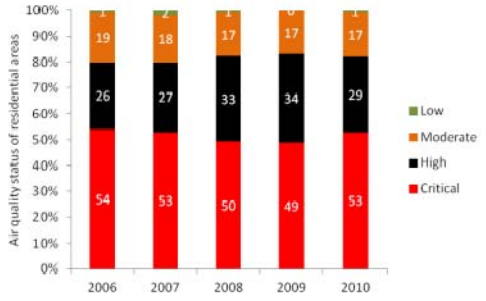
MEASURING AIR QUALITY: LEARNING HEALTH IMPACTS

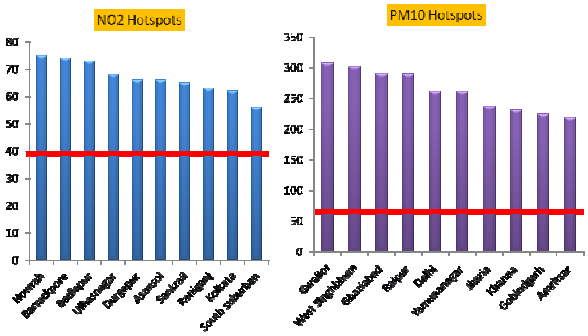
15 years of Right To Clean Air Campaign

Air pollution: national crisis
Close to half of total urban population breath the air which exceeds the standard of PM10

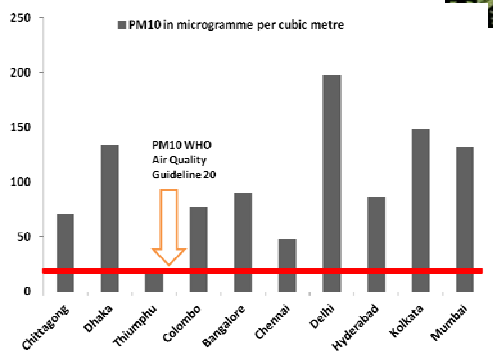


Source: Based on CPCB air quality data

Pollution hot spots
Smaller towns are getting more polluted than the metros



South Asia: PM10 level in selected cities



Source: Based on http://www.who.int/entity/phe/health_topics/outdoorair/databases/OAP_database.xls

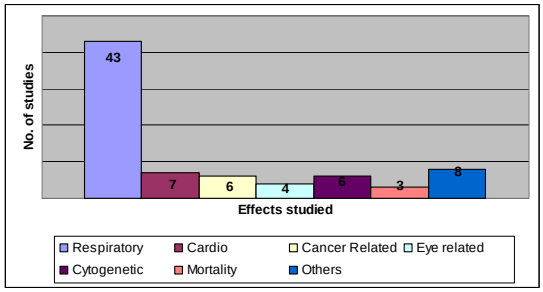
Health impacts deadly

Global Burden of Disease 2013

- Air pollution is among the top 10 killers in the world
- Two-thirds of the death burden in developing Asia
- South Asia most vulnerable
- In India 620,000 premature deaths a year
- More than 18 million healthy life years lost a year
- Air pollution triggers stroke, cardiovascular and respiratory diseases, cancer

Not just about respiratory ailments

Studies show links with other health end points – cardiovascular, eye disorders, cellular changes, cancer, premature deaths….

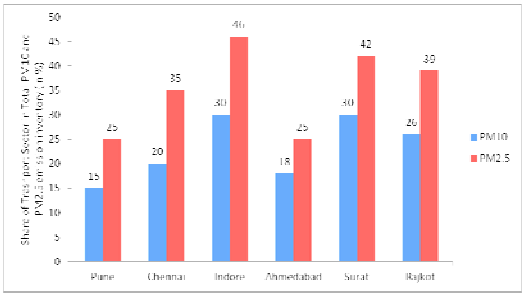


Source: CSE

Why air pollution?

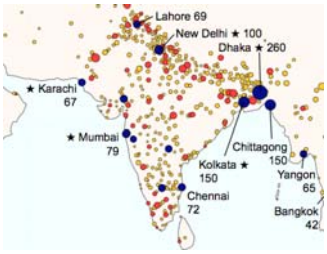
- Inventory of sources find vehicles (mobile sources) are of particular problem
- Controls on stationary sources – power plants and factories possible through standards and better fuels
- But vehicles grow in number; we lose benefit of cleaner fuel and cleaner technology
- It is not possible to control in-use emissions of vehicles
- **Result: Pollution**

Big particles other sources; small particles – deadly for health – vehicles dominate



Source: Based on– Sarath Guttikunda and Puja Jawahar 2012, Urban Air Pollution & Co Benefits Analysis for Indian Cities, SIM air Working Paper Series: 39 2012

Exposure to vehicle emissions



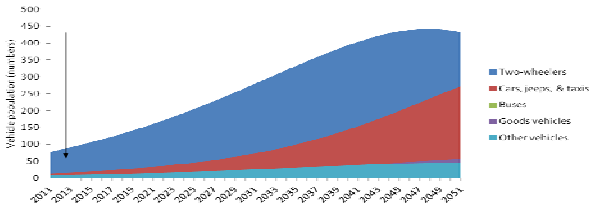
Exposure (iF) is the population-weighted intake fraction, or the grams of vehicle pollution inhaled per grams of vehicle pollution emitted.

Location	Exposure (iF)*
United States	21
World	39
China	45
India	51
Hyderabad	63
Bangalore	68
Ahmedabad	69
Chennai	72
Mumbai	79
Delhi	100
Kolkata	150

Estimates from Apte, J. S., Bombrun, E., Marshall, J. D., & Nazaroff, W. W. (2012). Global Intraurban Intake Fractions for Primary Air Pollutants from Vehicles and Other Distributed Sources. *Environmental Science and Technology*, *46*(6), 3415–3423.

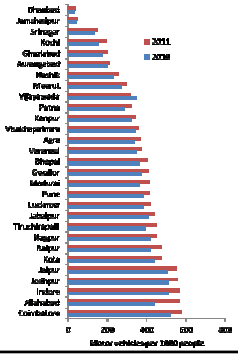
Vehicle numbers: Explosive already and more coming

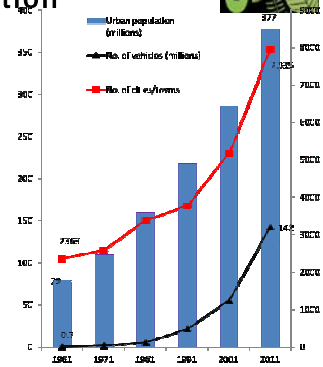
Need stringent and preventive action and decision here to influence the future stock -- several times higher than the legacy stock



Source: CSE

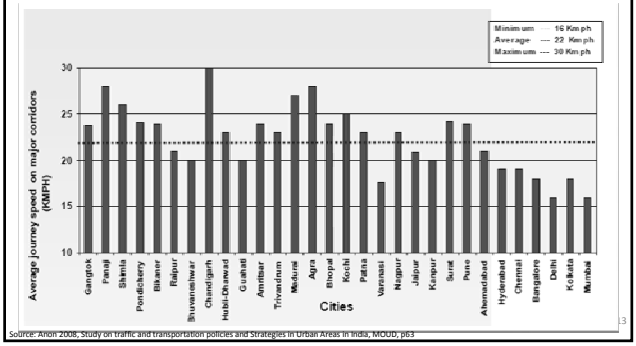
Vehicles growing fast in small cities; all faster than rate of urbanisation





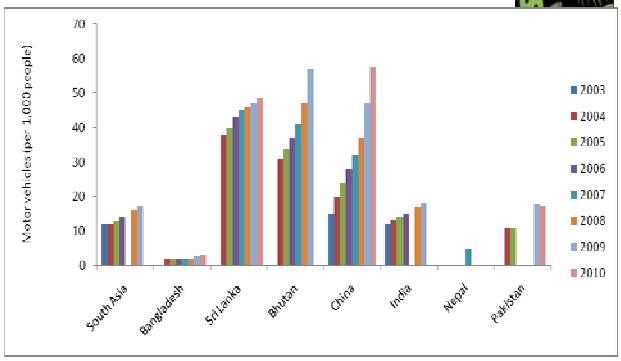
Vehicles grow in number; traffic slows in number

The average journey speed in Delhi (16 km/hr), Mumbai (16 km/hr) and Kolkata (18 km/hr): Abysmally poor compared to smaller cities



Source: Ahoh 2008, Study on traffic and transportation policies and Strategies in Urban Areas in India, MOUD, p63

Motor vehicles/1000 people in selected Asian countries



Source: Based on World Bank database (http://data.worldbank.org/indicator/IS.VEH.NVEH.P3)

Good News

Cities are increasing network to measure pollution
Once they know quality; public information can spur action

The best air quality network under national ambient air quality monitoring programme

Delhi	11
Chennai	11
Kolkata	10
Hyderabad	9
Bangalore	9
Kanpur	9
Visakhapatnam	8
Cochin	7
Nagpur	7
Gawahati	6

Delhi best: provides real time data

Bangalore: 2nd

- 15 including 6 manual air quality stations
- Does special monitoring for "Bus Day" and after "Bus Day"

Sl No	Parameter	Standards	Before BUS DAY (1.7.2011)	During BUS DAY (4.7.2011)	% Decreased	After BUS DAY (5.7.2011)	% Increased
1	SO2 µg/m3	80.0	20.8	19.1	↓ 8.2 %	21.8	↑4.8 %
2	NOx µg/m3	80.0	48.4	46.1	↓ 4.8 %	51.5	↑6.4 %
3	RSPM µg/m3	100.0	111.0	107.0	↓ 3.6 %	108.0	↑ 2.7 %
4	CO mg/m3	2.0	1.7	1.5	↓ 11.7 %	1.5	↓ 11.7 %
5	O3 µg/m3	100.0	5.0	4.8	↓ 4.0 %	5.1	↑2 .0%

Kolkata: 3rd

- Reports day and night trends; does special studies
- Has ten stations
- Data is provided in searchable database format, user can select the city and date and one can see the data in tabular format in three ways:
- > Daily Report , real time data of two stations
- > Report Between Dates of Choice
- > Day-And-Night Report to report air quality changes

- Also carried out special studies.
- Report on Air quality Management
- Fine Particulates in Ambient Air and Its Organic Component.

More monitoring: smaller cities improving record

CPCB says minimum monitoring required is for 104 days; cities that do more show initiative: Guwahati is best as all location monitored

City	Station	No. of days monitored / year (n)
Agra (UP)	Taj Mahal	286
Guwahati (Assam)	ITI Building, Gopinath Nagar	280
	Near Pragjyotish College, Santipur	264
	Head Office, Bamunimaidam	254
Kala Amb (HP)	Trilokpur	157
	Kala Amb Industrial Area	156

Smelt the air: Now act