Urban Air Quality Management – Practices and Learnings from Asia

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Global Trends from 2008-2013

Global urban air pollution levels increased by 8%, despite improvements in some regions.

Urban air pollution levels were lowest in high-income countries, with lower levels most prevalent in Europe, the Americas, and the Western Pacific Region.

Highest urban air pollution levels were experienced in low-and middle-income countries in WHO's Eastern Mediterranean and South-East Asia Regions, with annual mean levels often exceeding 5-10 times WHO limits, followed by low-income cities in the Western Pacific Region.

http://www.who.int/en/news-room/detail/12-05-2016-air-pollution-levels-rising-in-many-of-the-world-s-poorest-cities


AIR POLLUTION – THE SILENT KILLER
Every year, around
7 MILLION DEATHS
are due to exposure from both outdoor and household air pollution.
Air pollution is a major environmental risk to health. By reducing air pollution levels, countries can reduce:
Stroke
Heart disease
Lung cancer, and both chronic and acute respiratory diseases, including asthma
REGIONAL ESTIMATES ACCORDING TO WHO REGIONAL GROUPINGS:
Over 2 million
in South-East Asia Region
Over 2 million
in Western Pacific Region
Nearly 1 million
in Africa Region
About 500 000
deaths in Eastern Mediterranean Region
About 500 000
deaths in European Region
More than 300 000
in the Region of the Americas
CLEAN AIR FOR HEALTH
#AirPollution
World Health Organization

Why? - Sources of Air Pollution

Transport related emissions

Industrial emissions

Emissions from commercial buildings and housing

Wastes (dumped and burnt)

Road dust suspension

Building Construction

Emissions don’t have boundaries

Burning of Agricultural Residues (Case of New Delhi)

Asia Brown Cloud

Transport of Natural Dust over Deserts and Degraded Lands

Regional Emissions Transported to Delhi

Emissions resulting from burning of agriculture residues in the States of Punjab, Haryana and Uttar Pradesh have led to air pollution in Delhi.

In 2017, 3,300 cases of stubble burning were detected in Haryana and in 2018, 93 cases have already been reported.

Scope of Urban Air Quality Management needs to be expanded to cover the neighboring regions

Case of Hongkong

The Environmental Protection Department of the Hong Kong Special Administrative Region and Guangdong Provincial Environmental Monitoring Centre established the Pearl River Delta Regional Air Quality Monitoring Network in 2005.

In September 2014, the Environmental Protection Department and the Department of Environmental Protection of Guangdong Province enhanced the Network with the Macao Environmental Protection Bureau (Macao EPB) and the Macao Meteorological and Geophysical Bureau (Macao MGB) to monitor real-time air quality.

The enhanced Network has been renamed as the Guangdong-Hong Kong-Macao PRD Regional Air Quality Monitoring Network

Illustrative Combined Measures Taken

Hong Kong

Vehicle emission control, including encouragement to use pollution control devices on private vehicles and the conversion of mini-buses to liquefied petroleum gas instead of diesel fuel.

Power station emission control, including the use of air-scrubbing equipment and placing emission limits on individual stations.

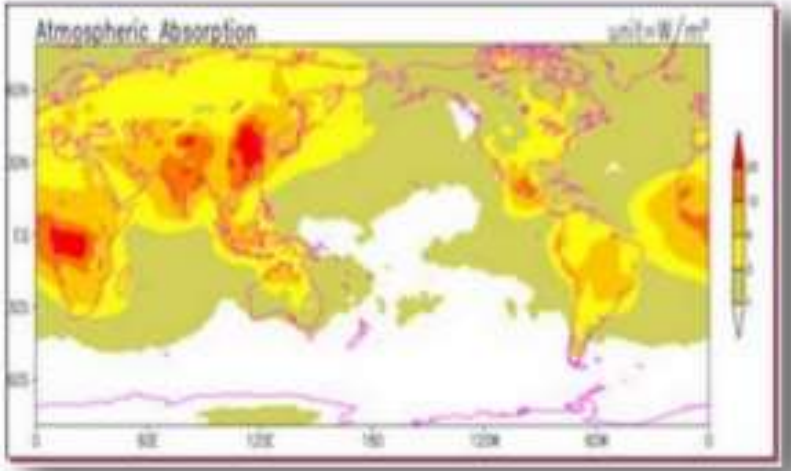
Guangdong

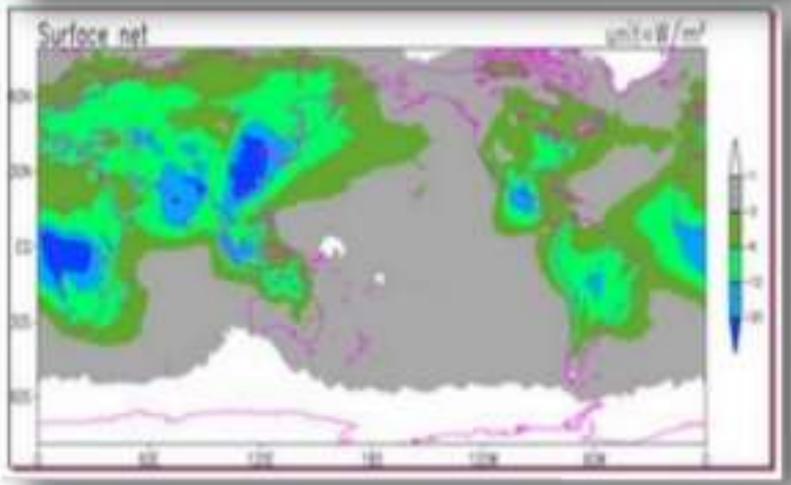
Vehicle emission control, including further tightening motor vehicle emissions and fuel standards, and recovering vapor from oil depots, tanker trucks and petrol filling stations.

Other emission control, including improving energy supply structure, installing flue gas desulphurization systems in thermal power plants, and stepping up control of emissions from industrial sources.

Atmospheric Brown Cloud

- Widespread layers of brownish haze
- Regions
  - Indo Gangetic Plain in South Asia
  - East Asia
  - Indonesian Region
  - Southern Africa extending southwards
  - The Amazon basin in South America





Haze from forest fires in Indonesia is choking parts of the country as well as neighboring Malaysia and Singapore.

Short-Lived Climate Pollutants

Strategies to reduce (SCLP) is an Opportunity for Asia

Achieve Air Pollution Reduction and Meet Climate Goals at the Same Time

Black Carbon • Tropospheric ozone • Methane • some Hydrofluorocarbons(HFCs)

Implementing the Black Carbon measures may help to avoid about 2.4 million premature deaths globally each year

Issues not well addressed in the Region

Indoor Air Quality

Around 2 million people die prematurely each year in Asia from illness attributable to indoor air pollution

India has no Indoor Quality Standards

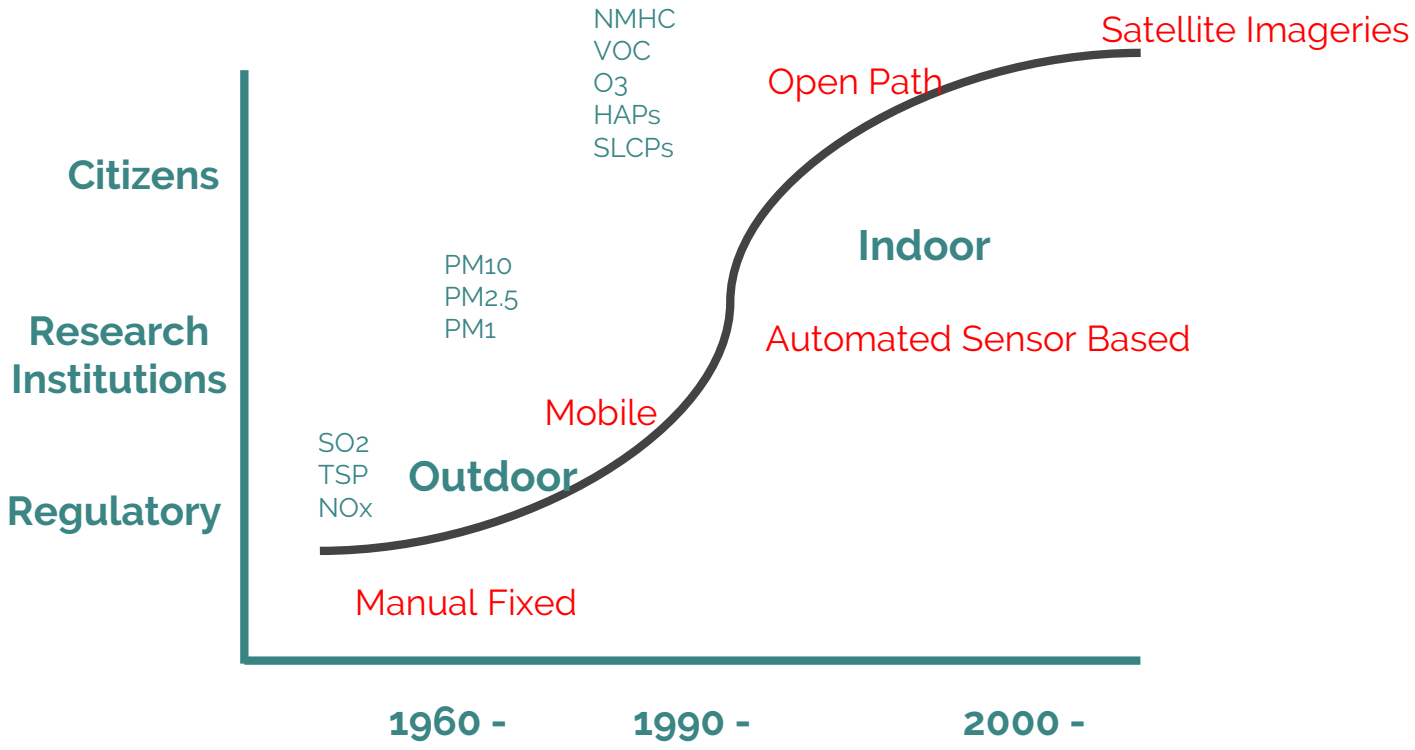
https://catalysts.basf.com/products-and-industries/indoor-air-quality

Pedestrian Exposure

Not just concentration, respiratory deposition

Less work done in Asia (pedestrians, drivers, bus commuters, traffic policemen)

Status on Air Quality Monitoring



Use of Air Quality Data

Communication for sensitization and understanding

Forecasting, issuing alarms

Source diagnosis, apportionment, prioritization

Taking Actions and

Assessing Effectiveness

Research to set Policies and Regulations


socfa

Issues with Sensors

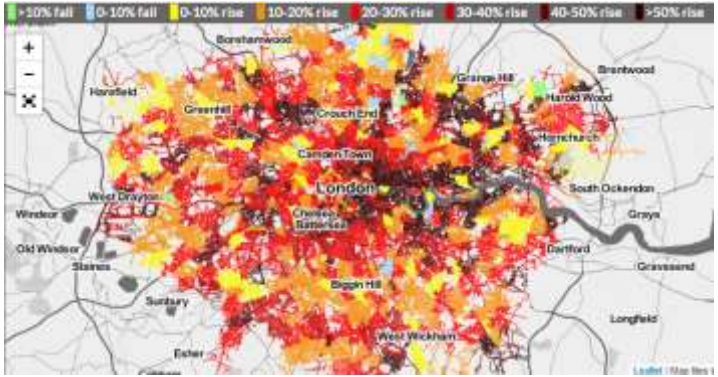
- While the sensors themselves are inexpensive, in some cases the costs involved in their installation and maintenance, as well as in analyzing the data they produce, are still prohibitively high.

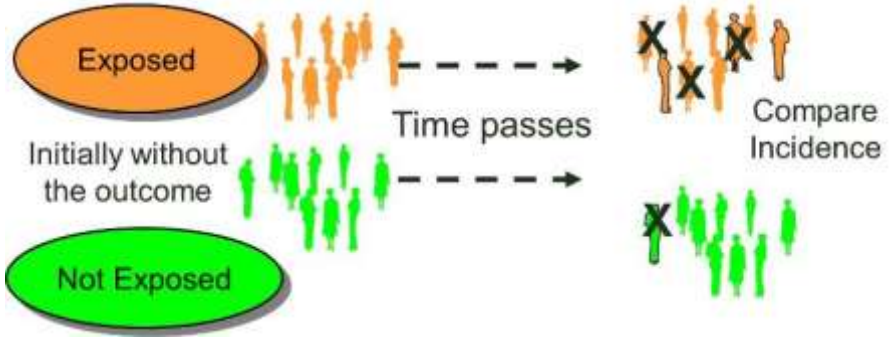
- Some academics are also concerned with these sensors' e-waste burden after they have reached the end of their usable life, as there has not yet been a proper analysis of their carbon footprint.

Need for Meta Data and Cohort studies

- If a city has a well-developed smart city agenda and advanced data management capabilities, it may want to measure not only air quality, but many other factors including traffic, climate, and noise

- For understanding health related impacts, cohort based exposure studies are needed





Governance

Air Quality Standards (concentration and load based)
Market Mechanisms (Cap and Trade)

Cleaner Fuels (CNG, LPG)
Alternate Fuels (BioCNG, Biodiesel, Ethanol)
Enforcement on Fuel adulteration (Pure for Sure petrol pumps in India)
Policy on Phasing out of Vehicles (addressing ELV)

Electric Vehicles

Public Transportation (BRT, Metro)
Telecommuting - emissions and work-life balance

Economic Instruments - Taxes on Fuels, Vehicles and Parking Places

Steps taken in India

Delhi boasts running the world's largest fleet of vehicles on CNG. Around 450,000 vehicles—this includes some 16,000 buses—in Delhi run on CNG,

India's state-run oil marketing invited expression of interest from potential entrepreneurs to set up CBG production plants to market the clean fuel for vehicular use.

In the city of Nagpur in India about 200 electric taxis are introduced with 25 charging stations. 55 buses run on bio-diesel

Tata Motors, India's largest Commercial Vehicles manufacturer has designed and developed bio-methane engines

Bio-Ethanol in PRC and Indonesia

PRC plans to roll out the use of ethanol fuel nationally by 2020. Ethanol can be made from both sucrose (beet or sugarcane) and corn, of which China has an estimated surplus of more than 200 million tons.

Government has set a targeted timeline for pushing the biofuel, known as E10 and containing 10 per cent ethanol, across the world's largest car market

Mandates requiring a minimum amount of biofuel to be blended into fuel for the nation's cars, similar to the United States and Brazil, are currently set at a provincial level.

Indonesia has set forth a goal for the introduction of biofuel for transportation to replace 15% of fossil fuels with bioethanol and 20% of them with biodiesel oil by the year 2025.

Reducing Sulphur in Fuel

Sulfur levels in both gasoline and diesel fuels are the primary fuel parameter to be addressed in developing a country's fuel road map. Reducing sulfur in fuels is a key measure in reducing air pollution from motor vehicles.

High sulfur levels reduce the effectiveness of advanced three-way catalysts for gasoline vehicles and clog particulate filters in diesel vehicles.

Almost all Asian countries will be adopting increasingly stricter Euro emission standards, which require reduced sulfur fuels, with an ultimate goal of 50 ppm or less sulfur in diesel and gasoline.

The benefits of reducing sulfur are clear.

Extensive studies in both developed and developing countries, including the United States (US), Mexico, and the People's Republic of China (PRC), have estimated that the economic benefits of an integrated system of clean fuels and vehicles far outweigh the costs.

The estimated benefit cost ratios of these programs are 15:1 in the United States, and 20:1 in the PRC.

http://cleanairasia.org/wp-content/uploads/portal/files/documents/Road_Map_for_Cleaner_Fuels_and_Vehicles_in_Asia_2008.pdf

Major Constraint – Poor Coordination
Weak Institutional Capacities

Central Ministry and State level Coordination

Urban Local Bodies

Who is the Air Quality Manager?

Air Quality Management Capability Assessment

ADB Knowledge Showcases

Clean Air Scorecard Helps Clear the Air in the People's Republic of China

Highlights

- Air pollution in some cities in the People's Republic of China (PRC) has surpassed the maximum levels prescribed by its national government, and is more than 20 times higher than the safety levels outlined by the World Health Organization.
- The Asian Development Bank, through Clean Air Asia, introduced the Clean Air Scorecard Tool to the PRC, designed to assess a locality's air pollution levels, air quality management capacity, and clean air policies.
- The scorecard's successful application in the PRC and in several other countries spurred plans to scale up its application Asia-wide to promote knowledge exchange and cooperation.

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People's Republic of China | Environment

BACKGROUND

Air pollution has reached alarming levels in the People's Republic of China (PRC). In some cities, air pollution indices have reached 500, the highest level set by the country. Likewise, the levels of particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) in some parts are over 20 times

Lessons Learnt

Regional approach needed

Indoor – Outdoor – Pedestrian

Emergence of Low cost sensors – data analytics- data quality issues

More Citizen participation

Factor SCLP control in AQ plans with GHG related objectives

Include Metadata – Health

Lessons Learnt

Alternate Fuels

Infrastructure for Air Quality Improvement (IAQI)

Public Transportation – Telecommuting

Institutional Capacity Building – who is the AQ manager?

Policy Toolbox, Standards, Enforcement Experience and Economic Instruments

Assessing Effectiveness

Regional cooperation on knowledge exchange

African proverb

If you want to go fast, go alone.

If you want to go far, go together.

Thank you

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