

**MALE' DECLARATION
NIA- INDIA**

**AIR QUALITY MANAGEMENT
IN
INDIA**

Functions of the Central Board (At National Level)

- Advise the Central Government on any matter concerning prevention and control of water and air pollution;
- Plan and execute nation-wide Pollution Control programmes;
- Co-ordinate the activities of State Boards and Pollution Control Committees;
- Provide technical assistance and guidance to the State Boards
- Carryout an sponsor investigation and research related to pollution control;;
- Plan and organise training programmes;
- Organise mass awareness programmes;
- Collect, compile and publish technical and statistical data relating to water and air pollution;
- Prepare manuals, codes and guidelines relating to treatment and disposal of wastes;
- Disseminate information in respect of matters relating to water and air pollution;
- Lay down, modify or annul waster and air quality standards; and
- Perform such other functions as and when prescribed by the Government of India.

STANDARD DEVELOPMENT UNDER AIR ACT

- Section 16 (2) (h) of Air Act
Central Board to lay down Standard for the quality of air (ambient air)
- Section 17 (1) (g) of Air Act
S.P.C.B. to lay down, in consultation with CPCB and having regard to the ambient air quality standard laid down by CPCB, standards for emission of air pollution into the atmosphere from Industrial plants and automobiles and for the discharge of any air pollutants into the atmosphere from any other source (except ship and aircraft)
- Section 19 (1) of Air Act
State Govt. in consultation with SPCB to lay down Air Pollution Control Area
- Section 19 (1) (5) of Air Act
State Govt. after consultation with SPCB prohibit the burning of any material in any air pollution control area.

STANDARD DEVELOPMENT UNDER WATER ACT

- Section 16 (2) (g)

Central Board may lay down, modify and annul, in consultation with State Govt. concerned, the Standard for a stream or well

- Section 17 (1) (g)

S.P.C.B. shall lay down, modify and annul effluent standards for the sewage and trade effluents and for the quality of receiving water resulting from the discharge of effluent and to classify waters of the State.

- Section 17 (1) (k)

SPCB shall lay down standard for treatment of sewage and trade effluent to be discharge into any particular stream taking into account the minimum fair weather dilution available in that stream and the tolerance limits of pollution permissible in the water of the stream, after the discharge of such effluents.

STANDARD DEVELOPMENT UNDER E P ACT 1986

- Section 6 (1) (2)

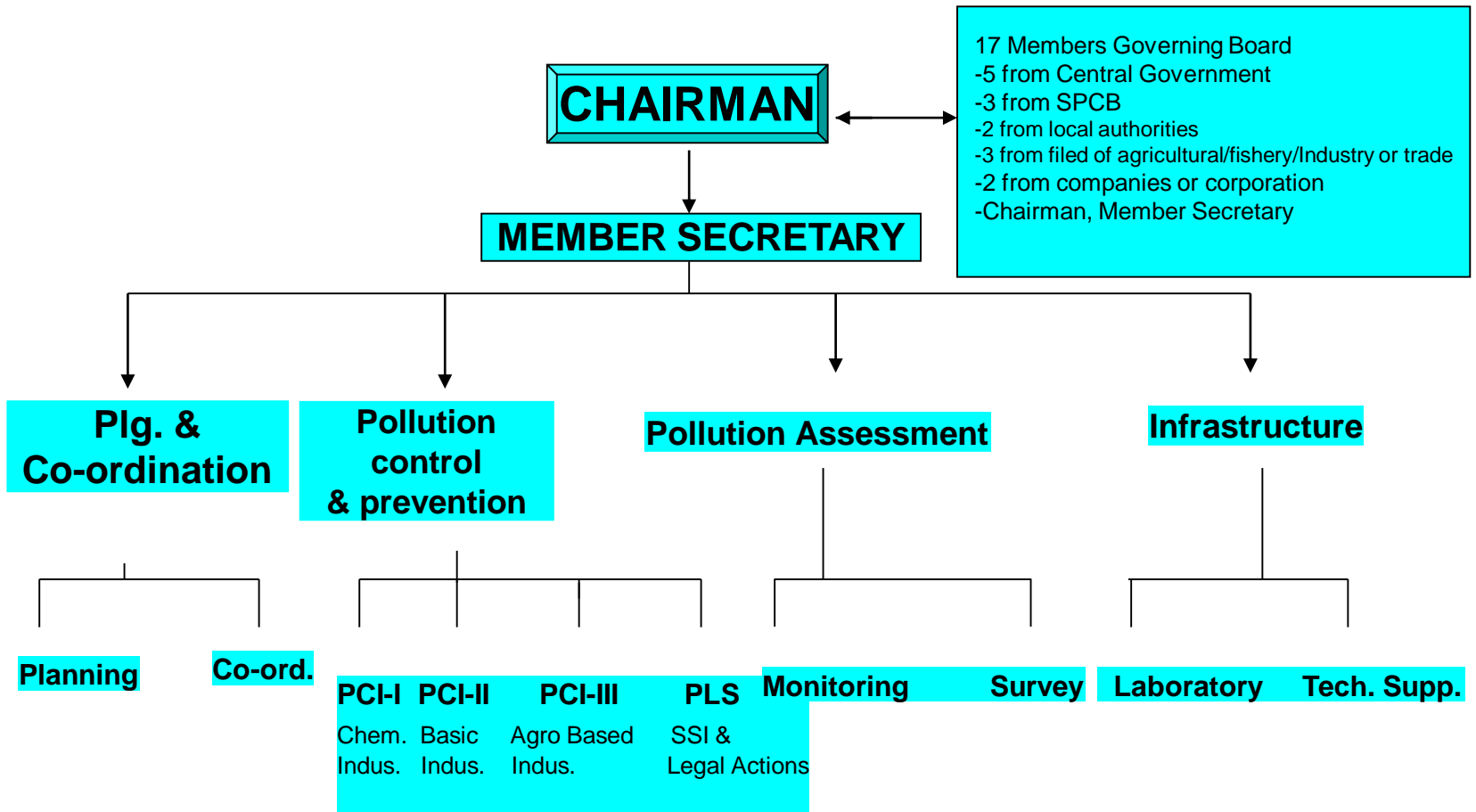
The Central Government may be notification into official Gazette, make rules in respect to following,

- (a) The standard of quality of air, water or soil for various areas and purposes.**
- (b) the maximum allowable limits of concentration of various environmental pollutants (including noise) for different areas.**

NEW RESPONSIBILITIES GIVEN BY MoEF to CPCB

- **Environmental Protection Control Authority (EPCA), Delhi**
- **Loss of Ecology Authority Work**
- **Taj Trapezium Authority**
- **Bio Medical Rules – Standard development, co-ordination**
- **Noise Pollution Control – Standard development**
- **Vehicular Pollution Control – Standard development, Road Map, co-ordination**
- **Fuel quality standard**
- **Hazardous waste management (Technical issues)**
- **Municipal solid waste management**
- **Plastic waste management**
- **Fly ash rules**
- **Registration of industries for recycle and reuse under hazardous Waste Rules**
- **Water quality monitoring under GAP / YAP**
- **Action plan of 16 cities for Air Pollution Control**
- **STP performance set up under GAP / YAP**

ORGANISATION STRUCTURE



**CENTRAL POLLUTION CONTROL BOARD (CPCB)
HEAD OFFICE, DELHI**

Zonal Offices of CPCB with Jurisdiction

KANPUR

KOLKATA

SHILONG

BHOPAL

VADODARA

BANGLORE

Uttar Pradesh
Uttaranchal
Jammu &
Kashmir,
Himachal
Pradesh,
Punjab,
Haryana
UT Delhi

Bihar
Jharkhand
Orissa
Sikkim
West Bengal
UT Andaman
Nicobar

Assam
Manipur
Meghalaya
Mizoram
Nagaland
Tripura

Madhya
Pradesh
Rajasthan
Chattisgarh

Gujrat
Maharashtra
UT Daman,
& Nagar
Haveli

Andhra Pradesh
Goa
Karnataka
Kerla
Tamilnadu
UT Lakshadweep
UT Pondichary

Major Environmental Issues in India

- 1. Air Quality Problem in Major Cities (45) and Metro Cities (7) with respect to RSPM/PM₁₀ and NO_x**
- 2. Surface Water Quality problem in 86 river stretches.**
- 3. Common Effluent Treatment Plant (CETP) performance not upto desired level in 61 CETPs.**
- 4. Hazardous Waste treatment & disposal Sites are not set up in all States**

- 7. Hazardous Waste Inventory not prepared as per new guidelines.**
- 8. Industrial Pollution Control**
- 9. Pollution Control from Small Scale Industry (3 million).**
 - a. Stone Crusher**
 - b. Lime Kiln**
 - c. Foundries**
 - d. Electroplating**
 - e. Rerolling Mills**
 - f. Brick Kiln**
- 10. Untreated sewage / Sewage Treatment Plants performance (Class I/II cities)**

- 9. Coal Quality (Clean Coal Technology, High Ash)**
- 10. Fuel Quality (Benzene, Sulphur)**
- 11. Pollution control from in-use Vehicles improvement of (I/M System)**
- 12. Noise Control from vehicles, DG sets, cracker, etc.**
- 13. Management of Bio-Medical Waste (Incinerator, Common facility, Segregation of wastes etc.)**
- 14. Solid Waste Management (segregation, collection, treatment and disposal)**
- 15. Municipal Waste Water Management (collection & Management)**
- 16. Fly Ash Management (100 million tonne generation)**

**WORK DONE IN THE
FIELD OF AIR
POLLUTION CONTROL**

WORK DONE IN THE FIELD OF INDUSTRIAL AIR POLLUTION CONTROL

- **Evolved National Ambient Air quality Standard (1982, 1994)**
- **Developed Emission Standard for major air polluting Industries such as Thermal Power Plants, Cement Plants, Iron & steel Industries, Non Ferrous Metallurgical Industries. Oil Refineries etc.**
- **Enforcement of Standard in 17 categories of highly polluting industries.**
- **Developed pollution prevention and control technology for small scale air polluting industries such as Foundry, Rerolling Mills, Brick Kiln, Lime Kiln, etc including demonstration of technology.**
- **Approved fuel for major cities.**
- **Identification of critically polluted areas with reference to air pollution and preparation and implementation of action plan.**
- **Promotion of clean coal programme e.g. coal beneficiation notification, IGCC, CFBC Technology etc.**
- **Promotion of use of fly ash.**

WORK DONE IN THE FIELD OF

VEHICULAR POLLUTION CONTROL

1. Fuel Quality Improvement

- a) Unleaded petrol in whole country from 2000.
- b) Low sulphur petrol and diesel (1996, 2000, 2005).
- c) Low Benzene Petrol

2. Clean Vehicle Technology

- a) Improvement of vehicular exhaust standard (1991, 1996, 1997, 2000, 2005 and 2010)
- b) Use of clean fuel (CNG, LPG) vehicles more than 112,000 CNG vehicles (80,000 in Delhi)

EMISSION REDUCTION FROM VEHICLES **BY INTRODUCING STRICTER NORMS**

Norms	Year of Implementation
1996	1996
1998 (Cat. Converter Norms)	1998
Bharat Stage I (Euro I)	1999
Bharat Stage II (Euro II)	2000/2001
Bharat Stage III (Euro III)	April, 2005
Bharat Stage IV (Euro IV)	April, 2010

VEHICULAR POLLUTION CONTROL

III. Fuel Quality Improvement

Norms	Year of Implementation
0.5% S – Diesel	1996
0.25% S – Diesel	2000
0.05% S – Diesel	2003
0.035% S – Diesel	2005
Unleaded Petrol	2000
Low Smokes 2 T oil	1998

IV. APPROVED FUEL FOR U.T. OF DELHI

- **Coal with low sulphur (S - 0.4%)**
- **Fuel oil / LDO/ LSHS / with low sulphur (S – 1.8%)**
- **Motor gasoline (as per specifications given in the notification dated 2-4-96 of the Ministry of Environment and Forests, annexed hereto)**
- **Diesel (as per specifications given in the notification dated 2-4-96 of the Ministry of Environment and Forests, annexed hereto)**
- **Liquid petroleum Gas (LPG)**
- **Compressed Natural Gas(CNG)**
- **Kerosene**
- **Naphtha (for power station)**
- **Aviation turbine fuel (for aircraft)**
- **Fire wood (only for domestic use in rural areas and crematorium)**
- **Bio - Gas**

V. ALTERNATE FUEL USE IN NCR DELHI

- **CNG – Norms notified and more than 80,000 CNG vehicles plying in Delhi**
- **LPG – Norms notified, LPG kits approved**
- **Gasoline with 5% ethanol from 2003 in sugar producing states & UT to be extended to other states and Union Territories. 10% to be introduced by 2007**
- **Bio – diesel (5%) by 2005 & Bio – diesel (10%) by 2011**

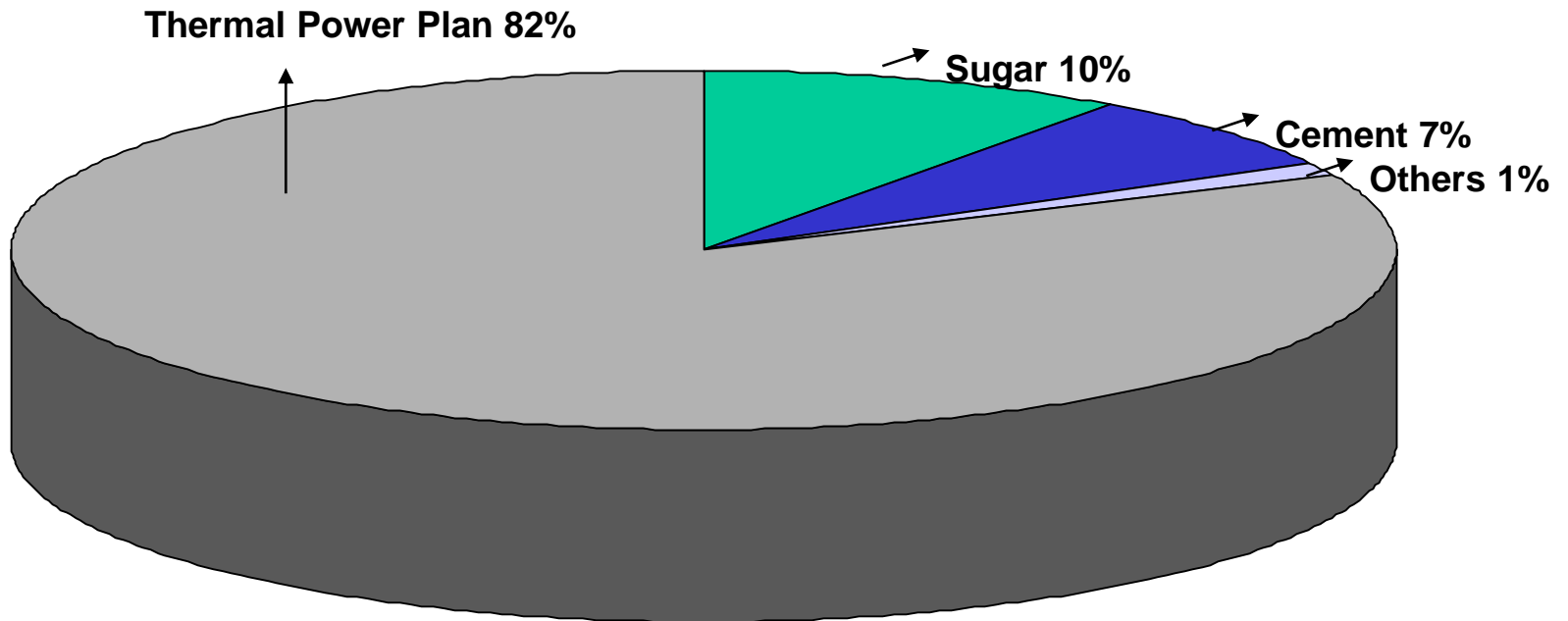
VI. RESTRICTION ON GROSSLY POLLUTED VEHICLES IN DELHI

- 15 YEARS OLD COMERCIAL VEHICLES PHASED OUT IN DELHI**
- CITY DIESEL BUSES PHASED OUT IN DELHI AND INTRODUCED CLEAN FUEL (CNG) BUSES**

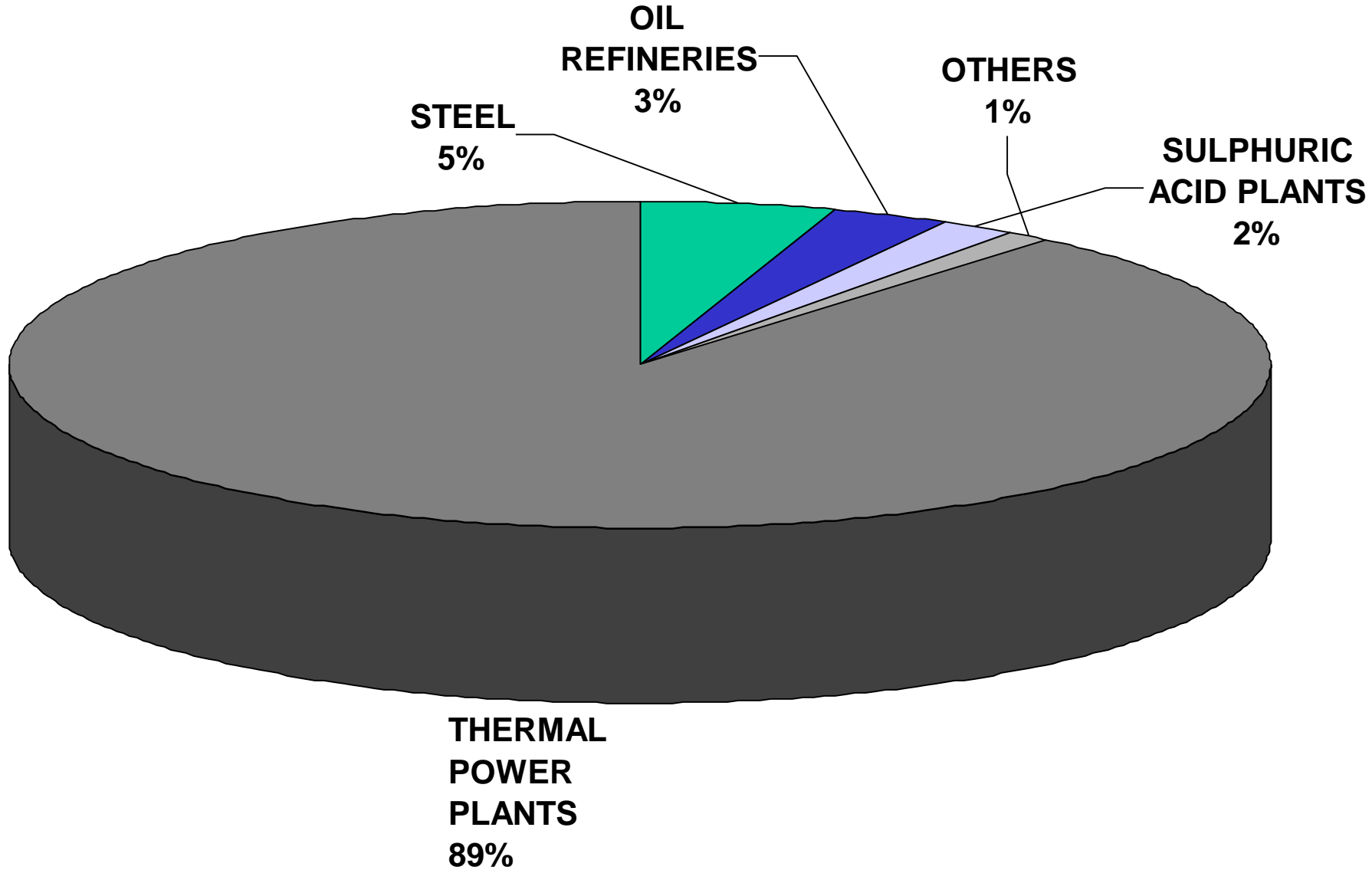
INDUSTRIAL AIR POLLUTION LOAD

SHARE OF SPM LOAD (TONNES/DAY) FROM DIFFERENT CATEGORIES OF INDUSTRIES WITH CONTROL DEVICE

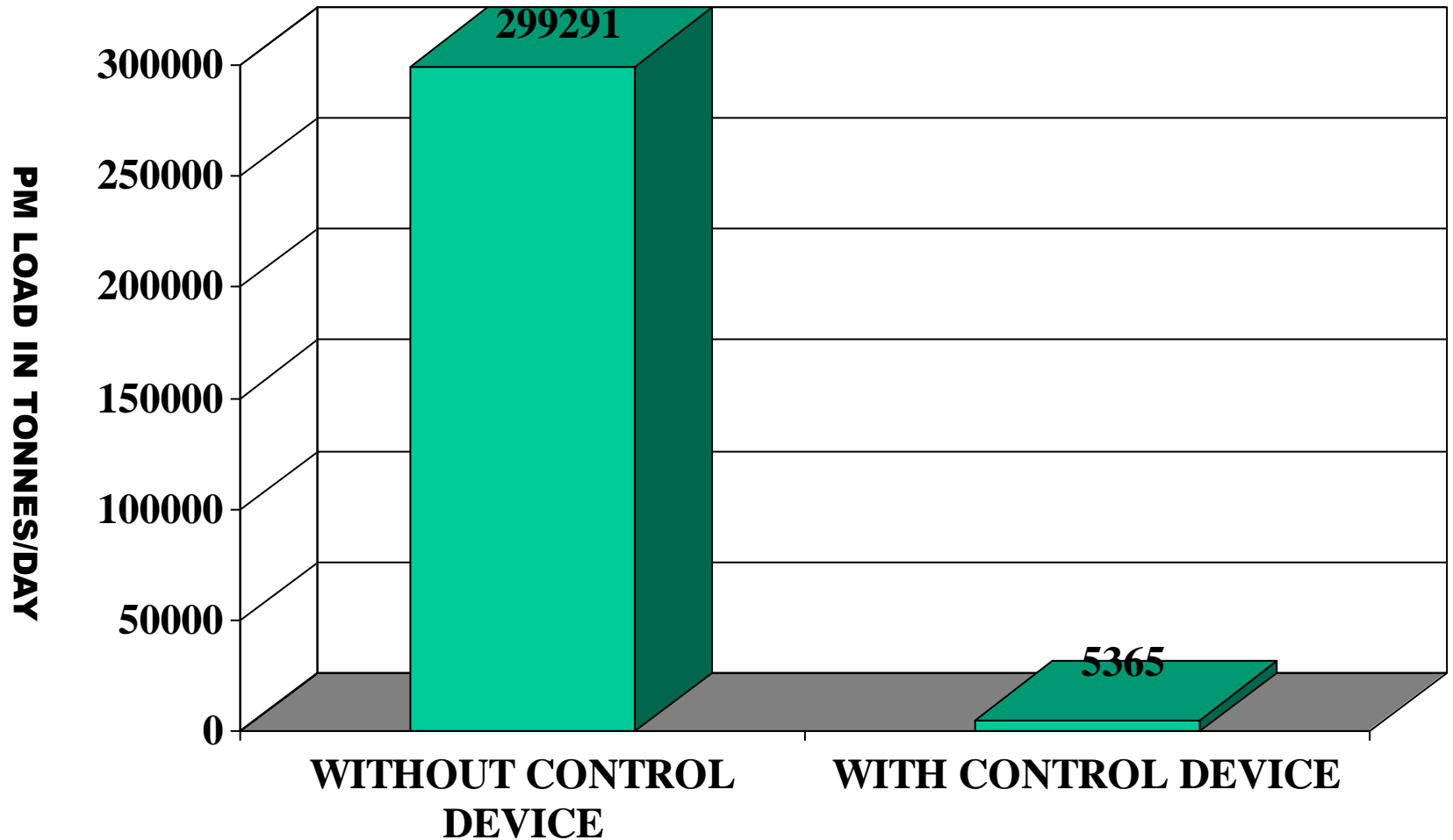
■ SUGAR ■ CEMENT ■ OTHERS ■ THERMAL POWER PLANTS



SHARE OF SULPHUR DIOXIDE LOAD (TONNES/DAY) FROM DIFFERENT CATEGORIES OF INDUSTRIES



REDUCTION IN PARTICULATE MATTER LOAD DUE TO VARIOUS CONTROL MEASURES



Air Quality Monitoring

- Air Quality Monitoring-NAMP
 - started in 1984 with 7 stations
 - presently 295 stations
 - agencies involved
- Ambient air quality standards-area-wise
 - parameters monitored-criteria and specific
 - 45 cities and 7 metros identified based on EF

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

Pollutant	Time Weighted Average	Concentration in Ambient Air			Method of Measurement
		Industrial Area	Residential, Rural and other Areas	Sensitive Area	
Sulphur Dioxide (SO ₂)	Annual Average*	80 µg/m ³	60 µg/m ³	15 µg/m ³	1. Improved West and Gaeke Method 2. Ultraviolet Fluorescence
	24 Hours Average**	120 µg/m ³	80 µg/m ³	30 µg/m ³	
Oxides of Nitrogen as NO ₂	Annual Average*	80 µg/m ³	60 µg/m ³	15 µg/m ³	1. Jacob & Hochheiser modified (NaOH-NaAsO ₂) Method 2. Gas Phase Chemiluminescence
	24 Hours Average**	120 µg/m ³	80 µg/m ³	30 µg/m ³	
Suspended Particulate Matter (SPM)	Annual Average*	360 µg/m ³	140 µg/m ³	70 µg/m ³	High Volume Sampling (Average flow rate not less than 1.1m ³ /minute)
	24 Hours Average**	500 µg/m ³	200 µg/m ³	100 µg/m ³	
Respirable Particulate Matter (Size less than 10µm) (RPM)	Annual Average*	120 µg/m ³	60 µg/m ³	50 µg/m ³	Respirable Particulate Matter Sampler
	24 Hours Average**	150 µg/m ³	100 µg/m ³	75 µg/m ³	
Lead (Pb)	Annual Average*	1.0 µg/m ³	0.75 µg/m ³	0.50 µg/m ³	AAS Method after sampling using EPM 2000 or equivalent filter paper
	24 Hour Average**	1.5 µg/m ³	1.0 µg/m ³	0.75 µg/m ³	
Carbon Monoxide (CO)	8 Hours Average**	5.0 mg/m ³	2.0 mg/m ³	1.0 mg/m ³	Non dispersive Infrared Spectroscopy
	1 Hour Average	10.0mg/m ³	4.0 mg/m ³	2.0 mg/m ³	
Ammonia (NH ₃)	Annual Average*	0.1 mg/m ³			-
	24 Hour Average**	0.4 mg/m ³			

* Annual Arithmetic mean of minimum 104 measurements in a year twice a week 24 hourly at uniform interval.

** 24 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.

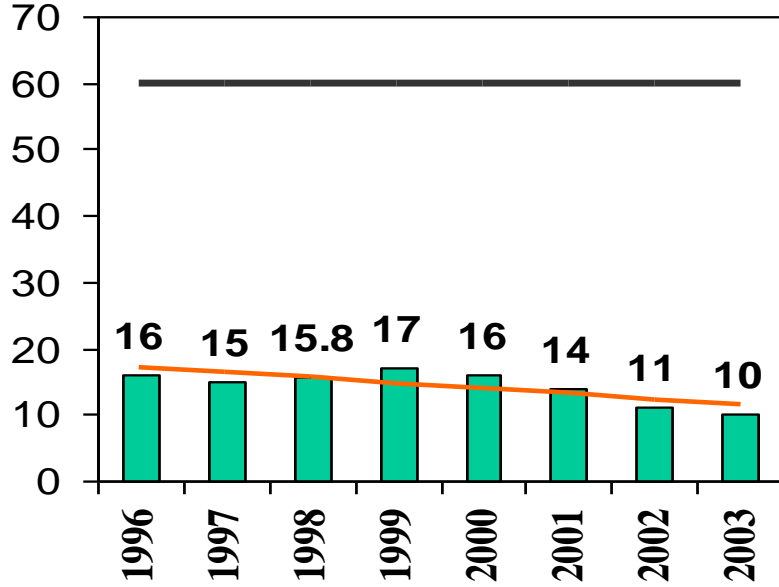
NOTE

1. National Ambient Air Quality Standard : The levels of air quality necessary with an adequate margin of safety, to protect the public health, vegetation and property.
2. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.
3. The State Government / State Board shall notify the sensitive and other areas in the respective states within a period of six months from the date of notification of National Ambient Air Quality Standards.

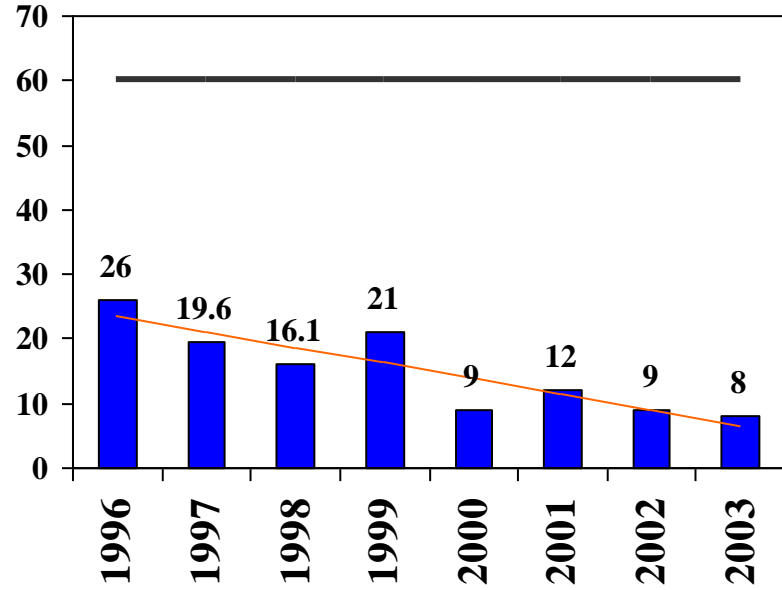
SO2 TRENDS IN METRO CITIES (RESIDENTIAL AREA)

* All values are in ug/m3.

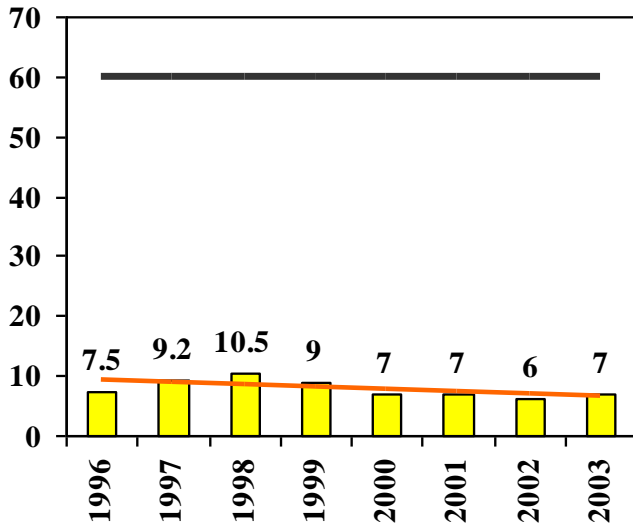
DELHI



MUMBAI



CHENNAI



KOLKATA

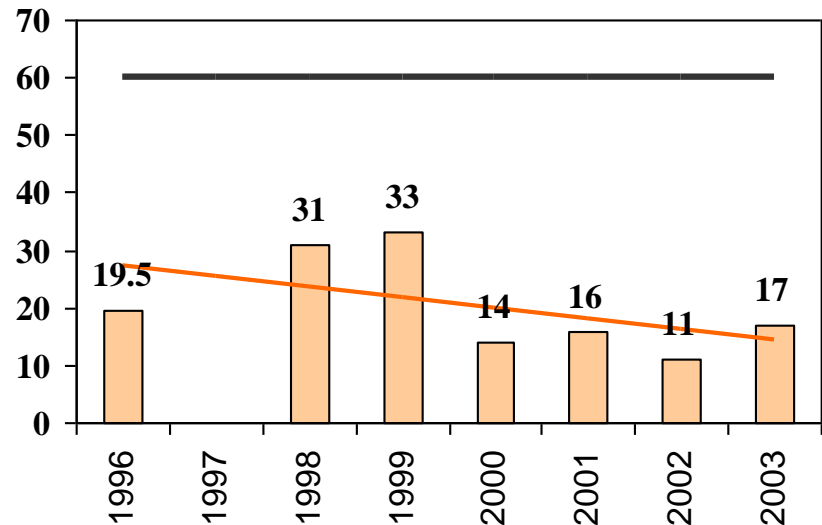
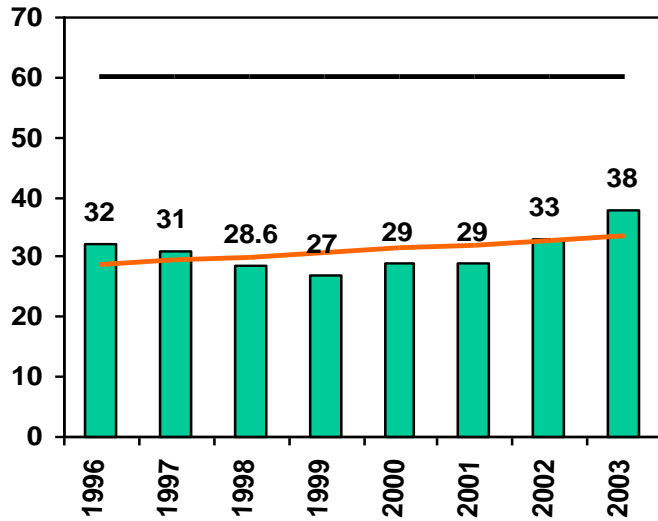


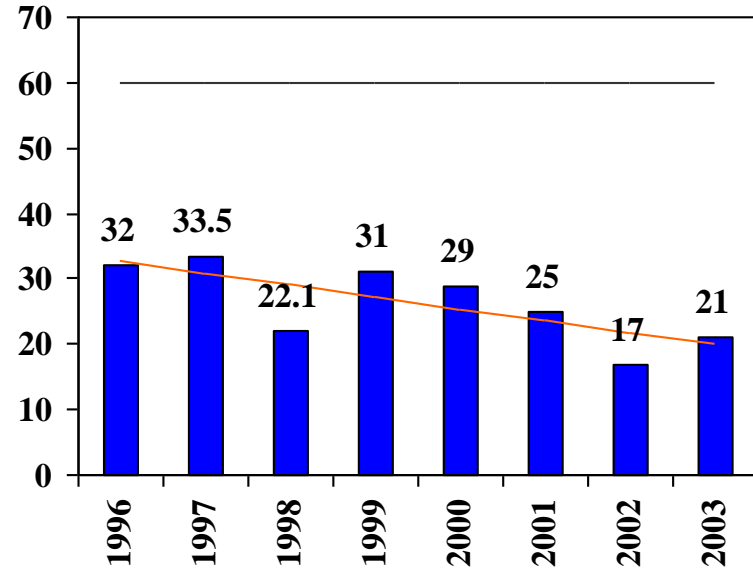
Fig 1.11 : NO2 TRENDS IN METRO CITIES (RESIDENTIAL AREA)

* All values are in ug/m³.

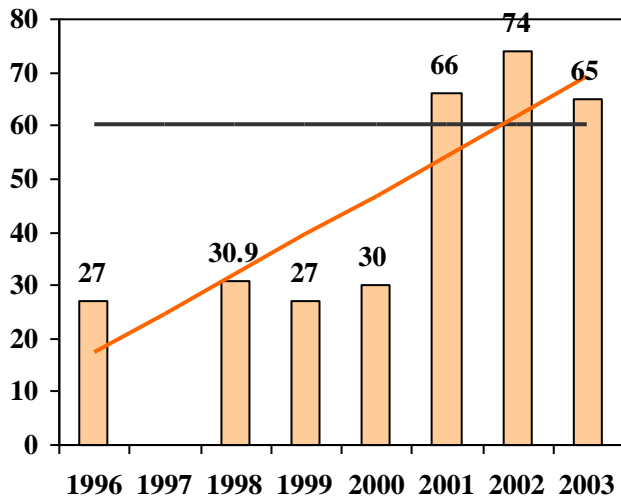
DELHI



MUMBAI



KOLKATA



CHENNAI

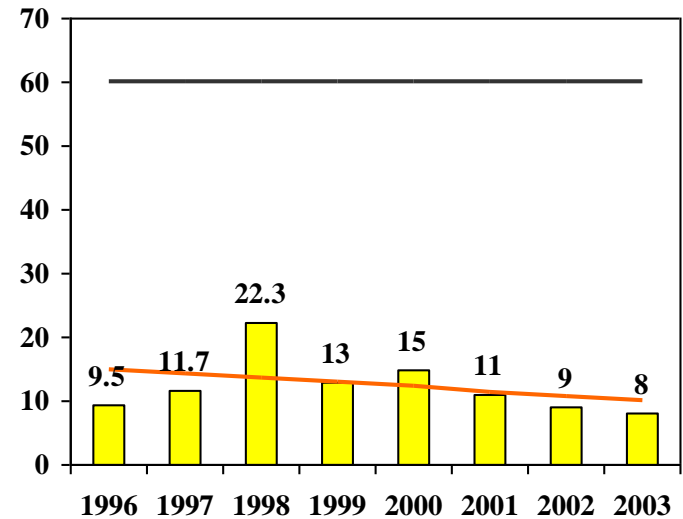
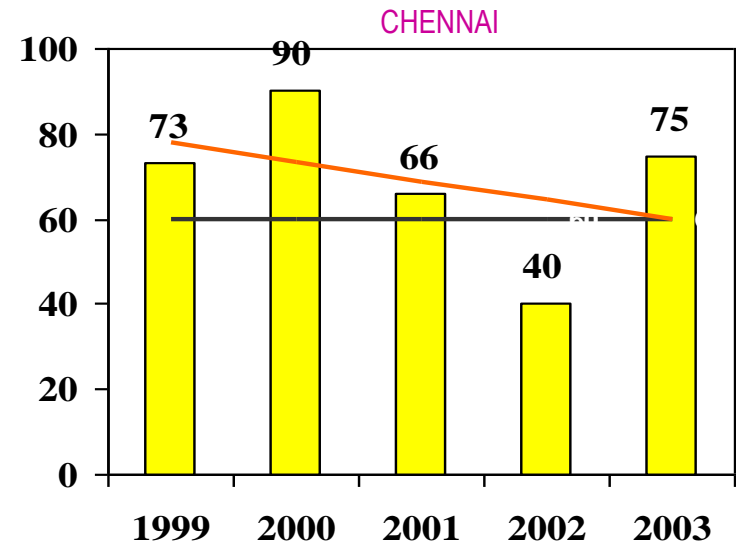
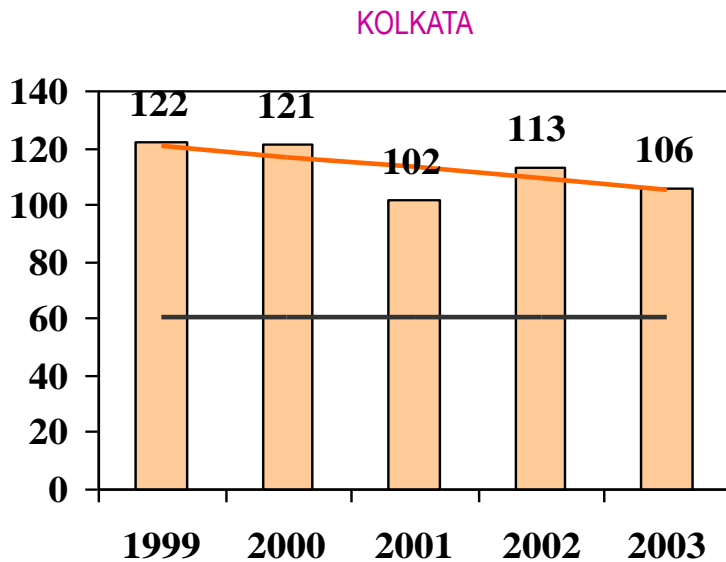
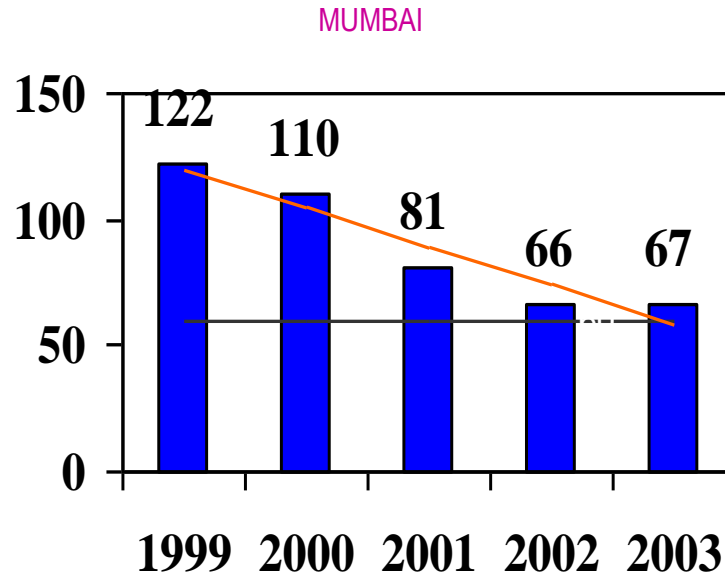
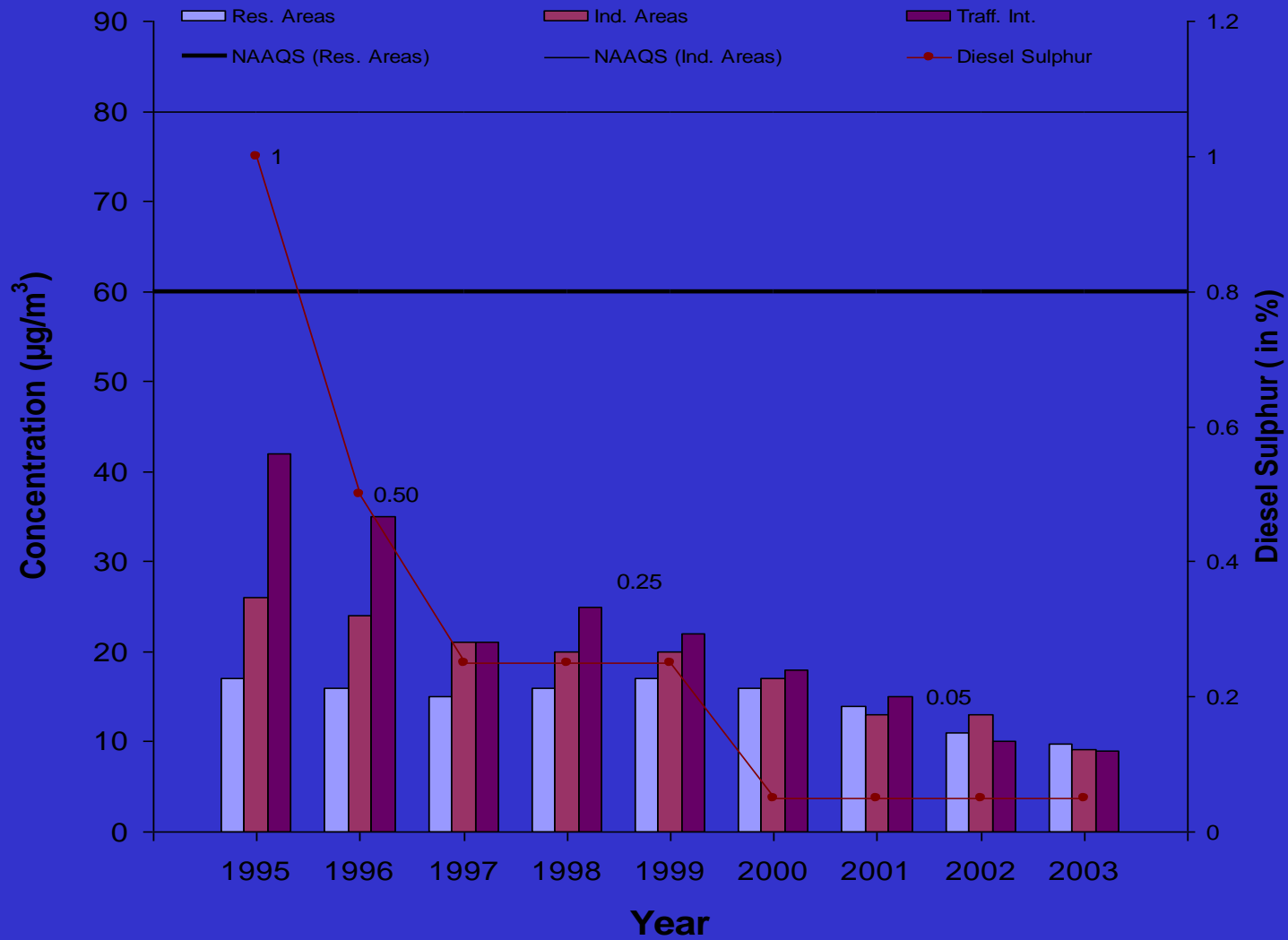


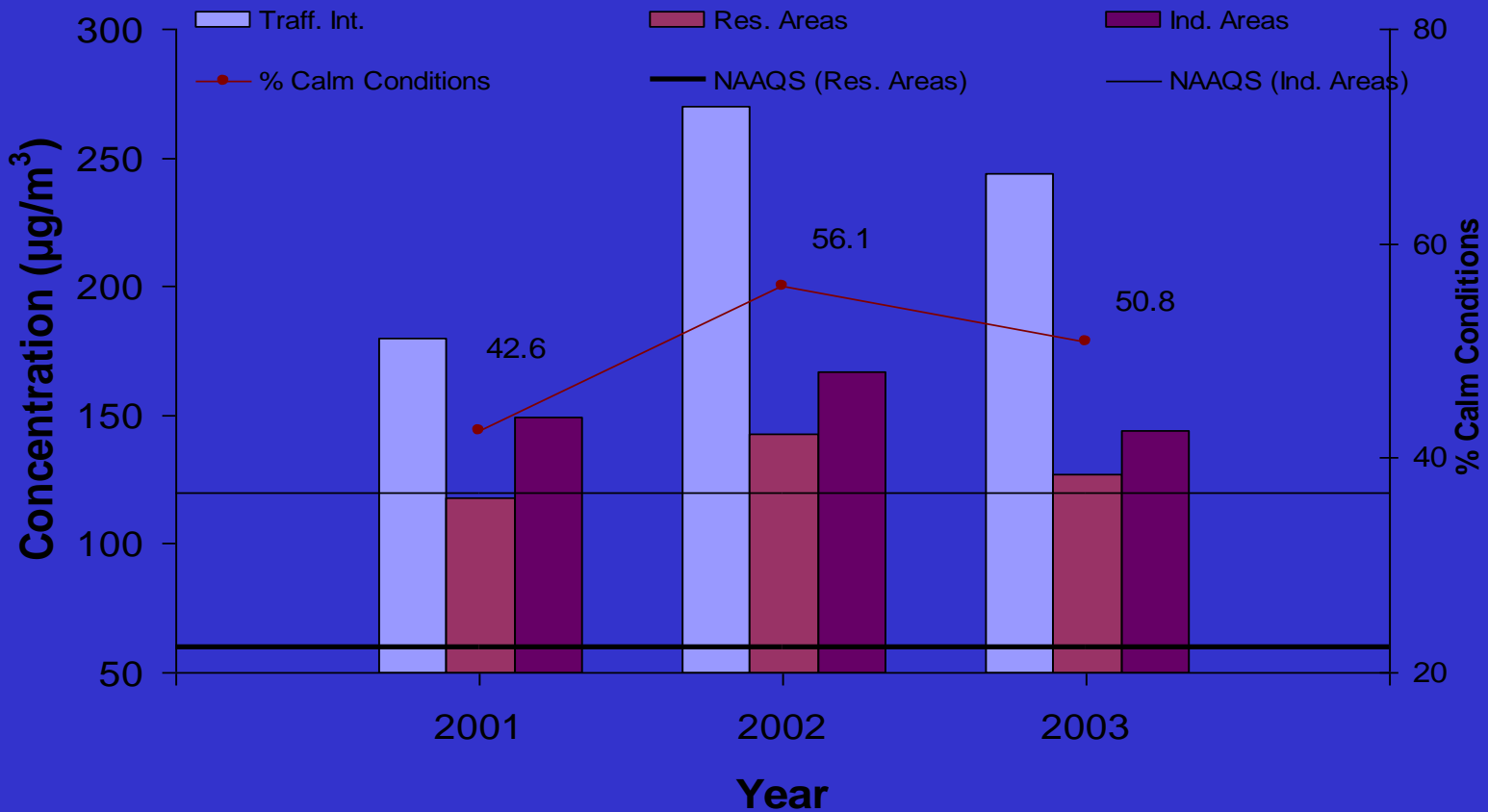
Fig 1.12 : RSPM TRENDS IN METRO CITIES (RESIDENTIAL AREA)



* All values are in ug/m³.



Trend in Annual Average Concentration of Sulphur Dioxide in Delhi.



Annual Average Concentration of Respirable Suspended Particulate Matter in Delhi.

SHARE OF SULPHUR DIOXIDE LOAD (TONNES/DAY) FROM DIFFERENT CATEGORIES OF INDUSTRIES

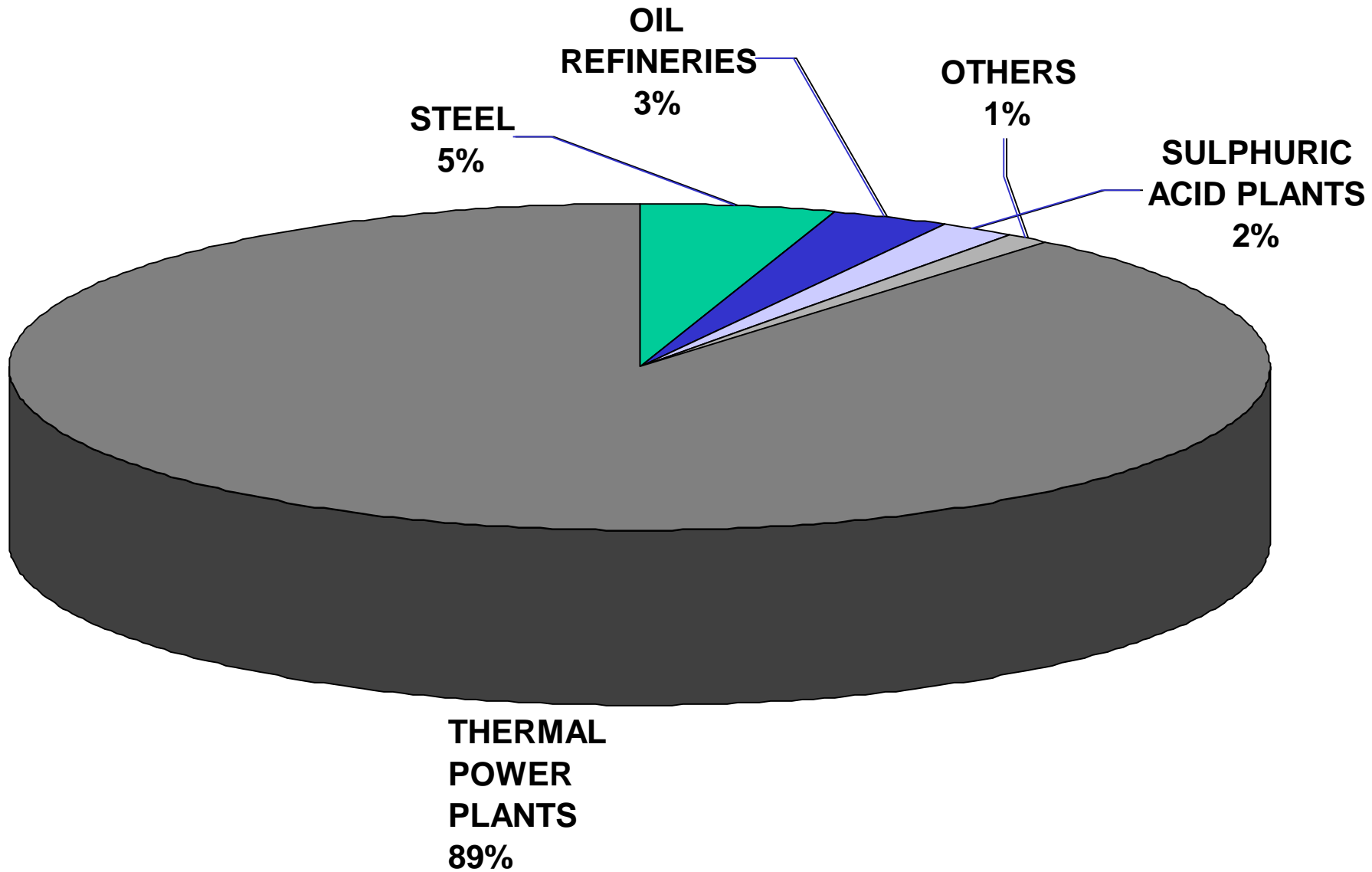


TABLE-V: DIESEL SULPHUR REDUCTION PROGRAM IN INDIA

Phase	Date of Introduction	Sulphur content	Areas covered
Phase-I	April 1996	Low sulphur (0.50%)	Four metros and Taj Trapezium
Phase-II	August 1997	Low sulphur (0.25%)	Delhi & Taj Trapezium
Phase-III	April 1998	Low sulphur (0.25%)	Metro cities
Phase-IV	January 2000	Low sulphur (0.25%)	Entire country
Phase-V	April 2000	Low sulphur (0.05%)	NCR-for private vehicles
	January 2001	Low sulphur (0.05%)	For all vehicles in Mumbai
	March 2001	Low sulphur (0.05%)	NCT-all vehicles
	June 2001	Low sulphur (0.05%)	NCR-all vehicles
	July 2001	Low sulphur (0.05%)	NCR,Chennai & Kolkata
Phase-VI*	April 2005	0.035	Metro cities
		0.05	Entire Country
	April 2010	0.005	Metro Cities
		0.035	Entire Country

•Proposed limits commensurate with Euro-III & IV Norms. The Auto-Fuel Policy shall review the same when required

Source Apportionment

- PM2.5 measured-3/2001-1/2002 – Delhi, Mumbai and Kolkata
- Significance of PM2.5
- Very high vis-vis USEPA value – Delhi – 132/15
- Chemical mass-balance method
- 5 sources – diesel, gasoline, road dust, bio-mass and coal; specific markers
- Contribution of diesel and gasoline about 40% with assumptions
- Current status despite steps taken – cause for concern

THANK YOU