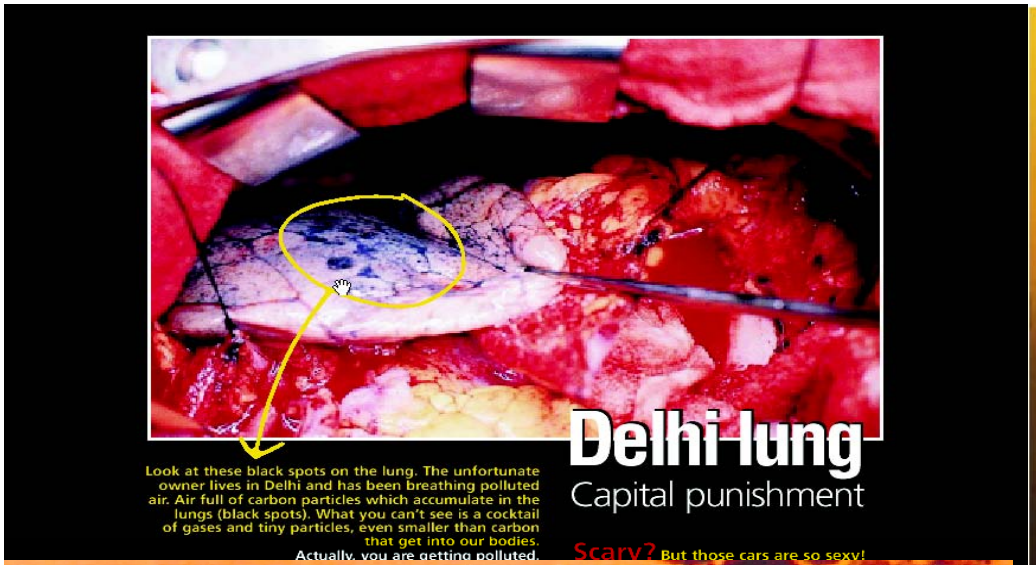
Right to Clean Air: Campaign

Vivek Chattopadhyaya, CSE

The story so far in India…..



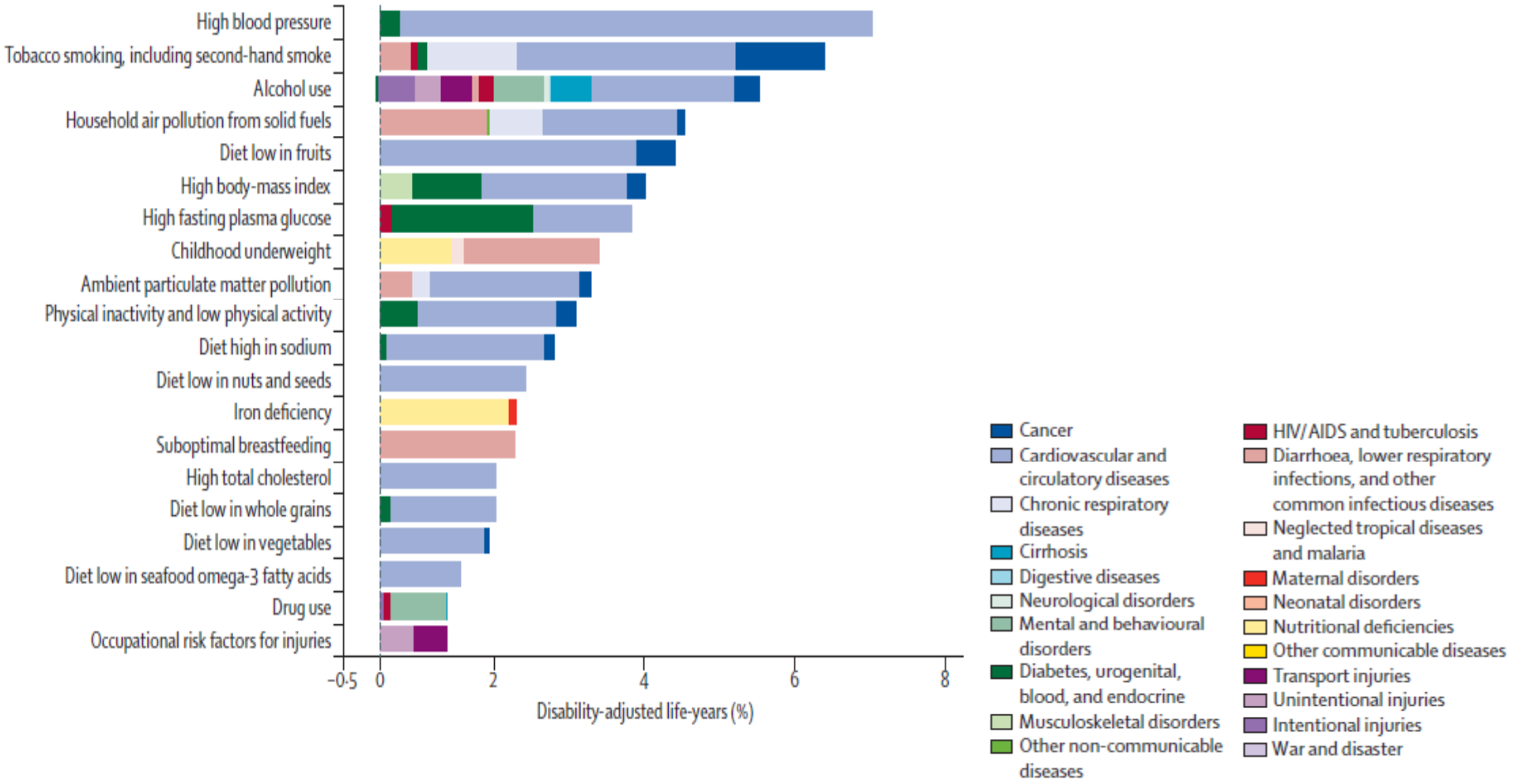

Delhi winter smog


Sputum cytology of a 14-year old girl in Delhi

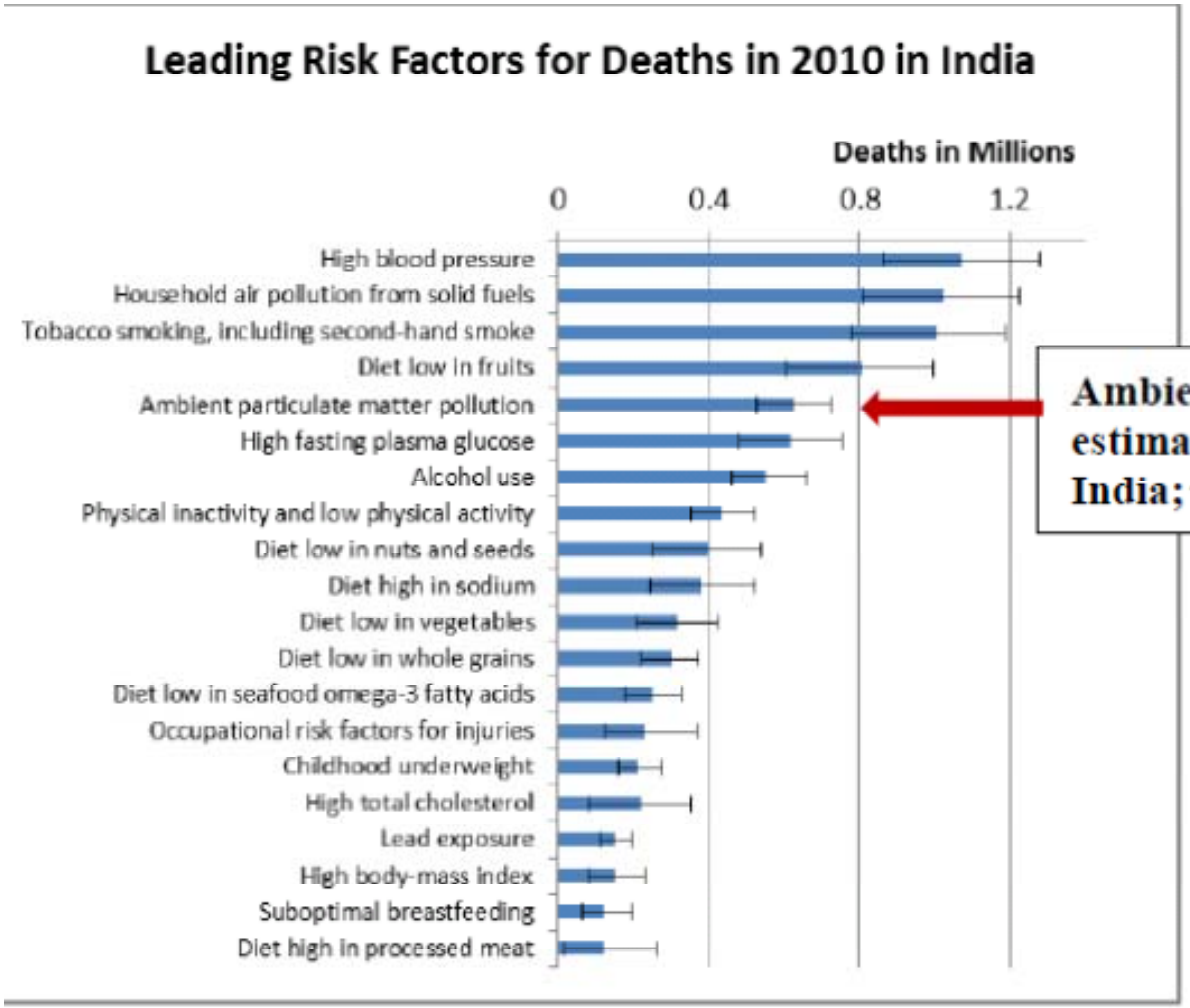

Haze over the Ganges Delta, NASA

Particulate pollution:
Ninth largest killer in the world

Global Burden of Disease



Fifth largest killer in India……



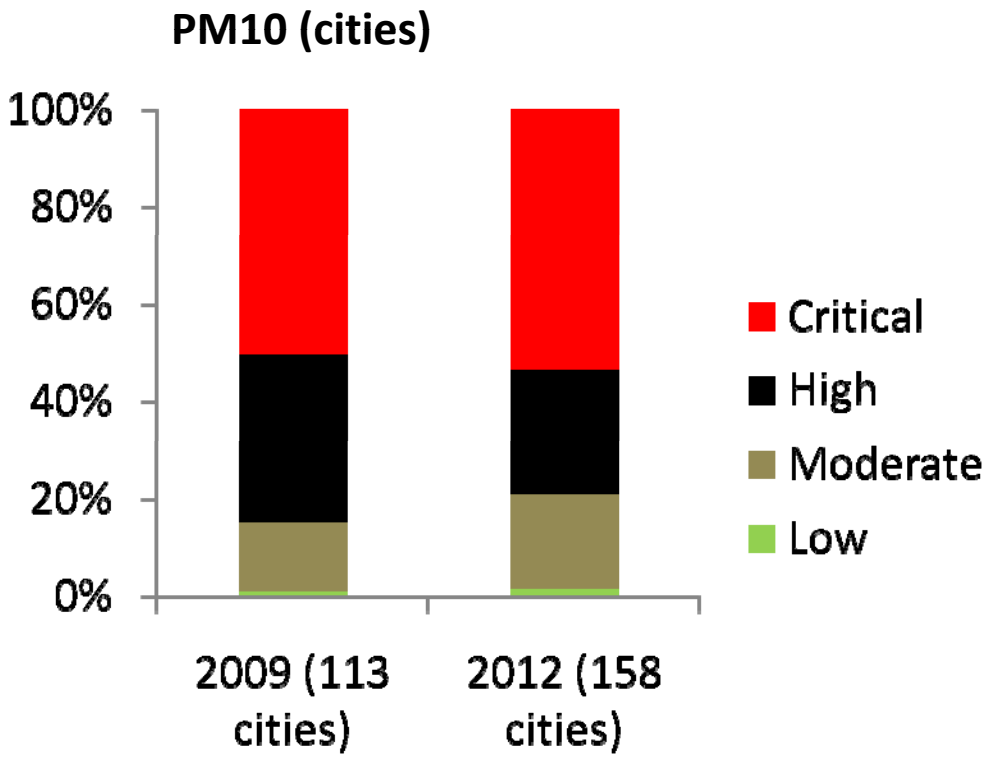
Ambient $PM_{2.5}$ caused an estimated 627,000 deaths in India; ~6% of all deaths in 2010

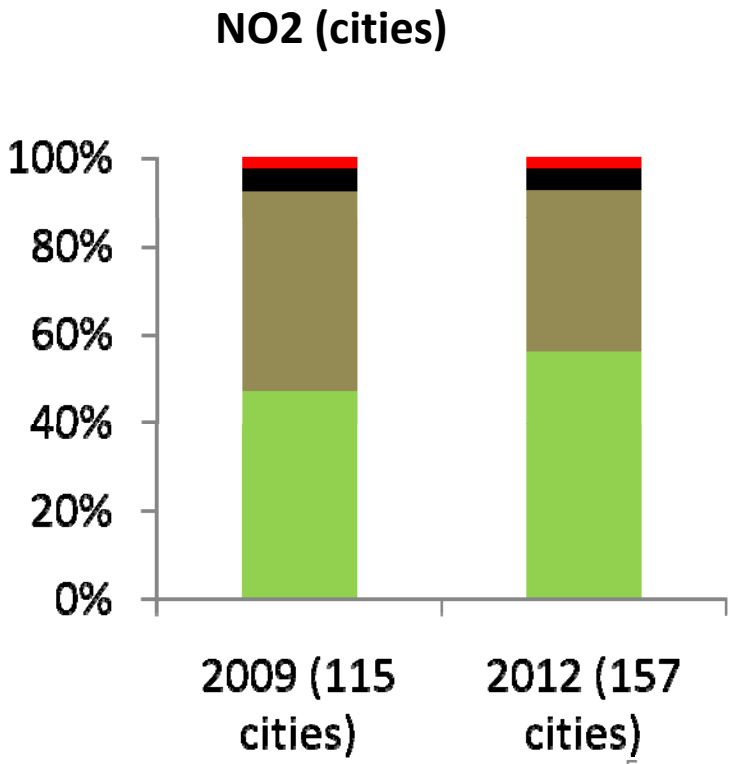
More than 18 million healthy life years lost due to air pollution. Air pollution triggers stroke, cardiovascular and respiratory diseases, cancer…..

Air pollution is the 5th largest killer in India…….

Air quality: A national challenge

PM10: Number of critically polluted cities have increased from 57 in 2009 to 85 in 2012.
Nearly half of Indian cities have critical pollution levels.
NO2: Critically polluted cities have from 3 to 4 and highly polluted from 6-8

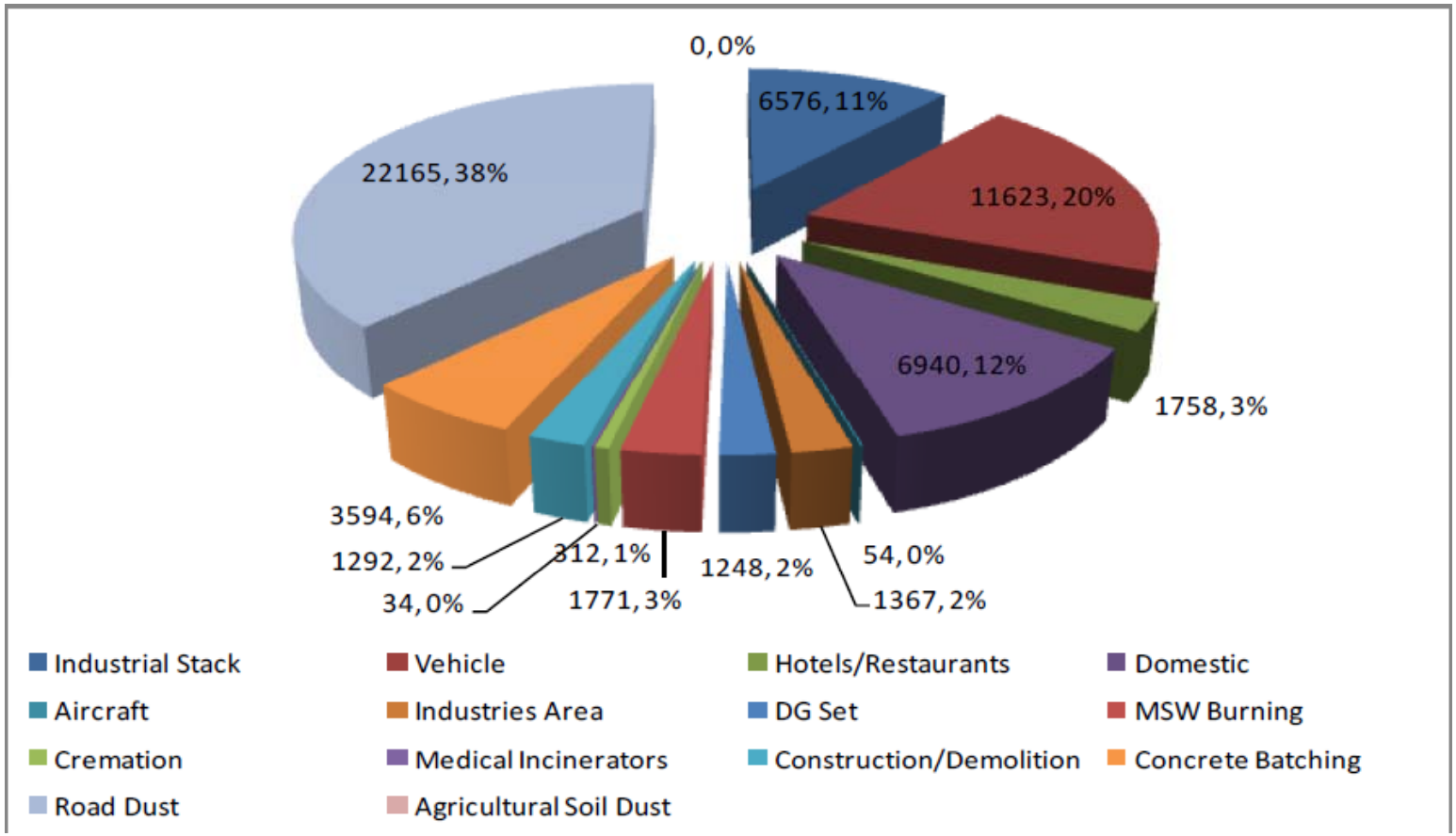




Source: Based on National Ambient Air Quality Status report for 2009 and 2012

Delhi NCT: PM2.5 emission inventory results

The top four contributors to PM2.5 emissions are road dust (38 %), vehicles (20 %), domestic fuel burning (12 %) and industrial point sources (11%).



Source: IIT Kanpur, Draft emission inventory study 2015

Delhi NCT: PM2.5 sources at the receptor, what we breathe

The winter sources (% contribution) include:
•Secondary particles (30%),
•Vehicles (25%),
•Biomass burning (26%),
•Municipal waste burning (8%)
•A lesser extent soil and road dust.

The summer sources
•Coal and flyash (26%),
•Soil and road dust (27%),
•Secondary particles (15%),
•Biomass burning (12%),
•Vehicles (9%)
•MSW burning (7%).

The two most consistent sources for PM in both the seasons are secondary particles and vehicles.

The other sources on average may contribute more (or less) but their contributions are variable from one day to another.

Source: IIT Kanpur, Draft emission inventory study 2015

First generation reforms.....
Soft options are now all exhausted

Delhi has fought hard to get breathing space

On vehicles

- Introduced low sulphur fuels and petrol with 1 per cent benzene
- Mandated pre-mix petrol to two- and three-wheelers
- Moved from Euro I to Euro IV over the last decade
- Implemented largest ever CNG based public transport programme
- Capped the number of three-wheelers
- Phased out 15 year old commercial vehicles
- Strengthened vehicle inspection programme (PUC)
- Efforts made to divert transit traffic
- Set up independent fuel testing laboratories to check fuel adulteration

On industry

- Relocated polluting units
- Tighter controls on power plants. No new power plants.

Air quality monitoring

- Adopted new ambient air quality standards
- Expanded air quality monitoring and reporting

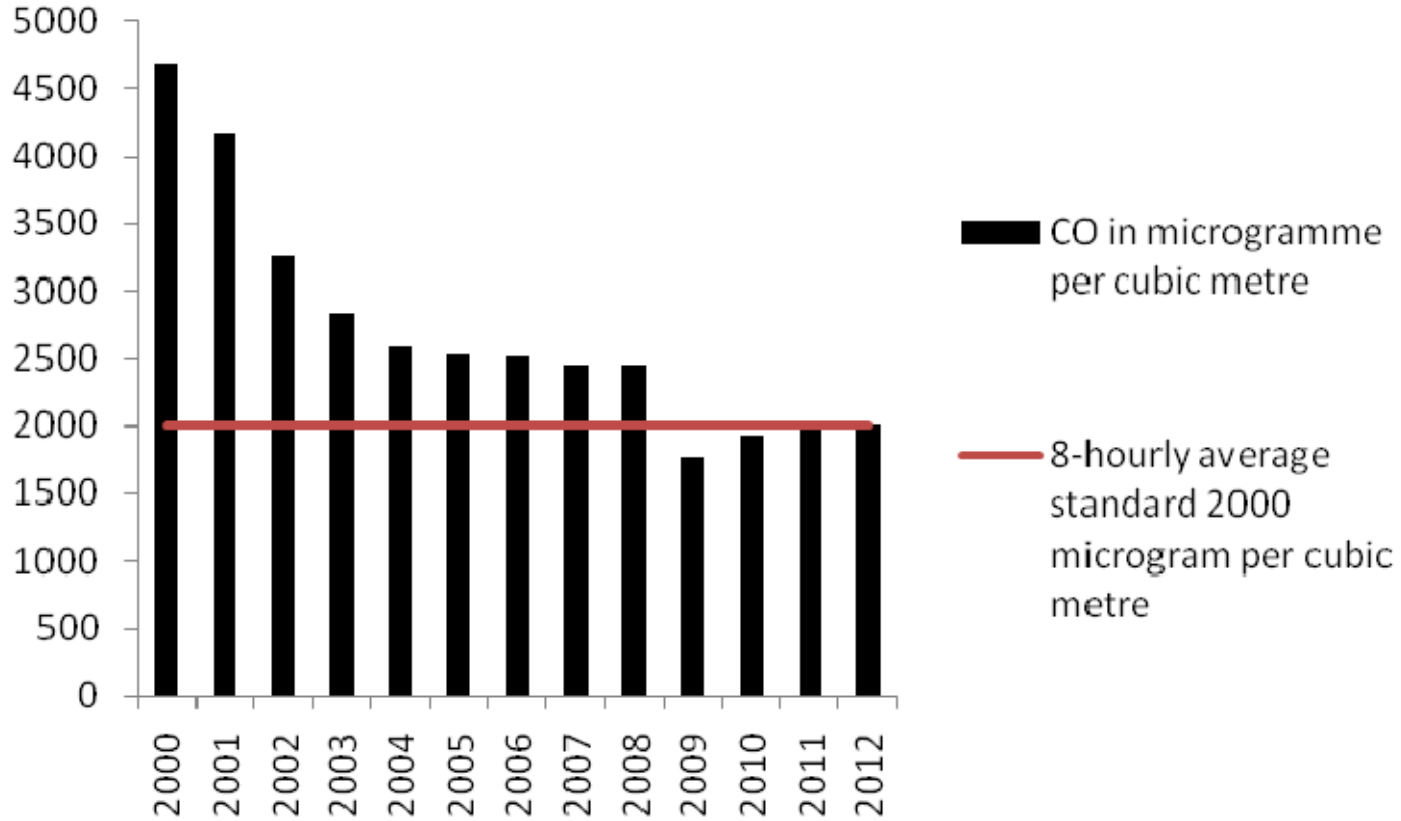
Other sources

- Emissions standards for generator sets
- Ban on open burning of biomass

Soft options over...need to take time-bound and tough action

- **Implementation of Bharat Stage IV norms in the 63 selected cities and Bharat Stage III norms in rest of the country. Need to cover whole India by end of 2016, not in 2017**
- **National Air Quality Index was launched by the Prime Minister in April, 2015 starting with 10 cities: Heath advisory requires action advisories and emergency action plan**
- **Banning of burning of leaves/ biomass. Fine of Rs 5k, ban but still requires much action**
- **Rules to control construction and demolition waste and rules for handling and management of municipal waste. Fine of Rs 50k, but need wide spread adherence**
- **Construction of Eastern and Western Expressways.**
- **Industrial standards have been formulated and notified. Enforcement**
- **Vehicle maintenance, pollution under control certification etc. Visibly smoky vehicles are easy to spot. PUC certificates are 'self certification'**
- **Public transport augmented. Need to arrest decline, augment further to 80%**

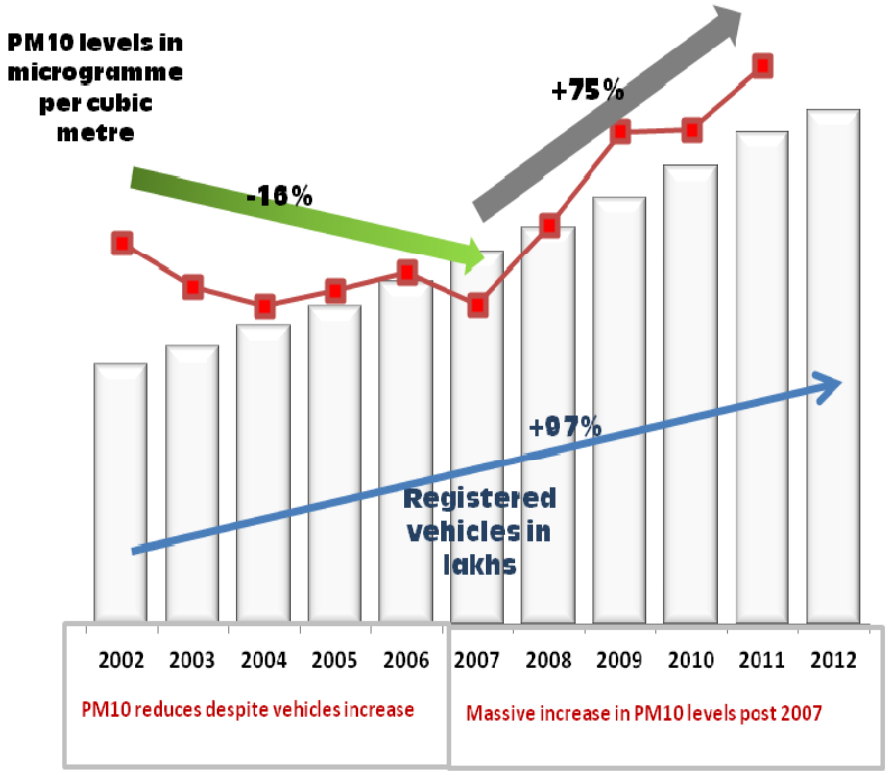
Delhi gains: reduction in carbon monoxide levels



Based on CPCB data

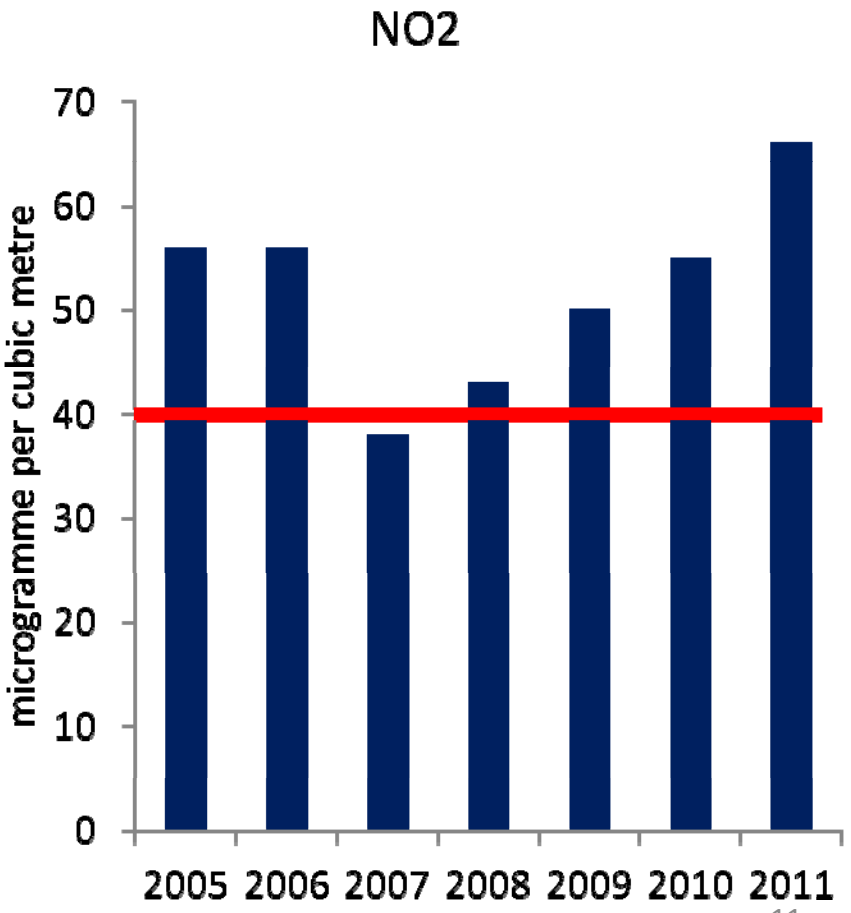
Delhi has lost its gains. After a short respite pollution curve turns upward

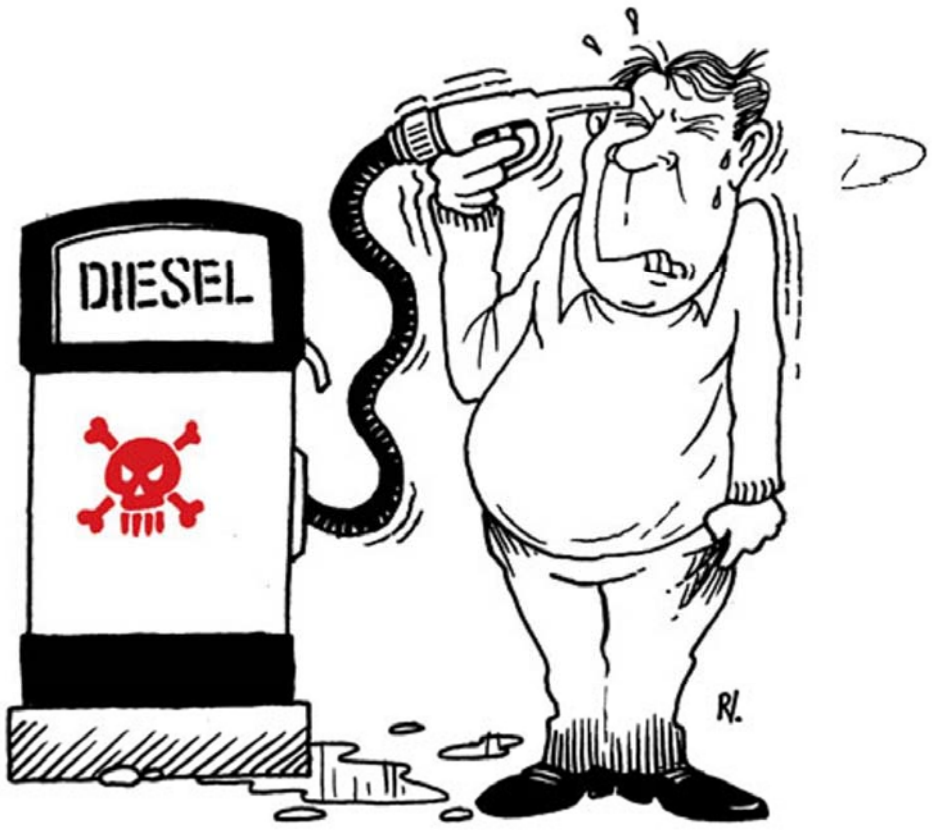
Particulate pollution decline and rise again due to rapid increase in vehicle numbers



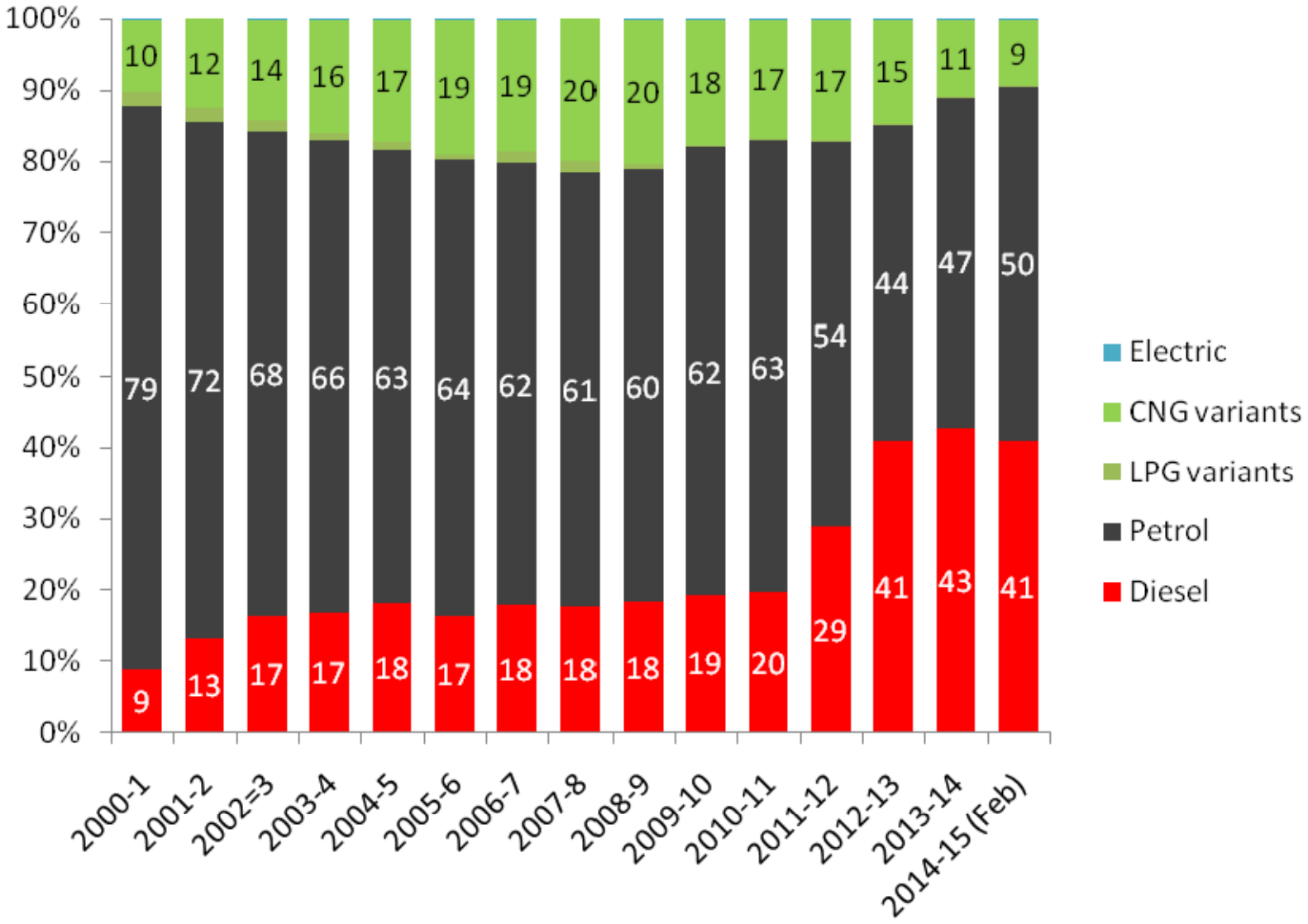
Based on CPCB data

NO2 levels rising steadily




DIESEL

Distorted fuel pricing leads to dieselisation in Delhi and other cities



Ambient PM vs Combustion PM

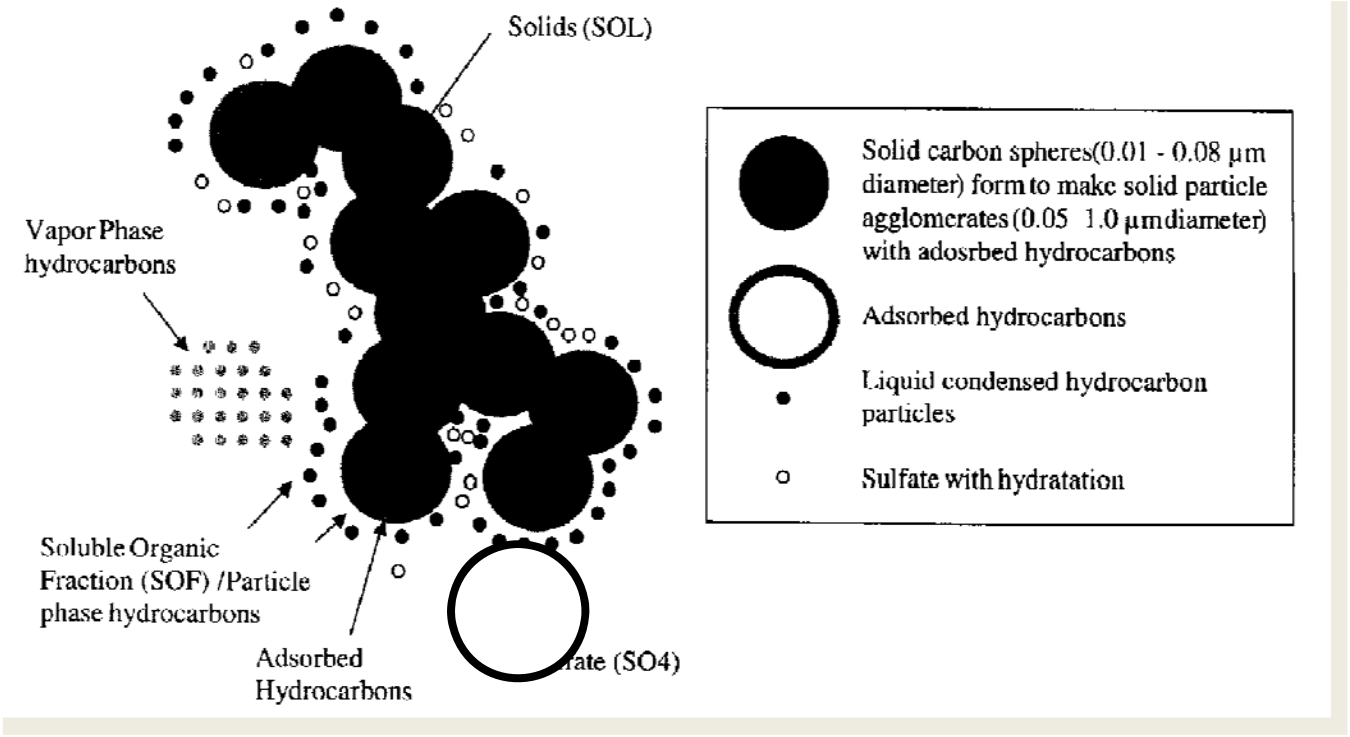
Particulate Matter

- All combustion processes
- All dust generating activities
- Secondary particulates – Nitrates and sulfate
- The condensation of gases into liquid droplets

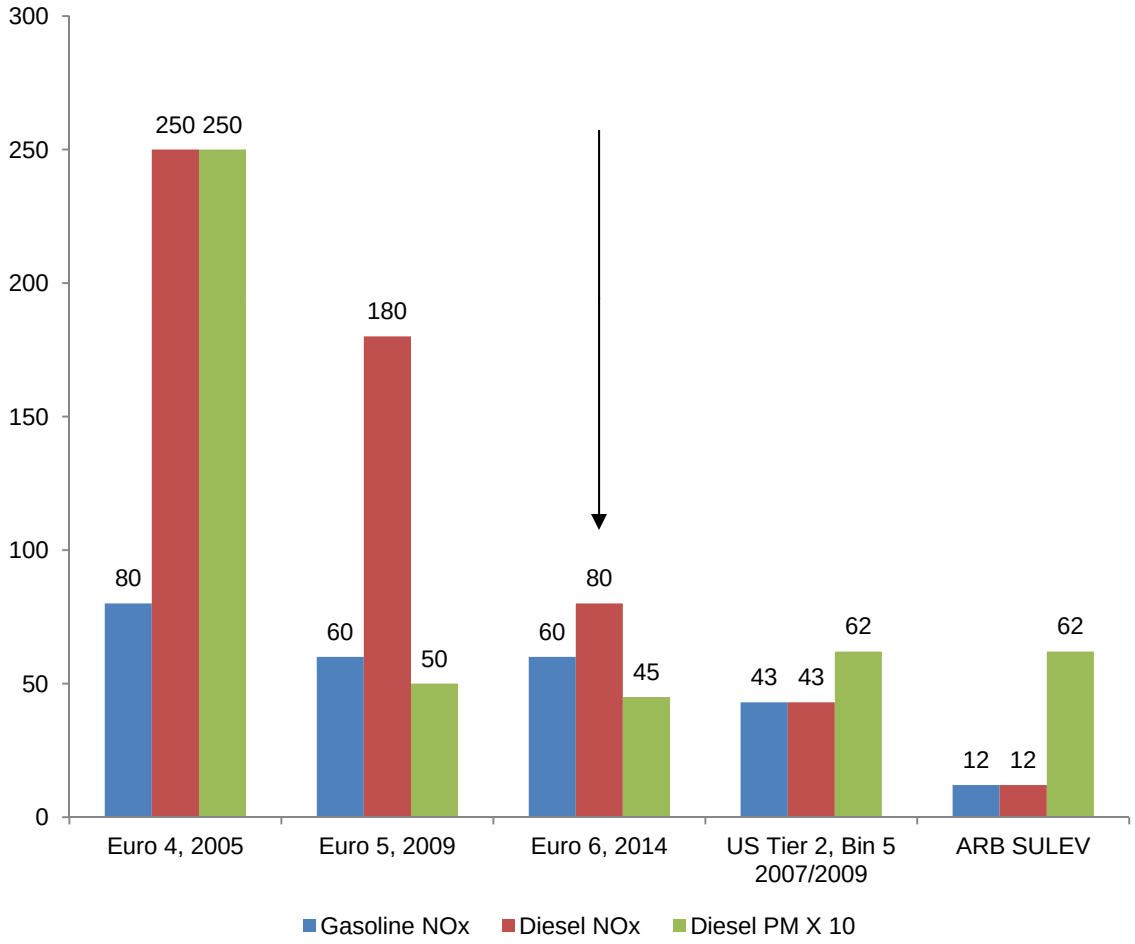
EC/ Black Carbon/ including other toxics

- Part of PM2.5……
- Low temperature combustion of carbonaceous fuels
- Incomplete combustion….

Core of Diesel PM



Need leapfrog…



\-- At Euro VI level NOx limits for diesel and petrol vehicles narrow down but remain.

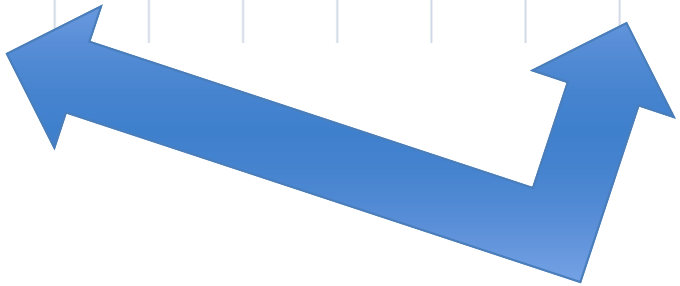
-- Not until Euro VI more stringent limits are put into effect for heavy duty vehicles.

-- Particle number standards only in Euro VI which finally forces the use of a diesel particulate filter in heavy duty vehicles.

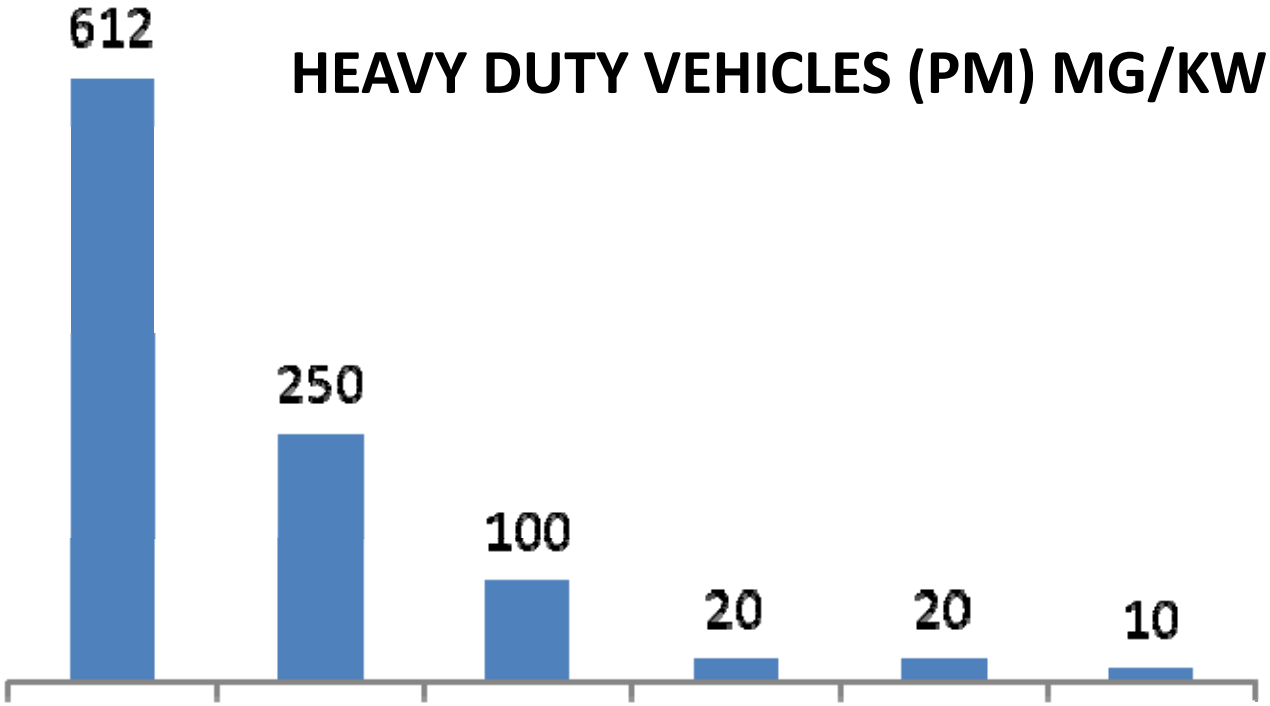
-- Diesel NOx standards even if they were met in use have been 3 times higher up through Euro 5.

Towards tighter norms

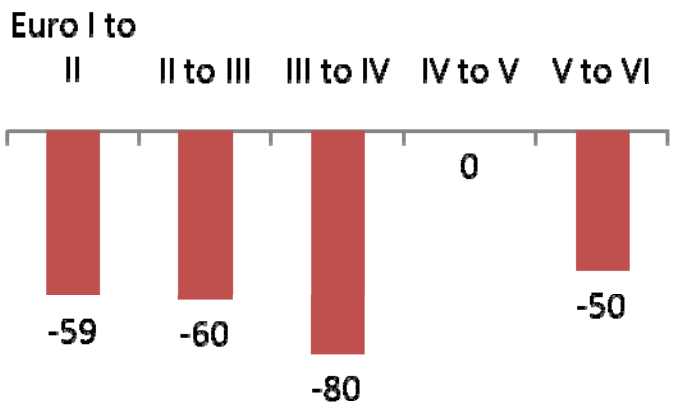
Auto Fuel Policy	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
India	Euro 3			Euro 4			Euro 5						Euro 6	
Few Indian cities	Euro 4													



HEAVY DUTY VEHICLES (PM) MG/KWHR



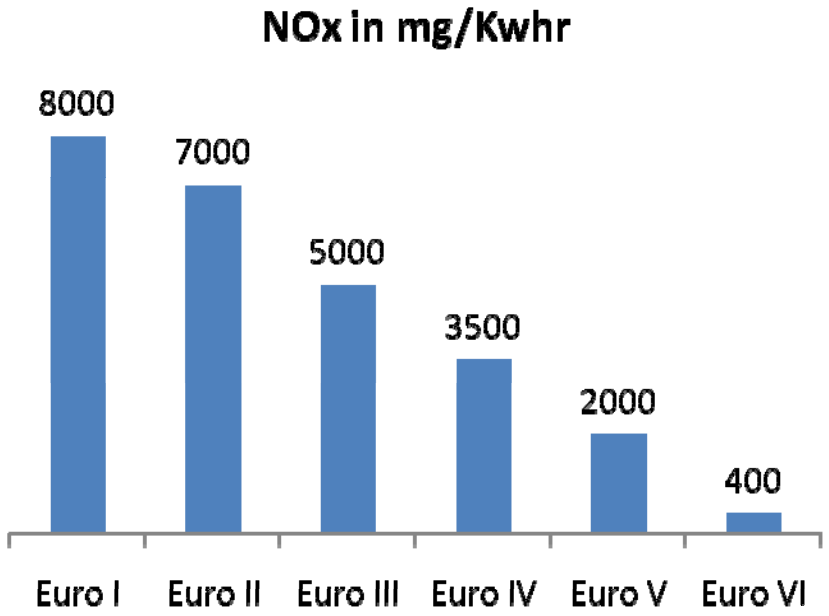
PM % reduction

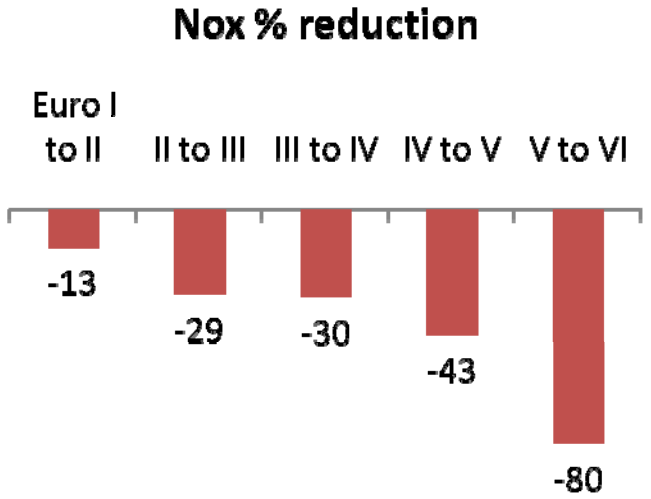


In heavy duty vehicles there is a 80% reduction in PM emissions between Euro 3 to Euro IV

Then further reduction in Euro 6

Heavy duty: NOX reduction only in Euro VI





Impact of accelerated roadmap

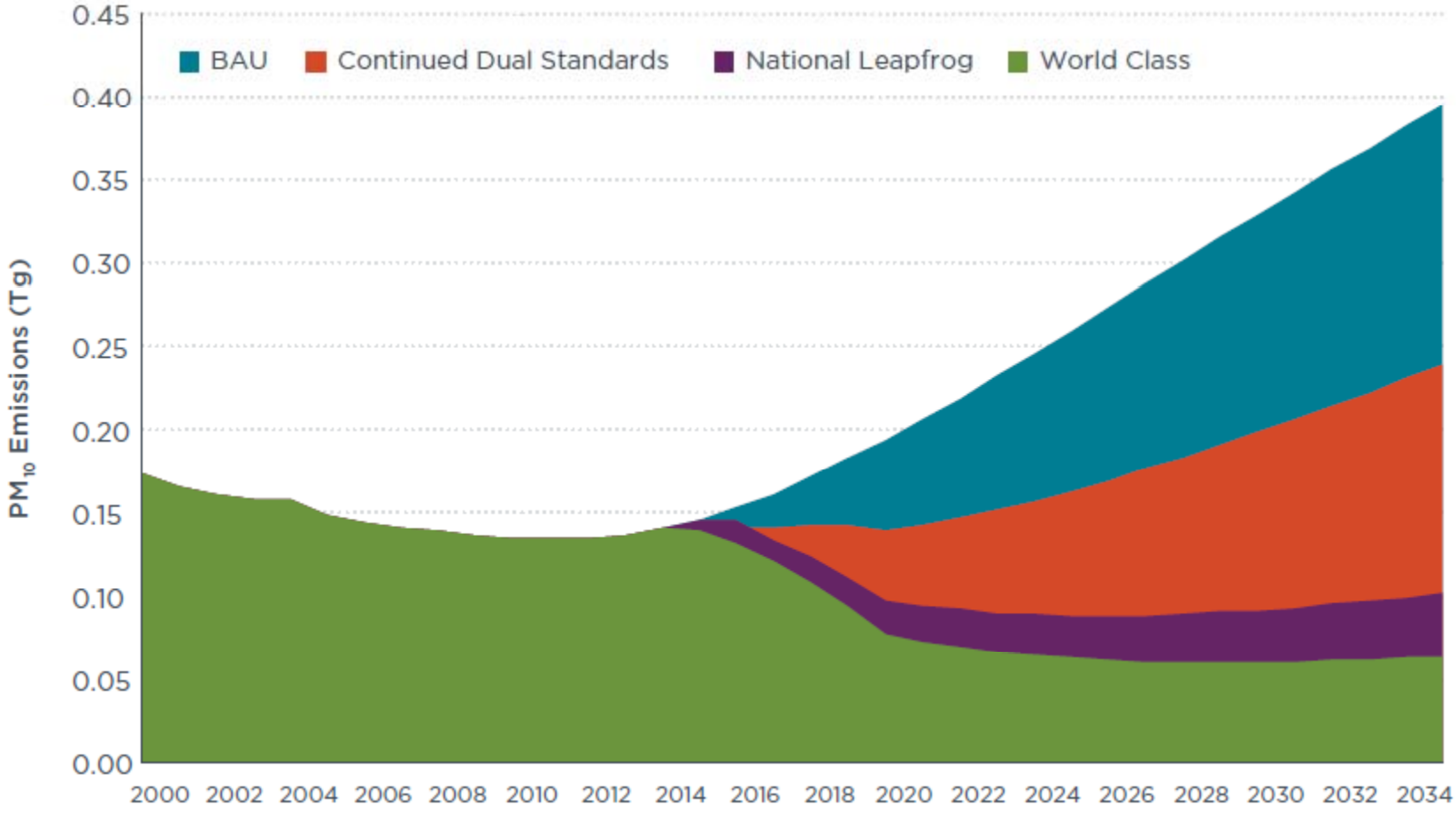
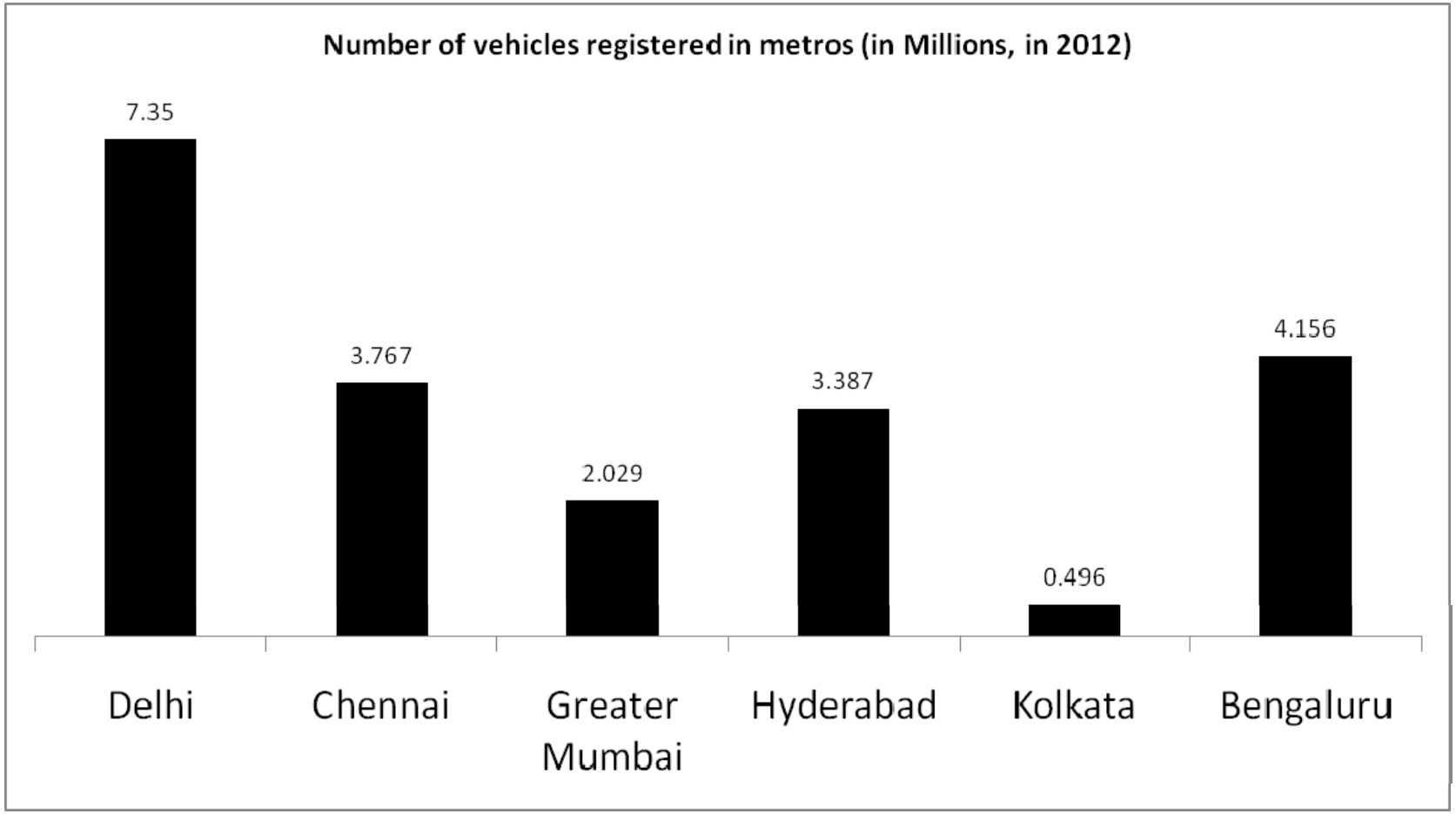


Figure ES-7: Projected total PM_{10} emissions with further policy action (2010–2035)

Source: ICCT

Motorisation and automobile depedancy

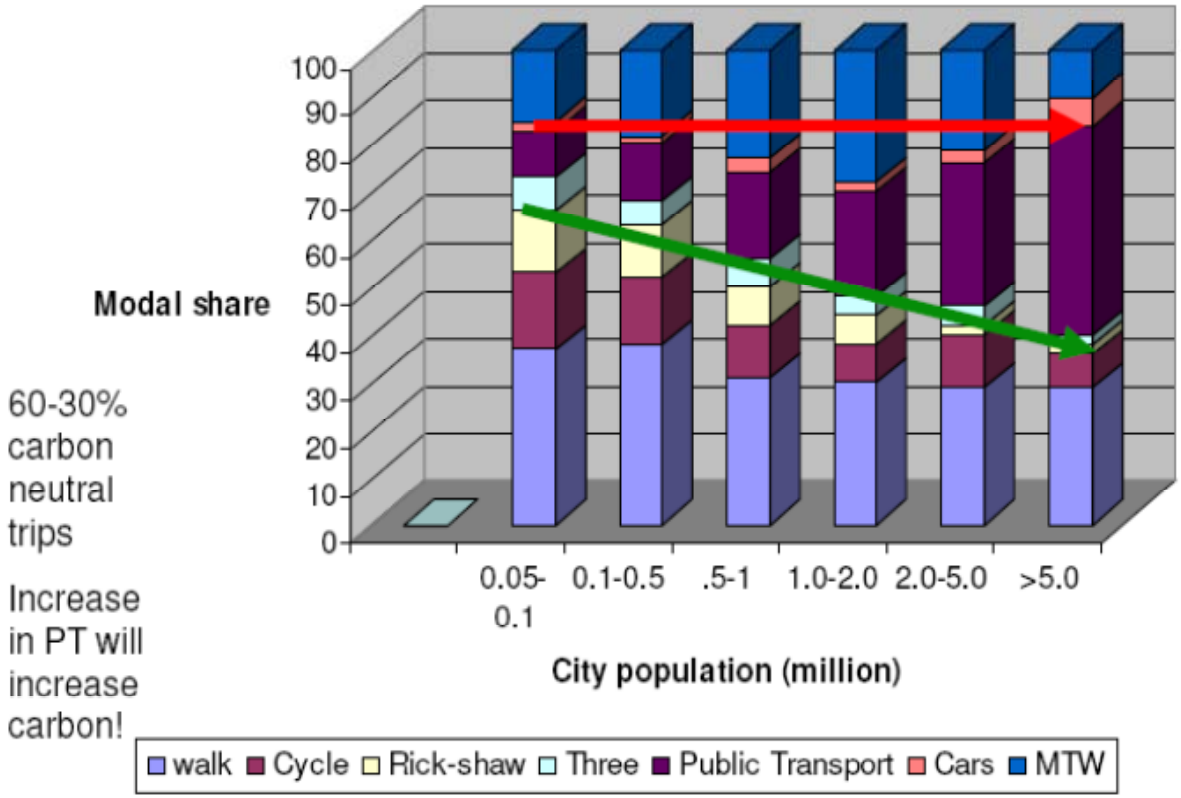


Reinvent mobility

Zero emissions travel – (walk and cycle) and low pollution travel (public transport) need upscaling

Urban Mobility

PT and NMV based, MTW majority personal vehicles



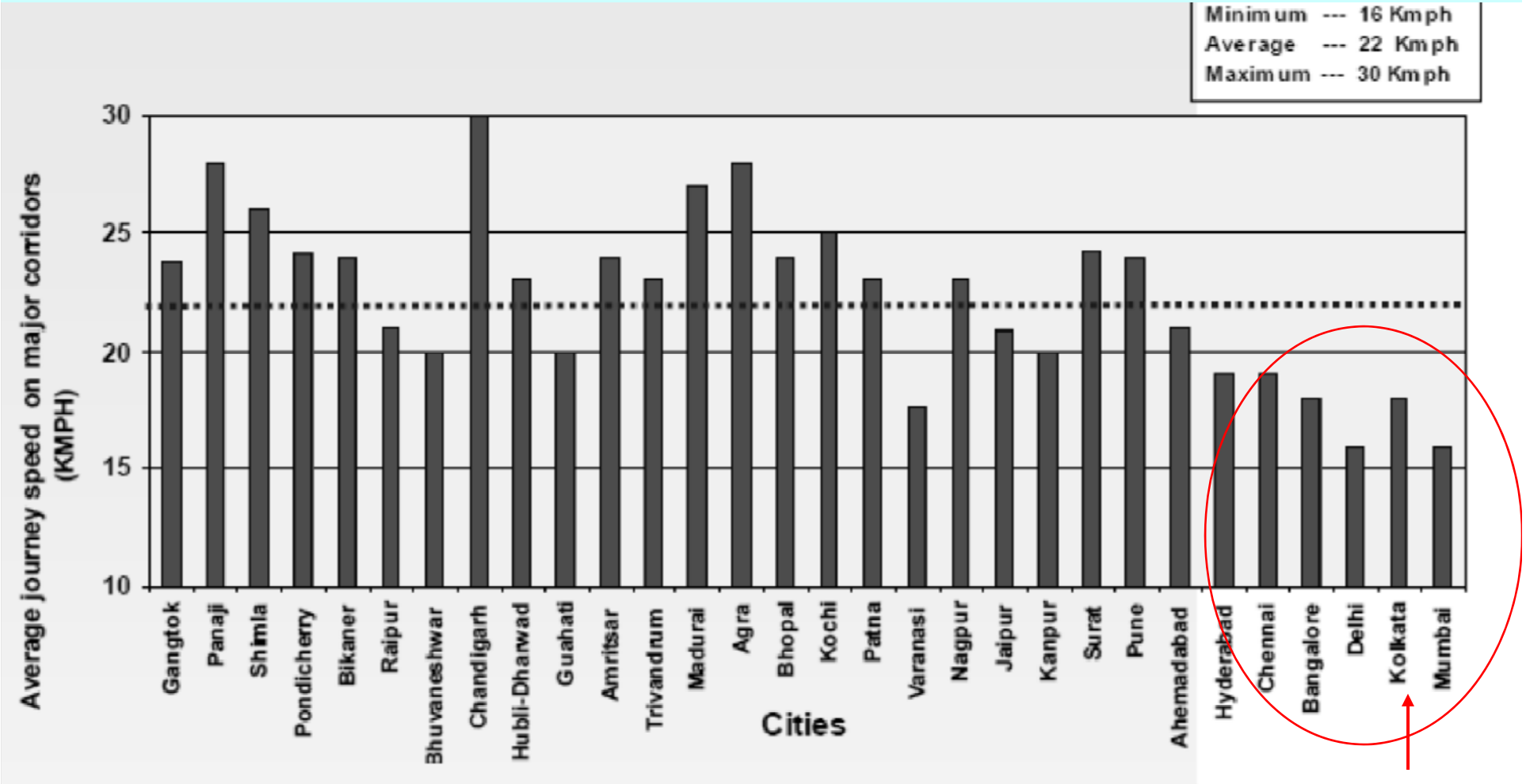
60-30% carbon neutral trips

Increase in PT will increase carbon!

Source TRIPP, 2010

Cities are Paralyzed- The Crawling Traffic

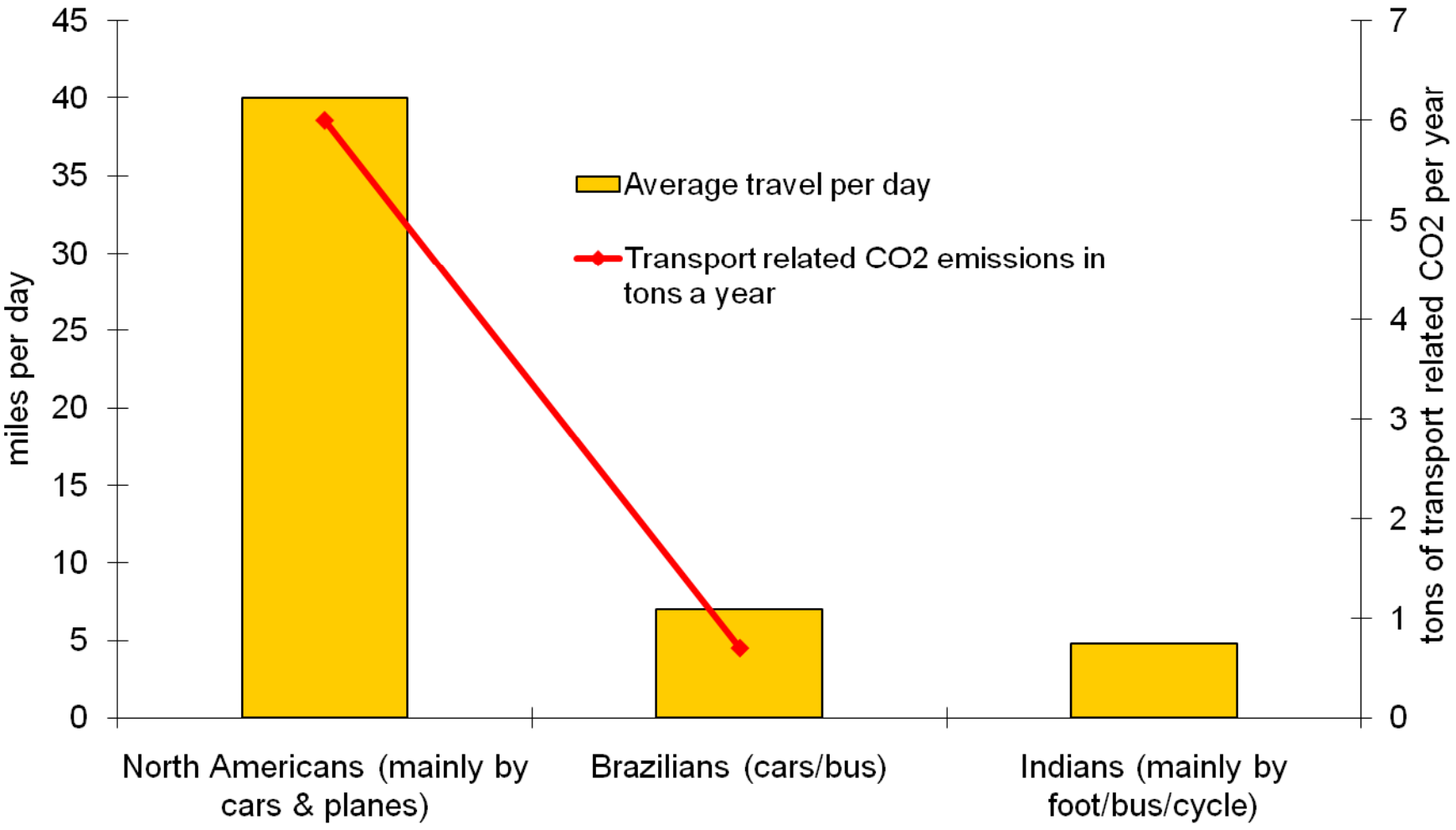
The average journey speed in Delhi (16 km/hr), Mumbai (16 km/hr) and Kolkata (18 km/hr): Abysmally poor compared to smaller cities



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

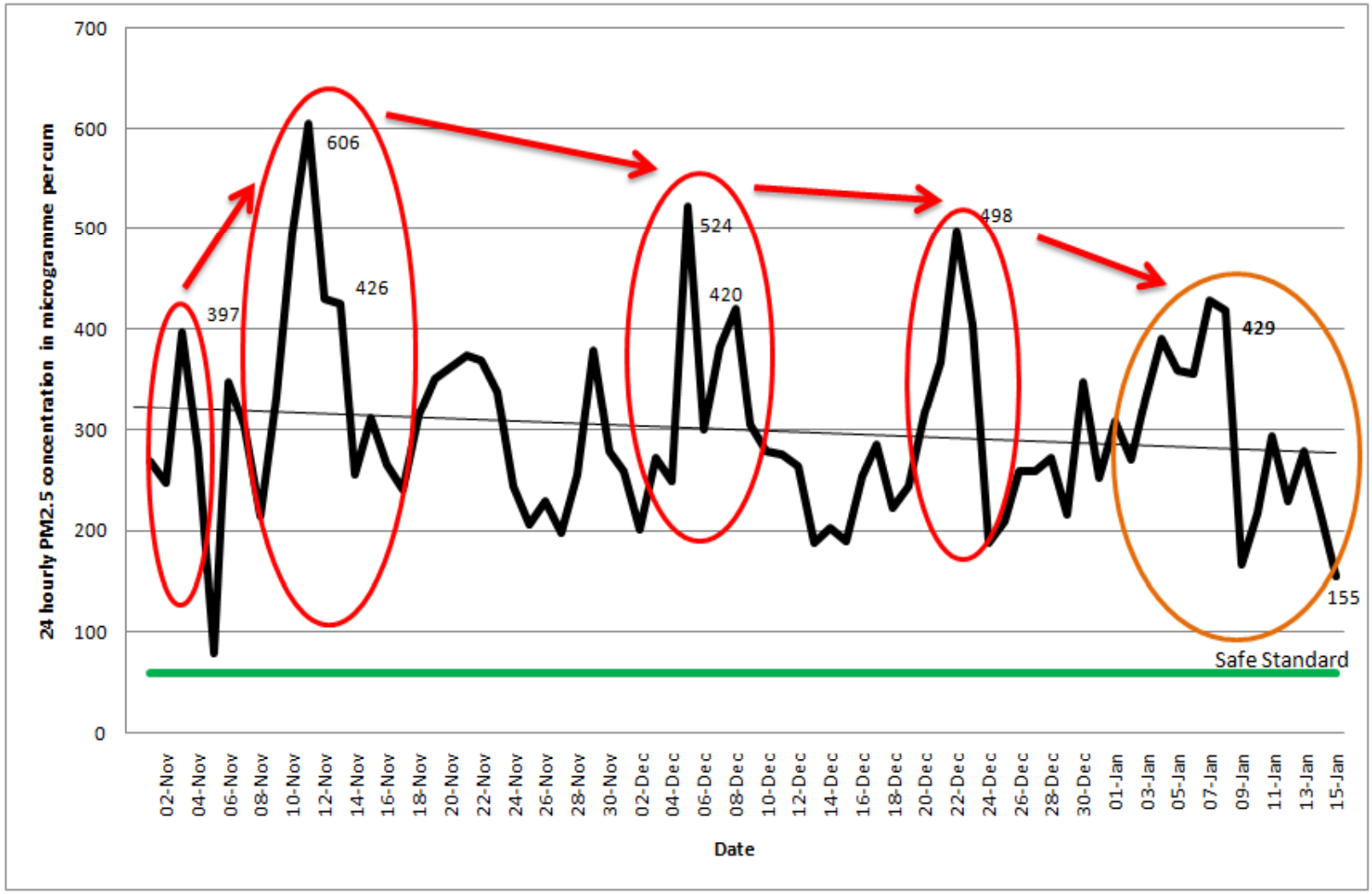
Difference is showing up in carbon emissions

Cities with more and longer car based travel have more carbon emissions



Source: WBCSD and MOUD data

Delhi: Emission control efforts including bypassing of trucks, odd-and even scheme are helping to reduce the strength smog episode peaks



Source: Based on DPCC data

Odd and even scheme

•**DTC:** there is an increase in average daily ridership in DTC buses from **35 lakh to 38 lakh,** amounting to **8.5%.**

• DTC fleet utilization has also increased from **84% (2014-2015) to 95%** during Odd-even policy.

•**60,000 cars have been converted to compressed natural gas (CNG)** since the odd-even restrictions started on January 1

•Travel Speed: It is observed that overall travel speeds have increased across the whole network of Delhi. Maximum increase in speed has been observed along Gurgaon Expressway, Mathura Road and along NH 1 where average journey speeds as high as 50 kmph were observed during the ODD-EVEN trial against 20 – 25 kmph of speeds in regular conditions.

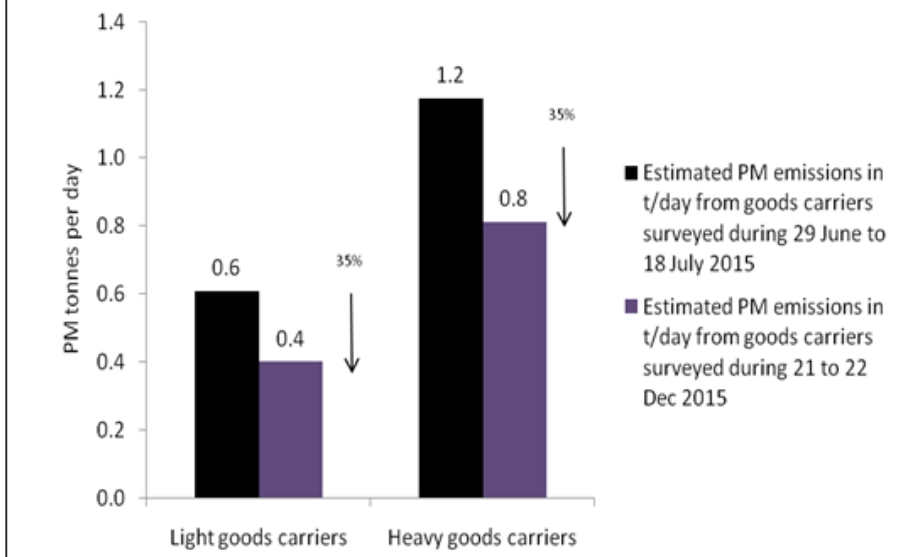
Impact of diversion of trucks

Category	Average Daily Vehicles entering Delhi in Non-ECC month (October, 2015)	Average Daily Vehicles entering Delhi in ECC month (November, 2015)	Change in Traffic Count after imposition of ECC (%)
Category-2	17,106	13,392	-22%
Category-3	5,578	3,583	-36%
Category-4	8,341	4,888	-41%
Category-5	4,118	2,224	-46%
Total	**35,143**	**24,087**	**-31.5%**

Source: CSE Compilation of traffic count data provided by SDMC

Impact of diversion of trucks

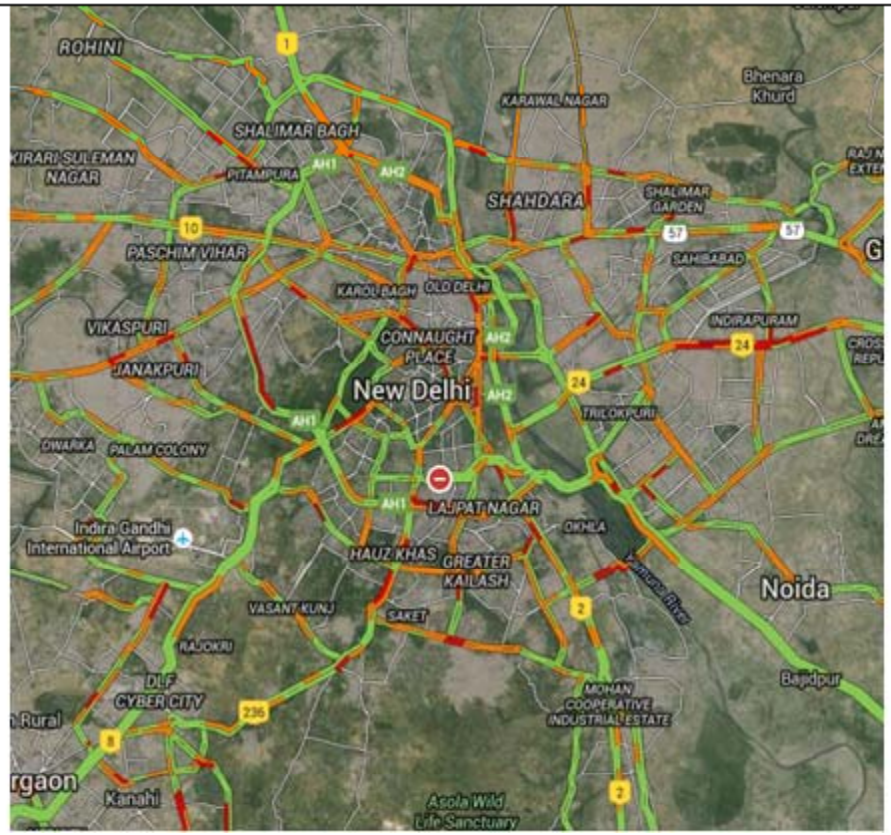
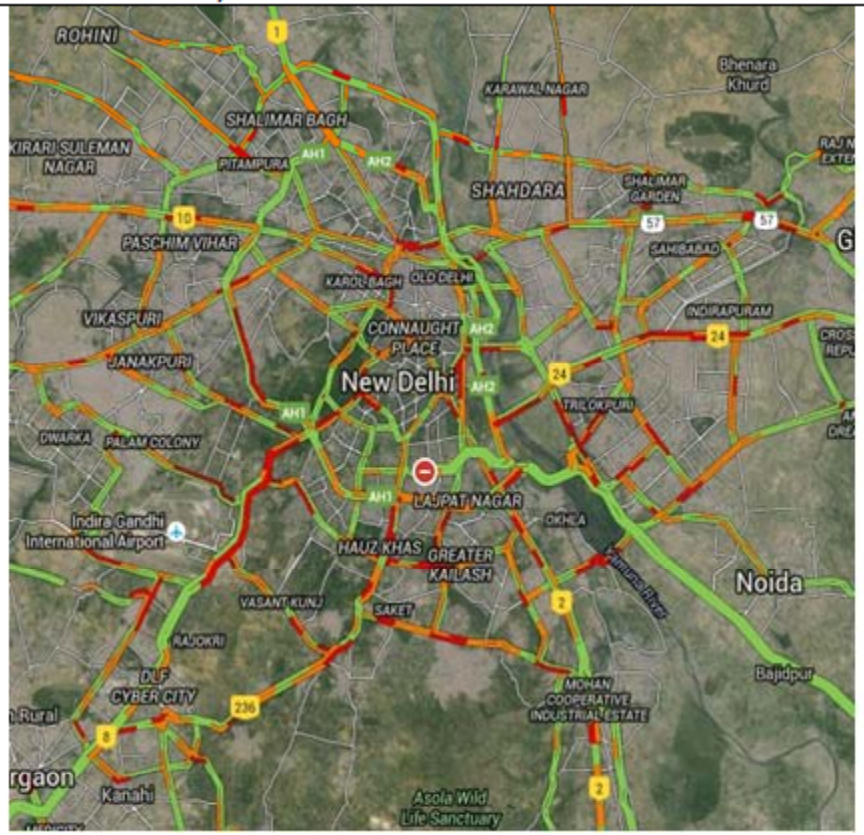
a. PM emissions load



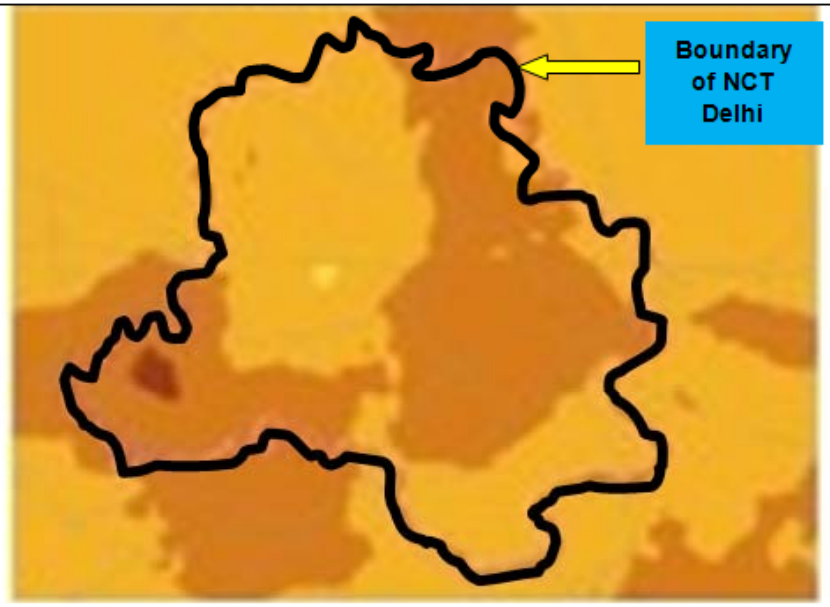
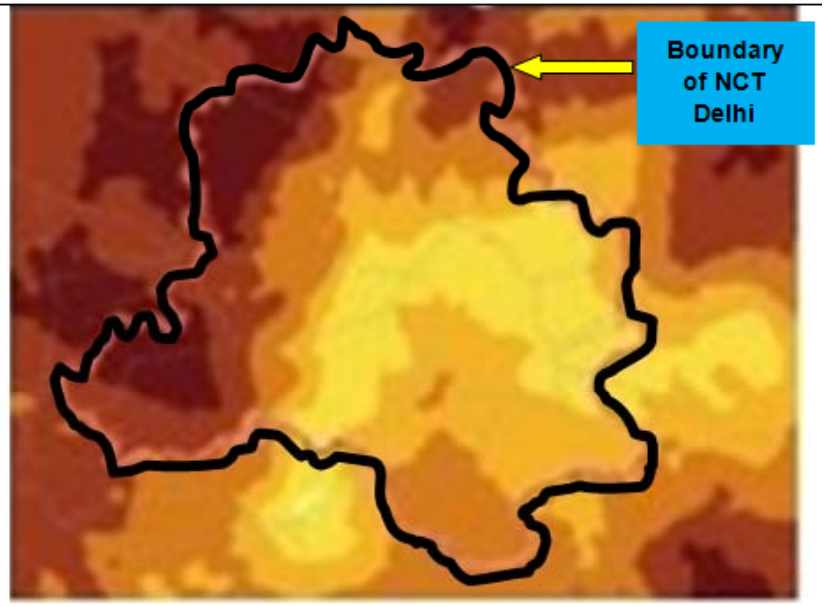
b. NOx emission load from goods carriers

Source: CSE estimates based on vehicle data provided by the CSE hired survey agency V R TECHNICHE Consultants Pvt Ltd, NOIDA, UP

Odd and even scheme

During Odd-Even	After Odd-Even
January 15, 2016 – Time- 10:30 am	January 18, 2016 – Time- 10:30 am (will add tomorrow's)
	

Odd and even scheme impact on AOD
(AOD tells us how much direct sunlight is prevented from reaching the ground by these aerosol particles)

AOD: Pre Odd-Even Trial	AOD: During Odd-Even Trial
	
December 18 to 31, 2015	January 1 to 15, 2016

Legends:

Good					Bad
0 to 0.3	0.3 to 0.45	0.45 to 0.60	0.60 to 0.75	0.75 to 0.90	> 0.90

Integrate co-benefit indicators with air pollution regulations

World Bank study for India (July, 2013):

-- Outdoor air pollution is 29% of the total environmental damages

-- Health cost of PM10 – 3% of GDP
-- PM10 mitigation cost less than 1% of GDP

-- Annual savings from health benefits can be more than USD 100 billion..
And CO_2 emissions can be reduced by upto 60%

Outdoor air pollution toll:

1-3 deaths per hour in Delhi (CSE/UC). 71 deaths / hr in India (GBD 2013)

Roll down the window of your bullet-proof car, Mr Prime Minister

The security threat is not the gun. It's the air of Delhi

Hon'ble Prime Minister,

Here is something that just may convince you: while India's Gross Domestic Product has increased two-and-half times in two decades (1975-1995), the pollution load from industries has gone up four times and from vehicles a shocking eight times.

A study by the Centre for Science and Environment shows that the number of people dying due to air pollution went up by almost 30 per cent in four years between 1991 and 1995. An estimated 52,000 people are dying due to air pollution every year – about 10,000 of them in Delhi itself.

One person dies every hour due to air pollution in the city.

In Delhi vehicles are responsible for 70 per cent of the pollution load. Because of the high toxicity of fumes from transport fuel, one out of every 10-15 people living in Delhi is likely to get cancer.

Your government has failed to arrest this deterioration of air quality in Indian cities. Worse still, it contributes to the pollution in a big way by producing low quality fuel in state-owned refineries. Improving fuel quality is a short-term measure which will go a long way. Vehicles using clean fuel will pollute less.

Seeing your government's inability to tackle air pollution, we present you with a peoples' charter for clean air. This will help to immediately improve the quality of the air we breathe.

Mr Prime Minister, 50 years into Independence, please give us our right to clean air. We hope you will take our concern seriously.

Yours sincerely

Centre for Science and Environment
November 2, 1998

PEOPLES' CHARTER ON CLEAN AIR

FOR AN IMMEDIATE IMPACT

✔ **PRODUCE CLEAN DIESEL OR IMPORT**
Diesel emissions contain deadly particulate matter with traces of the strongest carcinogen known till date. Indian diesel is 250 times dirtier than the world's best.

✔ **REMOVE BENZENE FROM PETROL**
India is moving towards unleaded petrol. But this fuel contains too much benzene. Though we use one hundred times less petrol than USA, the total amount of benzene emissions from Indian vehicles is the same as in the US.

Benzene causes blood cancer and air should have no benzene at all, says WHO. Yet the level of benzene in and around Connaught Place in Delhi is 10 times higher than the European safety limit. If you live in Delhi, your chances of getting blood cancer are twice as high as people living in Bangalore, Chennai and Mumbai.

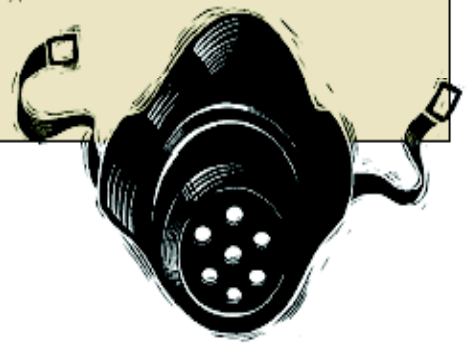
✔ **STOP PRIVATE DIESEL CARS**
Registration of all private diesel models should be banned in cities like Delhi. Cheap government diesel means more diesel cars, including luxury models.

✔ **TAX TO IMPROVE VEHICLE TECHNOLOGY**
Penalise vehicle manufacturers for producing polluting technology. Tax vehicles according to their emission level. Manufacturers will then invest in cleaner technology.

✔ **INTRODUCE EMISSION WARRANTY**
Make the industry accountable for the life-long emission efficiency of all vehicles they produce.

✔ **MAKE EMISSION LEVELS PUBLIC**
Manufacturers must inform buyers of the exact emission levels of their vehicles.

✔ **MONITOR ALL HARMFUL GASES**
Improve air quality assessment. A wide range of poisons are not monitored till date. Alert people about pollution levels in the city. It is done all over the world.



Register your protest to the Prime Minister today
PMO, South Block, New Delhi 110 001
Tel: 301 8939 Fax: 301 6857, 301 9817

Join CSE's Right To Clean Air campaign

CSE
Centre for Science and Environment
41, Tughlakabad Institutional Area, New Delhi 110 062
Tel: 698 3394, 698 1124, 698 6399 **Fax:** 698 5879
Email: cse@cseindia.org **Website:** www.cseindia.org

Freedom from congestion by cars


Do you think
we are not seeing
the point?
AUTO
INDUSTRY
GOVERNMENT

Thank You…..