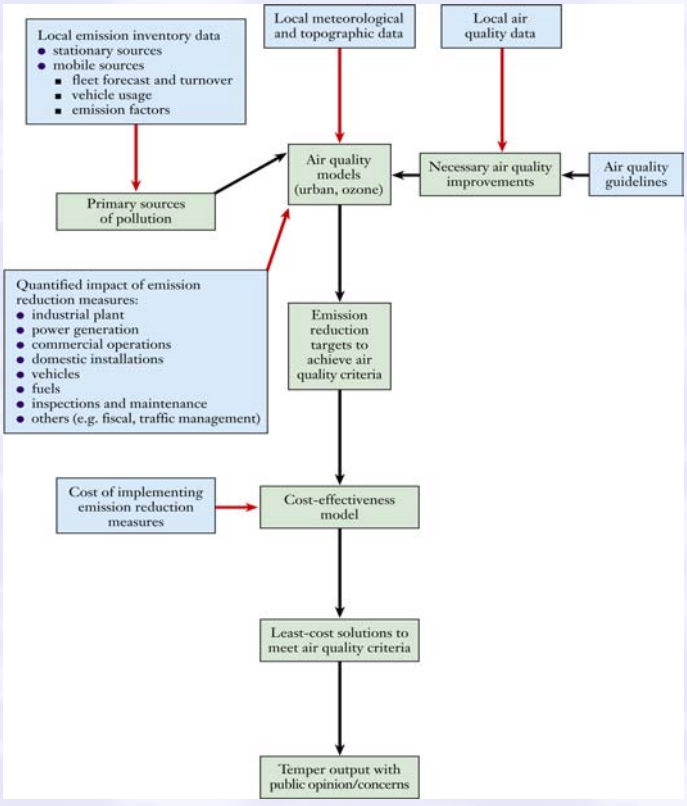
NERAM
Network for Environmental Risk Assessment and Management

Background to the IPIECA approach

The management of urban air quality is a problem facing cities worldwide, with rapid population growth, and fast economic, industrial and commercial expansion. Adoption of an urban air quality management approach which is based on the principles of sound air quality objectives, cost-effectiveness analysis, use of good science, recognition of the role of all major contributing emission sources, and involvement of all stakeholders, is crucial.

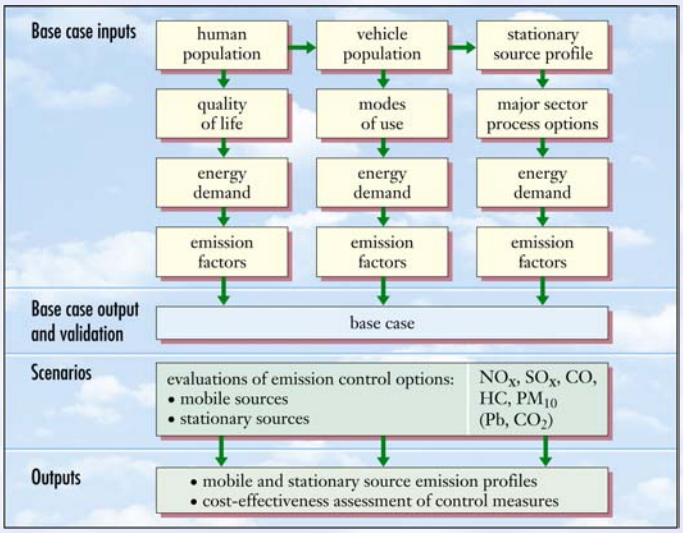
The IPIECA Air Quality Management process below sets out a standardized approach to air quality management which integrates local emission inventory data with the desired air quality improvements to present least-cost solutions for achieving local air quality goals.

IPIECA developed a flexible emission inventory model or "*Toolkit*" to address the development of local emission inventories, which are an essential component of any air quality study. The Toolkit embraces an integrated air quality management approach, facilitates the development and evaluation of local emission databases, and offers the opportunity for rapid screening of a wide spectrum of emission control strategy options by decision makers. The Toolkit also presents outputs, not only in terms of emission reductions, but also in terms of relative cost-effectiveness.



How the Toolkit works

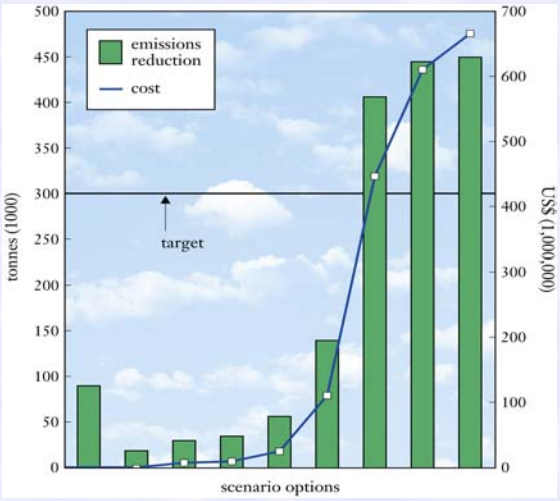
A schematic representation of the Toolkit process is given opposite. The Toolkit is a spatially adaptable model that can characterize mobile, stationary, and natural sources of historical emissions, and can forecast future emissions based on socio-economic growth factors. The Toolkit can be used to perform 'what if' analyses to determine the effectiveness and cost of emission control strategies applied to mobile or stationary sources (or both). The Toolkit therefore places a rapid screening tool in the hands of urban air quality management policymakers.



Data Input Requirements

- Time: The Toolkit can model up to 100 units of time (Years, Days)
- Human Population: The model uses population data characterize growth patterns for the base case and to forecast future growth
- Vehicle Population: The Toolkit classifies vehicles by size, by fuel type, by duty, as well as mode of use (driving modes, average speed and mileage driven within modes, and fuel consumption)
- Other vehicle-related inputs: These include the major fuel quality parameters for the fuel options selected, as well as emission factors drawn from the toolkit database
- Stationary sources: The Toolkit makes provision for type and quantity of residential, commercial and industrial fuels, including power generation.
- Natural Sources: The impact of natural or non-fuel sources of emissions can also be characterised.

Cost Effectiveness calculations



The Toolkit also provides a valuation of the cost-effectiveness of introducing emission control measures based on the costs associated with each measure. The cost data files within the Toolkit give the incremental costs of additional emission control measures, (e.g. introduction of catalysts). The data on vehicle technology is drawn from the European Auto/Oil studies.

Through an ongoing dialogue with the World Bank, the IPIECA Toolkit has been made accessible to cities taking part in the World Bank Clean Air Initiative (CAI). As part of the CAI program, IPIECA and Enstrat International have used the model in support of urban air quality management programmes in Latin American cities, and it has also been used by Shell Global Solutions in New Zealand. The Toolkit is available to non-profit making organizations, on application to the IPIECA Secretariat (http://www.ipieca.org), who will advise on necessary training requirements.

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