CHAPTER FOUR

Atmosphere

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ATMOSPHERE

Atmospheric Pollution – Main Sources

4.1 The atmosphere consists of a mixture of gases that completely surround the earth. It extends to an altitude of 800 to 1000 kms above the earth's surface, but is deeper at the equator and shallow at the poles. About 99.9% of the mass occurs below 50 Km and 0.0997% between 50 and 100 km altitude. Major polluting gases/ particles are confined to the lowermost layer of atmosphere known as Troposphere that extends between 8 and 16 Kms above the earth surface.

4.2 The **main sources of atmospheric pollution** may be summarized as follows:

a) The combustion of fuels to produce energy for heating and power generation both in the domestic sector as well as in the industrial sector.
b) The exhaust emissions from the transport vehicles that use petrol, diesel oil, etc.
c) Waste gases, dust and heat from many industrial sites including chemical manufacturers, electrical power generating stations, etc.

Environment Pollution due to Energy Use

4.3 A considerable amount of air pollution results from burning of fossil fuels. Fuels are primarily derived from fossilized plant material and consist mainly of carbon and/or its compounds. The household sector is the largest consumer of energy in India. More than 60 percent of Indian households depend on traditional sources of energy like fuel wood, dung and crop residue for meeting their cooking and heating needs. Out of total rural energy consumption about 65 per cent is met from fuel wood. Fuel wood consumption during 2001-02 is estimated at 223 million tones, 180 millions tones of which is for household consumption and the balance for cottage industry, big hotels etc. Burning of traditional fuels introduces large quantities of CO_2 when the combustion is complete, but if there is incomplete combustion and oxidation then Carbon monoxide (CO) is produced, in addition to hydrocarbons. Incomplete combustion of coal produces smoke consisting of particles of soot or carbon, tarry droplets of unburnt hydrocarbons and CO. Fossil fuels also contain 0.5–4.0% of sulphur which is oxidized to SO_2 during combustion.

4.4 The environmental effects of various fuels, namely, coal, oil, nuclear etc. are of growing concern owing to increasing consumption levels. The combustion of these fuels in industries and vehicles has been a major source of pollution. Coal production through opencast mining, its supply to and consumption in power stations, and industrial boilers leads to particulate and gaseous pollution which can cause pneumoconiosis, bronchitis, and respiratory diseases. Another major impact of coal mining is land degradation, especially of forest areas.

4.5 The consumption of petroleum products in vehicles, industries and domestic cooking activities results in the emission of pollutants in large quantities. Radioactive emissions from nuclear power plants are of grave concern as they can cause serious impact both in terms of spatial and inter-generational concerns. In addition, two key problems are long-term waste disposal and the eventual decommissioning of plants. Due to limited reserves of petroleum, main emphasis needs to be given to non-conventional energy sources such as wind energy, solar energy and ocean energy.

Industrial Emissions

4.6 Air borne emissions emitted from various industries are a cause of major concern. These emissions are of two forms, viz. solid particles (SPM) and gaseous emissions (SO_2, NO_x, CO, etc.). Liquid effluents, generated from certain industries,

containing organic and toxic pollutants are also a cause of concern. Heavily polluting industries were identified which are included under the 17 categories of highly polluting industries for the purpose of monitoring and regulating pollution from them. The Ministry of Environment and Forests has, developed standards for regulating emissions from various industries and emission standards for all the polluting industries including thermal power stations, iron and steel plants, cement plants, fertilizer plants, oil refineries, pulp and paper, petrochemicals, sugar, distilleries and tanneries have been prescribed. The industrial units in India are largely located in the States of Gujarat, Maharashtra, Uttar Pradesh, Bihar, West Bengal and Madhya Pradesh. The highest concentration of sulpher dioxide and oxides of nitrogen is, therefore, often found in cities located in these states. Some other industrial estates in Delhi, Punjab, Rajasthan and Andhra Pradesh are also becoming critical.

Road Transport

4.7 Road vehicles are the second major source of pollution. They emit CO, HCs, NO_X, SO_2, and other toxic substances such as TSP and lead. Diesel engines are much less polluting than petrol engines. Both types of engines are not very efficient converters of fuel energy. However, diesel types with a conversion efficiency of around 30% must be more efficient and use less fuel than petrol types with a 15-20% conversion efficiency. Both types of engines have incomplete combustion of fuel, so the major pollutant is CO, amounting to 91% by weight of all vehicle emissions.The primary pollutants produced in vehicle emissions undergo a series of complex interrelated chemical reactions in the troposphere and lower stratosphere to form secondary products.

4.8 Four factors make pollution from the vehicles more serious in developing countries.

(i) Poor quality of vehicles creating more particulates and burning fuels inefficiently.

(ii) Lower quality of fuel being used leads to far greater quantities of pollutants.

(iii) Concentration of motor vehicles in a few large cities.

(iv) Exposure of a larger percentage of population that lives and moves in the open.

Harmful Effects of Emissions

4.9 The high concentration of particulates in the atmosphere over large urban and industrial areas can produce a number of general effects. Smoke and fumes can increase the atmospheric turbidity and reduce the amount of solar radiation reaching the ground. The overall effect of air pollution upon the biosphere and the built environment can be broadly considered under 3 headings: The effect upon-

(i) buildings and materials,

(ii) soil, vegetation, crops and animal life,

(iii) human beings.

i) **Buildings and Materials**: The fabric of buildings that are surrounded by heavily polluted air for years undergo chemical changes. Gradual erosion takes place and this is only too evident when grimy upper surface is removed. A good example is that of the famous historical monument 'Taj Mahal' at Agra, which, on account of reaction of Sulphur-di-oxide, emitted from neighbouring industries, with the limestone has slowly, started turning yellow. As a result, on Court's directives, a number of measures have been taken to protect our national heritage monument, e.g. closure of neighbouring heavy polluting industries, operation of only non-polluting vehicles like battery buses, tonga, in the vicinity of Taj Mahal.

ii) **Soil, vegetation and Animal Life:** The presence of gaseous pollutants in the air and deposition of particulates on to the soil can effect plants. It can effect

the cattle and animals too as they have been found to develop breathing difficulties and suffer from low yield of milk, lameness and joint stiffness in a polluted environment.

iii) **Human beings:** Smoke and SO_2 cause the general and most widespread effects of air pollution on people. Atmospheric smoke contains potentially carcinogenic organic compounds similar to those that occur in cigarette tobacco smoke. The CO affects the cardiovascular system, NO_xs affect the respiratory system, Ozone causes increased sensitivity to infections, lung diseases, irritation in eyes, nose and throat, etc.

Ambient air quality

4.9 Sulphur dioxide (SO_2)

Annual average concentration of SO_2 levels are within the prescribed National Ambient Air Quality Standards (NAAQS) at almost all the locations as per reports of the Central / States Pollution Control Board.. A decreasing trend has been observed in sulphur dioxide levels in many cities. A decreasing trend has been observed in sulphur dioxide levels in cities like Delhi, Mumbai, Lucknow, Bhopal, etc., during last few years. The decreasing trend in sulphur dioxide levels may be due to various measures taken such as reduction of sulphur in diesel etc. and use of LPG instead of coal as domestic fuel.

4.10 Nitrogen dioxide (NO_2)

Annual average concentration of NO_2 was also within NAAQS at most of the locations. A decreasing trend has also been observed in nitrogen dioxide levels in residential areas of Madurai, Bhopal, etc. during last few year. The decreasing trend in nitrogen dioxide levels may be due to various measures taken for vehicular pollution control such as stricter vehicular emission norms etc. Vehicles are one of the major sources of NO_2 in the country.

4.12 Particulate Matter

Annual average concentrations of RSPM and SPM exceeded the NAAQS in most of the cities. A decreasing trend has also been observed in RSPM levels in cities like Solapur, Lucknow etc, during last few years. Decreasing trend in RSPM levels may be due to various measures taken such as reduction of sulphur in diesel, use of premix 2-T oil dispensor, stringent standard of particulate matter in diesel vehicles etc. One of the major source of high RSPM levels is vehicles. The vehicle population is increasing exponentially in many cities. This is the single major factor for high RSPM levels. The reasons for high particulate matter levels may be vehicles, engine gensets, small scale industries, biomass incineration, boilers and emission from power plants, resuspension of traffic dust, commercial and domestic use of fuels, etc. Lower levels of RSPM and SPM were observed during monsoon months possibly due to wet deposition. Higher levels of RSPM and SPM were observed during winter months possibly due to lower mixing heights and more calm conditions. One of the reason for low levels of pollution in coastal cities like Chennai is that it has excellent ventilation effects due to sea and land breezes which reduces pollution levels.

4.13 Aeas of Concern

a) Air pollution is existing in major cities where vehicles are the major sources.

b) There are 24 critically polluted areas where industrial pollution is predominant. Action plan have been formulated and implemented by the Central/ States Pollution Control Board in these problem areas.

4.14 Non-attainment Cities

CPCB has identified list of polluted cities in which the prescribed National Ambient Air Quality Standards (NAAQS) are violated. Action plans are being formulated and

implemented to control air pollution in non-attainment cities by respective states.

Steps taken to Control Air Pollution

4.15 Measures taken for Control of Air Pollution from Vehicles

A) Vehicular Emission Norms

The vehicle emission norms in India are detailed below.

a) During 1990-91 India for the first time notified mass emission norms for the vehicles at the manufacturing stage as well as for in-use vehicles. These norms were notified under EPA, more vehicles rules and Air Act.

b) b. The emission norms introduced in 1996 have been crucial in controlling vehicular pollution because of stringency of emission norms along with specifications on fuel quality in 1996. for the first time crankcase emission norms and evaporative emission norms were introduced.

c) From April 1995 passenger cars were allowed to register only if they are fitted with a catalytic converter in four metros-Delhi, Mumbai, Kolkata and Chennai. Emission norms for such vehicles were stricter by 50 percent compared to 1996 norms.

d) The testing method for passenger car norms were changed from hot start to cold start, which is also a stringent measure, compared to the earlier one.

e) More stringent norms were introduced for the year 2000. These norms were notified under Motor Vehicle Rules during 1997. Automobile manufacturers have to undergo major modification to meet these norms.

f) As per Hon'ble Supreme Court's directors only private vehicles confirming to at lease EURO-1 norms are being registered. In Mumbai Euro-II norms for private vehicles (4 wheelers) was applicable from 2001. In Mumbai Euro-II norms for private vehicles (4 wheelers) was applicable from 2001. In Kolkata, India-2000 norms (Euro-I) have been made applicable from November 1999.

g) From 1st October 1999, emission norms for agricultural tractors were introduced throughout the country. Bharat Stage-II and Bharat Stage-III emission norms for tractors have been scheduled to be implemented from 2003 and 2005 respectively.

h) The Bharat Stage-II norms for new 4-wheeler private non-commercial vehicle were introduced in Mumbai from January 2001 and in Kolkata and Chennai from July 2001 to 24th October, 2001.

i) Only those taxies are being registered in Delhi, which are meeting Bharat Stage-II norms.

j) Bharat State-II norms for Diesel 4 wheeler transport vehicles were introduced in NCT from 24th October, 2001, in Greater Mumbai, Kolkata & Chennai from 31.10.2001.

k) The expert committee on Auto Oil Policy was constituted during September 2001. The interim report of the committee was submitted to Govt. on 1.1.2000, recommending Bharat Stage-III emission norms for all category of 4-whellers in 7 mega cities from 2005 and rest of the country by 2010. Final report of the committee has been submitted in September 2002 which includes road map for control of vehicular pollution up to 2010.

l) Final report of the inter-Ministerial Task Force constituted by Ministry of Petroleum & Natural Gases at the instance of the Committee of Secretaries to evolve a long term policy for vehicular emission and auto fuel policy has been submitted which recommended introduction of Bharat Stage-II norms for 4-wheelers and next stage emission norms for 2/3 wheelers throughout the country from 2005 and introduction of Bharat stage III norms for four wheelers in 7-mega cities from 2005.

B) Fuel Quality Specifications

For the first time diesel and gasoline fuel quality with respect to environment related parameters has been notified under EPA during April 1996.

C) Lubricants Quality:

Specifications of 2T oil for two stroke engine with respect to smoke has been notified under EPA during September 1998 for implementation from 1.4.1999 throughout the country. Pre-mix 2T oil dispenser has been installed at all petrol filling stations in Delhi so that excessive oil is not being used by the vehicle owners. Sale of loose 2T oil has been banned from December 1998 in Delhi.

D) Alternate Fuels:

a) All Govt. vehicles were required to compulsorily fit CNG kit or catalytic converter by December 1996.

b) Custom duly on CNG kit has been excepted for promotion of CNG vehicles.

c) Emission norms for CNG vehicles have been notified under Motor Vehicles Rule Vide GSR 853 (E) dated 19.11.2001.

d) LPG is now being used as alternate fuel for motor vehicles after making amendments in CMVR. Emission norms for LPG vehicles have been notified vide GSR 284 (E) dated 24.4.2001.

e) Battery driven vehicles have been introduced in few corridors in Delhi

E) Restriction of Grossly polluting Vehicles

a. Registration of new auto rickshaws with conventional engine has been banned from May 1996 from May 1996 and registration of Defense Service and Govt. auctioned vehicles has been banned from April 1994 in Delhi.

b. 20 years old commercial vehicles were phased out from October 1998, 17 year old commercial vehicles has been phased out from November 1998 and 15 year old commercial vehicle from December 1998 in Delhi.

c. Registration on alternation of vehicles by replacing petrol engine with diesel has been banned from 1.4.1998 in Delhi.

F) Traffic Management

a. Restriction has been imposed on goods vehicles during day time from August 1999 in Delhi.

b. Left lane has been made exclusive to buses and other HMV in Delhi.

c. Time clocks have been installed in important red lights to enable the drivers to switch off their vehicles depending on the time left in the time clocks.

d. More fly over and subways have been constructed and T-Junctions have been closed for better traffic flow.

G) Public Transport Systems:

a. Number of buses has been increased to discourage use of individual vehicles by allowing private sectors for operation.

b. Metro Rail Project for Shahdara – Tri Nagar has been commissioned.

H) Technology

a. Fitment of catalytic converter for new petrol passenger cars has been made compulsory from 1.4.1995 in four metros and 45 cities from 1.9.1998.

b. Two wheeler scooters with four stroke engine are being introduced in the market from October 1998.

c. Registration of only rear engine auto rickshaws is being allowed from May 1996 onwards.

d. More four stroke two wheelers are being registered in Delhi.

I) Mass Awareness

a. Messages/articles related to vehicular emissions are disseminated through newsletters, pamphlets, newspapers, magazines, Television, Radio, internet, Workshops and Summer Exhibitions.

b. Display of ambient air quality data through display system near ITO, Newspapers, daily news and internet.

c. NGOs working on vehicular pollution control are being encouraged for mass awareness companies.

Measures Taken for Controlling Air Pollution from Industries

4.16 The measures taken for controlling air pollution from industries are as follows:

a. Emission standards have been notified under the Environment (Protection) Act, 1986 to check pollution

b. Industries have been directed to install necessary pollution control equipment in a time bound manner and legal action has been initiated against the defaulting units.

c. 24 critically polluted areas have been identified. Action Plan have been formulated for restoration of environmental quality in these areas.

d. Environmental guidelines have evolved for siting of industries.

e. Environmental clearance is made compulsory for 29 categories of development projects involving public hearing/NGO participation as an important component of Environmental Impact Assessment process.

f. Environmental audit in the form of environmental statement has been made mandatory for all polluting industries.

g. Preparation of zoning Atlas for setting of industries based on environmental considerations in various districts of the country has been taken up.

h. Power plants (coal based) located beyond 1000 kms from the pit-head are required to use low ash content coal (not exceeding 34%) with effect from 1.6.2002. Power plants located in the sensitive areas are also required to use low ash coal irrespective of their distance from the pit head.

.4.17 Up-coming initiatives

a. Monitoring using automatic analysers is being initiated in 16 polluted cities identified by Hon'ble Supreme Court.

b. Action Plan are being formulated and implemented by the Central/ States Pollution Control Boards in 16 cities identified by Hon'ble Supreme Court as polluted cities.

c. Road map given by Auto fuel policy for vehicular pollution control is being implemented.

d. Corporate Responsibility for Environmental protection (CREP) is being implemented by industries for controlling industrial pollution.

e. Source apportionment studies have been imitated and it is planned to carry out such studies initially in six cities.

f. Monitoring of hazardous air pollutants such as benzene, PAHs etc. has been initiated and it is proposed to carry out there monitoring in other cities also.

Major City Specific Action Plan in Delhi

4.18 a) Vehicular Pollution Control

a. Public transport (buses, auto, taxis) in Delhi has been converted to CNG mode.

b. Sulphur content in diesel has been reduced in a phased manner.

c. The lead content in petrol has been progressively reduced to make it unleaded.

d. Bharat Stage-III norms have been implemented in Delhi.

e. Pre-mix 2T oil dispensers have been installed at all petrol filling stations.

f. Grossly polluting old commercial vehicles have been phased out .

g. Restriction has been made on plying of goods commercial vehicles during day time.

h. Metro rail has been introduced to have a more efficient public transport system.

(b) Industrial Pollution Control

(i) Directions under Section 5 of E(P)A, 1986 have been issued on April 1996 and July 1996 to all the three power plants located in Delhi for completing the following in a time bound manner.

- Comply with emission and liquid effluent standard.
- Submission of action plan for switching over the beneficiated coal with an ash content of not more than 34%.
- Submission of action plan to achieve 20% utilization of fly-ash by Dec. 1997.
- Installation of opacity meter in all units to ensure compliance with the standards.
- Coverage of abandoned ash ponds with top soil.

(ii) All stone crushers have been closed down in Delhi and shifted to Pali in Rajasthan.

(iii) All the hot mix plants have been closed down and shifted to other states.

(iv) As per the directions of Hon'ble Supreme Court, 168 hazardous industries have been closed down in Delhi.

4.19 Major City Specific Action Plan in Mumbai

- Bhatart Stage-III norms have been implemented in Mumbai.

- Unleaded gasoline and low sulphur diesel are being supplied in Mumbai.

- Visits are made to petrol pump as per guidelines prescribed to check/inspect adulteration/malpractices in diesel and petrol under Central Govt. vide order The Motor Spirit and High Diesel (Regulation of Supply and Distribution and Prevention of Malpractices), 1998. Defaulter petrol pumps are legally prosecuted under Essential Commodities Act, 1955.

- Licence and 'End Use Certificate' is made compulsory to persons who store Naptha and Solvents which are also used as adulterants in petrol and diesel.

- Pollution under Control certificate has been made mandatory for every vehicle owner.

- Implementation of rigorous inspection and maintenance measures periodically for all types of vehicles, involving vehicle manufacturers.

- From 15.10.99 'No Pollution Under Certificate- No Petrol' scheme is launched in Mumbai Metropolitan Region (MMR)

- Buses, taxis, autos are on CNG mode.

- Mass awareness Programme are being organized for creating awareness in public.
- The Transport Commissioner's Office has increased vigilance in checking polluting vehicles in Mumbai by increasing number of exhaust monitors for petrol and diesel driven vehicles.

- Auto exhaust checking are also done at entry points to Maharashtra State to check compliance to norms fixed under Central Motor Vehicles Act, 1989.

Major City Specific Action Plan in Ahmedabad

4.20 a) Vehicular Pollution Control

The measures include following

(i) Banning of old buses of more than 15 years old

(ii) Bharat Stage- III norms have been introduced in Ahmedabad.

(iii) Banning of diesel run rickshaw within city limits.

(iv) Diversion of heavy vehicles such as trucks/luxury buses/trailers/tankers/tractors/lorries, etc. aw ay from the city.

(v) Improvement of road condition and making the roads pucca upto the footpath not leaving any uncovered space on either sides of the roads.

(vi) Strict enforcement of smoke test/vehicle test protocol

(vii) Surveillance of vehicles with higher black smoke emission

(viii) Third party audits of PUC Centres including calibration audits

(ix) To launch a drive to stop usage of kerosene in vehicles particularly three wheelers and commercial vehicles.

(b) Industrial Pollution Control

The measures include following

(i) Intensifying monitoring by special vigilance squad under the Air Act, 1981.
(ii) Determining efficacy of APC system & taking remedial action(s) including upgradation of existing Air Pollution Control Measures wherever needed.

(iii) Implementation of CREP Action Plan for highly pollution industries as decided by MOEF.

(iv) Ban on burning of off specification materials/wastes by scrap traders.

4.21 Major City Specific Action plan in Bangalore

- To reduce traffic congestion, 108 roads have been converted to one way, 5 flyovers completed, 3 railway under pass on Quter rind road (ORR) limit completed, 2 railway over bridges completed and 206 Km of road has been asphalted.

- Low sulphur diesel (Green Diesel) and Green Petrol (Sulphur 0.05%)is being supplied in Bangalore ORR area from 1.4.2003.

- Bharat Stage – III norms have been introduced in Bangalore.

- Out of 70,131 (as on 31.07.2003) auto rickshaws registered in Bangalore city, 35000 auto rickshaws are running on LPG

- 6 Auto LPG dispensing stations (ALDS) are operating

- Transport department has approved Bajaj 4 stroke (rear engine) LPG auto rickshaw in Bi- fuel mode

- 5% ethanol blended petrol is being supplied in all districts from 01.10.2003.

- Regular check on adulteration of fuel is being conducted by Food and Civil Supplies Department.

- Goods vehicles carrying construction materials are allowed within ORR only during 10 PM to 6AM for unloading.

- Modernization of Emission testing Centers for issue of "Pollution Under Control" Certificate bearing photograph of the tested vehicle using Web camera by the Transport Department.

- Karnataka State Pollution Control Board to take action to promote use of cleaner fuels used by major industries in Generator sets and boilers.

4.22 Major City Specific Action Plan in Chennai

- Bharat Stage – III norms have been introduced in Chennai.

- Unleaded gasoline and low sulphur diesel are being supplied in Chennai.

- Pollution Under Constrol Certificate has been made mandatory.

- Pre mixed 2T oil dispensers have been installed in most of the retail outlets in Chennai City.

- The Motor Spirit and High Speed Diesel (Regulation & Supply and Distribution and Prevention of malpractices) order 1998 has been republished by the Government of Tamilnadu with the intention to curb malpractices such as adulteration, pilferation etc.,

- LPG supply is being implemented by oil companies, Oil companies have promised to setup 28 Auto ALP dispensing station (ALDS). Presently five ALDS are functioning.

- Mass Rapid Transit System (MRTS) and electric trains are operated by Southern Railways.

- Power plants have been insisted to provide scrubber for the control of emissions

- For all the process emission sources and boiler of higher capacity air pollution control measures such as dust

collectors and wet scrubbers are insisted by Tamil Nadu Pollution Control Board.

- The industrial units are also insisted to switch over to cleaner fuels such as LSHS, LDO etc., to control the SO_2 emission.

Major City Specific Action Plan in Kolkata

4.23 a) Vehicular Pollution Control

i. Bharat State –III norms have been introduced in Kolkata

ii. Supply, Distribution and Selling of Loose 2T oil in Kolkata Metropolitan Area (KMA) has been Banned from 01.10.2001 and Selling of Premixed Fuel oil made Mandatory within KMA from 15.11.2001.

iii. Unleaded Petrol and Low Sulphur Petrol and Diesel made available within Kolkata and Howrah and adjoining agglomeration.

iv. Availability of Cleaner Automotive Fuel like LPG ensured in Kolkata.

v. Introduced Upgraded Auto Emission Testing Centre (PUC Centre)

b) Industrial Pollution Control

i. Stricter Locational Policy for New Industrial Units

ii. Ensuring Regulatory Compliance by Grossly Polluting Industries

iii. Introduction of Stricter Emission Standard for Boilers, Ceramic, Kilns, Foundries and Rolling Mills operating within Kolkata Metropolitan Areas.

iv. Mandatory Use of Cleaner Fuel in Small Boilers, Ceramic Kilns and Rolling Mills operating within Kolkata Metropolitan Area.

v. Discontinuance of Coal Supply to the industries which have been ordered to discontinue the use of coal.

vi. Environmental compliance by Cluster of Small Scale Industries is also ensured

Major City Specific Action Plan in Hyderabad

4.24 The measures include following

- Upgradation of existing Pollution under Control (PUC) centers with computer testing facility
- Unleaded gasoline and low sulphur diesel are being supplied in Hyderabad
- Introduction of mobile task forces to monitor the visibly polluting vehicles.
- Bharat Stage-III norms have been introduced in Hyderabad
- Ban on sale of loose 2T oil. Shall be dispensed through premixed dispensing stations
- Establishment of LPG dispensing stations
- Constitution of task forces to check the adulteration of oil and fuel
- Introduction of multi model transport system
- Urban Greening by Hyderabad Urban Development Authority (HUDA) is being carried out

o Open space plantation by Municipal Corporation of Hyderabad (MCH) is being carried out

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Noise Pollution

4.25 Of late, noise has been recognized as a pollutant which until recently was considered only as a nuisance. The Central Pollution Control Board (CPCB) has notified the ambient noise standards in 1987 under section 20 of the Air (Prevention and Control of Pollution) Act, 1981. The noise standards specify limits as 55dB(A) and 45dB(A) as limits for day and night time, respectively, for residential areas, 75 dB(A) and 70 dB(A) in the day and night time for industrial areas, and 50 dB (A) and 40 dB(A) in the day and night for silence zones. Special campaign for reduction in use of fire crackers in Delhi have resulted in reduced pollution levels during Diwali.

Green House Gases and Their Effects

4.26 The greenhouse effect plays a crucial role in regulating the heat balance of the earth. It allows the incoming short-wave solar radiation to pass through the atmosphere relatively unimpeded; but the long-wave terrestrial radiation emitted by the earth's surface is partially absorbed and then re-emitted by a number of trace gases in the atmosphere. These gases known as Greenhouse Gases (GHGs) are: water vapor, carbon dioxide, methane, nitrous oxide and ozone in the troposphere and in the stratosphere. This natural greenhouse effect warms the lower atmosphere.

4.27 If the atmosphere were transparent to the outgoing long wave radiation emanating from the earth's surface, the equilibrium mean temperature of the earth's surface would be considerably lower and probably below the freezing point of water. Mere incidence of GHG's in the atmosphere, by itself, is no concern. What is more important is that their concentration should stay within reasonable limits so that global ecosystem is not unduly affected. However, by increasing the concentrations of natural GHG's and by adding new GHG's like chloroflouro carbons, the global average and the annual mean surface-air temperature (referred to as the global temperature) can be raised, although the rate at which it will occur is uncertain. This is the enhanced greenhouse effect, which is over and above that occurring due to natural greenhouse concentration. Such a rise in the atmospheric concentration of GHG's has led to an upward trend in global temperature.

4.28 While it is required to follow the general commitments under the Framework Convention on Climate Change, India is not required to adopt any GHG reduction targets. Irrespective of international commitments, it seems prudent to be ready with

- Inventory of sinks and sources of GHG emission
- Predict the cumulative impact of national and international GHG emissions to plan for temperature and sea level rise
- Devise land use plans for the coastal areas likely to be affected
- Devise water and land management strategies especially agricultural sector.

TABLE 4.5.2 : AVERAGE NOISE LEVELS IN VARIOUS METROPOLITAN CITIES

(dB[A])

Sl. No.	Metropolitan Cities	Day/ Night	Industrial Area	Commercial Area	Residential Area	Silence Area
1	2	3	4	5	6	7
1	Kolkata	Day	78	82	79	79
		Night	67	75	65	65
2	Mumbai	Day	76	75	70	66
		Night	65	66	62	52
3	Chennai	Day	71	78	66	63
		Night	66	71	48	49
4	Bangalore	Day	78	76	67	67
		Night	53	57	50	--

Source : TEDDY (TERI Energy Data Directory and Yearbook) 2002/03

The noise pollution has already reached at a high level in most of the metropolitan cities in all the residential, commercial, industrial and silence zones. The increasing noise pollution may be attributed to increase in no. of vehicles, urbanization and industrialization. The increase in noise levels may cause impaired hearing ability.

TABLE 4.5.3 : EFFECTS OF NOISE POLLUTION ON HUMAN HEALTH

A. Noise Hazards	
Stage : I Threat to Survival (a) Communication interference (b) Permanent hearing loss	**Stage : II** Causing Injury (a) Neural -humoral stress response (b) Temporary hearing loss (c) Permanent hearing loss
B. Noise Nuisances	
Stage III Curbing Efficient Performance (a) Mental Stress (b) Task Interference (c) Sleep Interference	**Stage IV** Diluting Comfort and Enjoyment (a) Invasion of Privacy (b) Disruption of Social Interaction (c) Hearing Loss

Source: Sound Pollution, During Festivals in West Bengal a growing menace
West Bengal Pollution Control Board

TABLE 4.1.1 : AVERAGE GASEOUS COMPOSITION OF DRY AIR IN THE TROPOSPHERE

Sl. No.	Gas	Percent by Volume	Parts Per Million (ppm)
1	2	3	4
1	Nitrogen	78.080000	780840.00
2	Oxygen	20.950000	209500.00
3	Argon	0.930000	9300.00
4	Carbon dioxide	0.034500	345.00
5	Neon	0.001800	18.00
6	Helium	0.000520	5.20
7	Methane	0.000140	1.40
8	Kryton	0.000100	1.00
9	Hydrogen	0.000050	0.50
10	Xenon	0.000009	0.09
11	Ozone	Variable	Variable

Source : Ministry of Environment & Forests

TABLE 4.1.2 : NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

Sl. No.	Pollutant	Sulphur Dioxide (SO_2)		Oxides of Nitrogen (NO_2)		Suspended Particulate Matter (SPM)		Respirable Particulate Matter (RPM) (size less than 10 µm)		Lead		Carbon Monoxide (CO)		Ammonia #	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**Time Weighted Average**	Annual * Average ($\mu g/m^3$)	24 hours** Average ($\mu g/m^3$)	Annual * Average ($\mu g/m^3$)	24 hours** Average ($\mu g/m^3$)	Annual * Average ($\mu g/m^3$)	24 hours** Average ($\mu g/m^3$)	Annual * Average ($\mu g/m^3$)	24 hours** Average ($\mu g/m^3$)	Annual * Average ($\mu g/m^3$)	24 hours** Average ($\mu g/m^3$)	8 hours** Average ($\mu g/m^3$)	1 hours Average ($\mu g/m^3$)	Annual * Average (mg/m^3)	24 hours** Average (mg/m^3)
2	**Industrial Area**	80	120	80	120	360	500	120	150	1.00	1.50	5.00	10.00	0.10	0.40
3	**Residential, Rural and Other Area**	60	80	60	80	140	200	60	100	0.75	1.00	2.00	4.00	0.10	0.40
4	**Sensitive Area**	15	30	15	30	70	100	50	75	0.50	0.75	1.00	2.00	0.10	0.40
5	**Methods of Measurement**	1. Improved West & Gaeke Method 2. Ultraviolet Fluorescence		1. Jacob & Hochheiser Modified (Na- arsenic) Method 2. Gas phase Chemiluminiscence		High volume sampling (Average flow rate not less than 1.1 m^3/minute)		Respirable particulate matter sampier		AAS Method after sampling using EPM 2000 or equivalent filter paper		Non- Dispresive infra-red Spectroscopy		-------	

Source : Central Pollution Control Board

* : Annual Arithmatic Mean of minimum 104 measurements in a year taken 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 time, it may exceed but not on two consecutive days.

: Included vide notification SO. 955 (E), Air (Prevention & Control of Pollution) Act, 1981 dated October 14, 1998.

µm : Micometer µg : Microgram

Note :

1. National Ambient Air Quality Standards : The level of air quality necessary with an adequate margin of safety necessary to protect the public health, vegetation and property
2. Whenever and wherever two consecutive values exceed the limits specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.
3. The standards for H_2s and CS_2 have been notified seqerately vide GSR No. 7, dated December 22, 1998 under Rayon Industry. continuous monitoring and further investigations.

The primary aim of the ambient air quality standards is to provide a basis for protecting public health from adverse effects of air pollution and for eliminating or reducing to a minimum, those contaminants of air that are known or likely to be hazardous to human being, animals, vegetation and historical monuments.

TABLE 4.1.3 : AMBIENT AIR QUALITY STATUS IN SOME CITIES/TOWNS DURING 2003

Pollution Level	Annual Mean Concentration Range (µg/m^3) (microgram per cubic meter)					
	Industrial			Residential		
	SO_2 & NO_2	SPM	RSPM	SO_2 & NO_2	SPM	RSPM
Low (L)	0-40	0-180	0-60	0-30	0-70	0-30
Moderate (M)	40-80	180-360	60-120	30-60	70-140	30-60
High (H)	80-120	360-540	120-180	60-90	140-210	60-90
Critical (C)	>120	>540	>180	>90	>210	>90

Sl. No.	State/City	Sulphur Dioxide		Nitrogen Dioxide		RSPM		SPM	
	Area class	I	R	I	R	I	R	I	R
1	2	3	4	5	6	7	8	9	10
1	**Andhra Pradesh**								
	Hyderabad	L	L	L	M	M	M	M	H
	Vishakhapatnam	L	L	L	L	M	C	M	H
2	**Assam**								
	Guwahati	--	L	-	L	-	C	-	H
3	**Bihar**								
	Patna	--	L	-	L	-	H	-	H
4	**Chhattisgarh**								
	Bhilai	L	L	L	L	H	C	M	C
	Korba	--	L	-	L	-	C	-	C
	Raipur	L	L	L	M	C	C	M	C
5	**Chandigarh**								
	Chandigarh	L	L	L	L	H	C	M	H
6	**Delhi**								
	Delhi	L	L	M	M	C	C	H	C
7	**Gujarat**								
	Ahmedabad	L	L	L	L	C	C	M	C
	Ankaleshwar	L	L	L	L	H	C	L	H
	Jamnagar	-	L	-	L	-	C	-	C
	Rajkot	L	-	L	-	C	-	M	-
	Surat	L	L	L	L	H	C	L	H
	Vadodara	L	L	L	L	C	C	M	C
	Vapi	L	L	L	M	H	C	L	H
8	**Goa**								
	Ponda	--	L	-	L	-	-	-	M
9	**Himachal Pradesh**								
	Damtal	-	L	-	L	-	-	-	C
	Parwanoo	L	L	L	L	-	H	M	H
	Paonta Sahib	L	L	L	L	-	-	H	C
	Shimla	--	L	-	L	-	L	-	L
10	**Haryana**								
	Faridabad	L	L	L	L	-	-	H	C
11	**Jharkhand**								
	Dhanbad	-	L	-	H	-	-	-	C
	Jharia	L	-	M	-	-	-	M	-
	Sindri	L	-	M	-	-	-	M	-
	Jamshedpur	M	-	M	-	-	-	M	-
12	**Karnataka**								
	Bangalore	L	L	L	M	L	H	L	H
	Mysore	L	L	L	L	L	M	L	M
13	**Kerala**								
	Kochi	L	L	L	L	M	H	L	M
	Kottayam	L	L	L	L	L	H	-	-
	Kozhikode	L	L	L	L	L	M	L	M
	Thiruvananthapuram	L	L	L	L	H	C	-	-
	Palakad	L	-	L	-	L	-	M	-
14	**Maharashtra**								
	Mumbai	L	L	L	L	M	H	M	C
	Chandrapur	L	L	L	M	M	H	M	H
	Nagpur	L	L	L	L	M	H	M	C
	Nasik	L	L	L	L	M	C	L	C
	Pune	L	M	L	H	M	C	M	C
	Solapur	L	L	M	M	H	C	H	C
	Thane	L	L	L	L	M	M	-	-

TABLE 4.1.3 : AMBIENT AIR QUALITY STATUS IN SOME CITIES/TOWNS DURING 2003-- Concld.

Sl. No.	State/City	Sulphur Dioxide		Nitrogen Dioxide		RSPM		SPM	
	Area class	I	R	I	R	I	R	I	R
1	2	3	4	5	6	7	8	9	10
15	**Madhya Pradesh**								
	Bhopal	L	L	L	L	M	H	-	-
	Indore	-	L	-	M	H	C	-	-
	Jabalpur	-	L	-	L	-	H	-	-
	Nagda	L	L	L	M	H	C	-	-
	Satna	L	L	L	L	C	C	-	-
16	**Meghalaya**								
	Shillong	-	L	-	L	-	H	-	M
17	**Nagaland**								
	Dimapur	-	-	-	-	-	H	-	M
18	**Orissa**								
	Angul	L	L	L	L	M	M	L	M
	Rourkela	-	L	-	L	-	H	-	H
	Talcher	L	-	L	-	M	-	L	-
	Rayagada	L	L	L	L	M	M	L	M
19	**Pondicherry**								
	Pondicherry	L	L	L	L	M	M	L	M
20	**Punjab**								
	Gobindgarh	L	-	L	-	C	-	C	-
	Jalandhar	-	L	-	L	C	C	-	-
	Ludhiana	L	L	L	M	C	C	-	-
21	**Rajasthan**								
	Alwar	L	L	L	M	H	C	M	C
	Jaipur	L	L	L	M	H	C	H	C
	Kota	L	L	L	L	M	C	M	C
	Udaipur	L	L	M	M	M	H	H	C
	Jodhpur	L	L	L	L	H	C	M	C
22	**Tamil Nadu**								
	Chennai	L	L	L	L	M	H	M	H
	Coimbatore	L	L	M	M	L	M	L	M
	Madurai	L	L	L	L	M	C	L	C
	Salem	-	L	-	M	-	M	-	L
	Tuticorin	L	L	L	L	L	M	L	L
23	**Uttaranchal**								
	Dehradun	-	L	-	L	-	-	-	C
24	**Uttar Pradesh**								
	Agra	L	L	L	L	-	-	H	C
	Anpara	L	-	L	-	H	-	M	-
	Gajroula	L	-	L	-	M	-	H	-
	Kanpur	L	L	L	L	C	C	H	C
	Lucknow	L	L	L	L	C	C	H	C
	Noida	-	-	-	-	C	-	H	-
	Varanasi	-	L	-	L	-	C	-	C
25	**West Bengal**								
	Haldia	L	-	L	-	M	-	L	-
	Howrah	L	L	H	M	H	H	M	H
	Kolkata	L	L	H	H	H	C	M	C

Source :Central Pollution Control Board

I : Industrial Area R : Residential Area -- : Data not available/Inadequate

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
Urban		***Residential***					
Andhra Pradesh							
	i	Tarnka, Hyderabad	N.A.	138	119	139	148
	ii	ABIDS, Hyderabad	N.A.	170	152	155	171
	iii	Police Banacks , Hyderabad	..	174	..	201	-
	iv	Banjara Hills, Hydrabad/Jublee Hills	127	107	131	146	126
	v	Panchayat Raj Office, Vishakhapatnam	85	107	171	180	-
	vi	Civil Defence Bldg., Vishakhapatnam	137	..	202	-	-
	vii	Charminar	-	-	-	-	266
	viii	Police Barracks	-	-	-	-	186
	ix	Mindi	-	-	-	-	195
	x	Seerhammadhara	-	-	-	-	162
Assam							
	i	Head Office, Bamuninaidam, Guwahati	140	172	193	174	176
	ii	Paltan Bazar,Guwahati	-	-	-	229	221
Bihar							
	i	Beltron Bhavan, Shastri Nagar, Patna	151	185	169	258	-
	ii	Gandhi Maidan, Test Centre, Patna	-	536	-	147	-
Chhattisgarh							
	i	Visak Hostel, Sec. 4, Bhillai	95	155	223	231	234
	ii	Regional Office, Bhillai	76	137	167	179	193
	iii	Gitanjali Bhavan, Old Bus Stand, Korba	104	116	195	243	209
	iv	Pragati Nagar, NTPC Colony, Korba	65	80	136	134	139
	v	New HIG-9, Hirapur, Raipur	154	190	308	366	402
	vii	ITI Rampur	-	-	-	-	-
Delhi							
	i	Nizamuddin, Delhi	279	261	329	315	-
	ii	Ashok Vihar, Delhi	306	273	425	356	-
	iii	Janakpuri, Delhi	242	278	442	291	-
	iv	Siri Fort, Delhi	225	324	378	281	-
	v	N. Y. School, Sarojini Nagar, Delhi	..	398	421	352	356
	vi	ESI Dispensary, Najafgarh Road, Delhi	..	625	-	-	-
	vii	Town Hall, Delhi	N.A.	561	534	478	508
Goa							
	i	Head Office, Ponda, Goa	102	114	150	-	-
	ii	Infront of Old GSPCB, Patto, Panaji	-	-	-	129	131
Gujarat							
	i	L D Engineering College/A & L	N.A.	320	292	180	176
	ii	R. C. High School, Ahemdabad	N.A.	344	301		
	iii	R.O.G.P.C.B. Race Course, Vadodra	..	..	N.A.	180	170
	iv	Citi Dondia Bazar, Vadodra	..	..	..	278	269
	v	SVR Engg. Collge, Surat	..	..	N.A	154	135
	vi	Air India Building, Surat	..	..	N.A	195	167
	vii	Vapi Nagar Palika, Vapi	..	..	..	166	163
	viii	Cadilla Bridge, Narol	-	-	-	278	286
	ix	Durga Traders	-	-	-	164	151
	x	Fisheries Office	-	-	-	319	245

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential					
Haryana							
	i	Near SBI, Chawla Cottege	..	338	-	-	-
	ii	Kothi No. 266, Sec. 9, Faridabad	N.A.	..	474	-	-
	iii	Regional Office, Haryana State Pollution	-	-	-	408	335
Himachal							
	i	Bus Stand, Winterfield, Shimla	27	N.A.	N.A.	69	64
	ii	Paonta Sahib	..	N.A.	..	272	276
	iii	Regional Office, Damtal	-	-	-	145	147
	iv	Old Road, Damtal	-	-	-	274	214
	v	R.O. HPSEP, PCB, Sector-4 Parwanoo	-	-	-	145	129
Jharkhand							
	i	Regional Office, Dhanbad	274	270	N.A.	275	-
	ii	Sakchi Water Tower, Jamshedpur	239	284	261	239	-
Karnataka							
	i	Anand Rao Circle, Bangalore	218	208	194	198	173
	ii	K.R. Circle, Visvesvaraya Bldg. Mysore	-	-	-	98	99
	iii	Rani Chennamma Circle	-	-	-	-	420
Kerala							
	i	M. G. Road, Cochin	..	..	..		
	ii	CSIR Complex, (Ernakulam North) Cochin	121	144	117	122	-
	iii	Town Hall, Cochin	..	232	..	-	-
	iv	SMV School, Thiruvananthpuram	19	N.A.	N.A.	138	-
	v	Pattor R. O. Thiruvananthpuram	..	N.A.	..	-	-
	vi	Kottayam, Kottayam	N.A.	N.A.	N.A.	NA	-
	vii	Palayam, Kozhikode	..	78	..	109	89
	viii	Cochin Port Trust Circle (M. G. Road),	230	..	103	-	-
	ix	S.M.V. Raja School, Thiruvananthpuram	16	..	N.A.	138	134
	x	Palmood, Thiruvananthpuram	13	..	N.A.		-
	xi	Mavoor, Kozhilode	47	..	95		-
	xii	PHED, Cochin	..	..	95		-
	xiii	Sasthamangalam,Thiruvananthpuram				NA	86
		Ernakulam South				122	100
Madhya Pradesh							
	i	Hamida Road, Bhopal	172	N.A.	N.A.	232	227
	ii	T. T. Nagar, Bhopal	64	N.A.	N.A.	44	66
	iii	Kothari Market, Indore	292	N.A.	N.A.	453	-
	iv	Telephone Nagar, Indore	205	N.A.	N.A.	302	-
	v	Vijay Nagar, Jabalpur	101	N.A.	N.A.	204	179
	vi	Grasim Kalayan Kendra Nagda	91	N.A.	N.A.	156	166
	vii	Vipra Niwas Pushpraj Colony, (Civil Lines)Satna	127	N.A.	N.A.	-	-
	viii	RO, Madhya Pradesh, PCB, Dharwari Gali No.5, Satna	-	-	-	195	234
	viii	BCI Labour Club, Nagda	88	..	N.A.	160	166

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
Maharashtra							
	i	Vinoba Bhawan, Bandra/worli, Mumbai	N.A.	238	221	219	247
	ii	Kalbadevi, Mumbai	N.A.	234	228	225	256
	iii	Kopri Ward Office, Thane (E), Mumbai	N.A.	N.A	N.A.	NA	-
	iv	Sahu Market Naupada, Thane, Mumbai	N.A.	N.A	N.A.	NA	-
	v	Maskasath, Nagpur	N.A.	197	283	260	-
	vi	NEERI, Nagpur	N.A.	129	135	139	150
	vii	Institute of Engeeres , Nagpur	..	271	..	190	211
	viii	Govt. Poly College, Sadar, Nagpur	..	281	..	181	195
	ix	Administrative Bldg., Chanderpur	144	161	N.A.	-	212
	x	Sub Regional Office, B. Nagar,	..	173	..	203	178
	xi	VIP Ind. Area, MIDC Satpura	..	181	..	-	-
	xii	RTO Colony Tank, Nasik	..	199	..	167	192
	xiii	Nashik Muni. Council Bldg.	..	236	..	214	197
	xiv	Mandai/Swargate, Pune	..	224	..	465	342
	xv	Nagpur Corporation Building, Maskasath,					264
	xvi	Nalstop, Pune				521	337
	xvii	Poud Phata (Kothrud)/Nal Stop	..	197	..	-	-
	xviii	Chitalae Clinic, Solapur	399	411	412	398	364
	xix	WIT Campus, Solapur	..	..	..	398	
Meghalaya							
	i	Board Office Permises, Motinagar	47	51	53	44	48
	ii	State Tuberculosis Hospital	N.A.	95	113	93	92
Nagaland							
	i	Bank Colony	-	-	-	85	125
	ii	Hong Kong Market	-	-	-	122	-
Orissa							
	i	Nalco, Angul	99	127	124	110	113
	ii	IDL Police Outpost	-	-	-	180	188
	iii	Regional Office, Rourkela	-	-	-	150	165
	iv	Municipality Office, Rourkela	135	189	4.9	10	-
	v	Rayagada, Raourkela	98	123	116	89	-
	vi	Regional Office, Angul	161	..	207		-
	vii	Regional Office	-	-	-	-	100
	viii	SOPCB Building, Bhubaneshwar	-	-	-	-	107
Punjab							
	i	Office of PPCB	..	N.A.	..	-	-
	ii	Regional Office, Jalandhar	289	209	N.A.	303	-
	iii	Municipal Council Tubewell No. 27	..	236	..	397	-
	iv	Clock Tower, Ludhiana	449	..	N.A.	-	-
	v	Beat all Sports, Jalandhar	324	..	329	-	-
	vi	PPCB Office Building, Viishwakarma chowk, Lud.Ludhiana	-	-	-	NA	-
Rajasthan							
	i	Town Hall, Udaipur	..	169	..	260	239
	ii	Municipal Corporation Bldg., Kota	..	259	N.A.	283	256
	iii	Salnor Glass, Kota	..	173	..	-	-

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential					
	iv	Regional Office, Jodhpur	..	450	..	-	-
	v	Sojati Gate, Jodhpur	..	474	..	371	336
	vi	RSPCB Office, Jodhpur	..	199	..	206	157
	vii	Ajmeri Gate, Jaipur	..	269	..	270	265
	viii	Malviya Nagar, Jaipur	..	277	..	312	-
	ix	Tripolia Bazar, Jaipur	N.A.	319	331	370	-
	x	Regional Office, Alwar	252	292	420	410	332
	xi	RIICO Pump House, Alwar	..	..	..	-	-
	xii	PHED, Gandhi Nagar, Jaipur	N.A.	..	296	-	-
	xiii	Barkhera, Kota, ***(Sensitive)***	..	..	..	-	-
	xiv	Veternary Hospital, Kota	N.A.	..	320	-	-
	xv	D.I.C. Udaipur	..	..	..	-	-
	xvi	Regional Office, Udaipur	..	..	..	-	-
	xvii	Maha Mandir Police Thane, Jodhpur	-	-	-	304	-
	xviii	Samcore Glass, Kota	-	-	-	233	-
	xix	Ambamata, Udaipur	-	-	-	223	-
	xx	Amabmata	-	-	-	-	245
	xxi	Maha Mandir Police Thana	-	-	-	-	310
	xxii	Samcore Glass	-	-	-	-	237
Tamil Nadu							
	i	Distt. Collector Office, Coimbatore	N.A.	46	98	98	147
	ii	Poniarajapuram,Coimbatore	-	-	-	97	124
	iii	Sai baba Colony, Coimbtore	..	37	-	-	-
	iv	Madras Medical College, Chennai	N.A.	102	87	149	103
	v	Zoological Survey of India	..	86	..	-	-
	vi	MK Evening College Highway Bldg. ,	..	75	..	138	110
	vii	NEERI CSIR Campus				95	89
	viii	Kunnathur Chatram (E), Madurai	..	241	..	393	397
	ix	Sowdeswari College, Salem	..	39	..	61	70
	x	AVM Building, Tutkorin	..	..	60	43	65
	xi	Fishries College, Tuticorin	N.A.	..	53	35	56
	xii	Chemical Research Centre, Tuticorin	..	..	..	-	-
	xiii	Santhome, Chennai	N.A.	..	88	-	-
Uttaranchal							
	i	Clock Tower, Dehradun	255	308	405	371	296
Uttar Pradesh							
	i	Tajmahal, Agra	..	334	..	-	
	ii	Regional Office, Bodala, Agra	..	476	..	440	363
	iii	Indira Chowk, Gajroula	166	275	237	-	184
	iv	Deputy Ka Porao, Kanpur	347	413	459	394	428
	v	Agriculture University, Kanpur	N.A.	273	290	-	-
	vi	Head Post Office, Kanpur	..	406	..	-	-
	vii	F & Training Centre, Kanpur	349	403	436	410	-
	viii	Kapoor Hotel, Hozratganj, Lucknow	N.A.	264	347	337	342

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
	ix	Mahanagar, Lucknow	..	280	..	340	339
	x	R. O. Jawahar Nagar, Varanasi	..	416	399	302	379
	xi	Kotwali, Kanpur	N.A.	..	410	-	-
	xii	Jaipur House, Agra	349	..	343	-	-
	xiii	Aminabad	-	-	-	-	406
	xiv	Aliganj Garden	-	-	-	-	477
	xv	Kidwai Nagar	-	-	-	-	413
	xvi	Dabauli	-	-	-	-	398
	xvii	RO Noida	-	-	-	-	412
	xviii	Tilak Nagar	-	-	-	-	420
	xix	Raza ka Tal	-	-	-	-	332
West Bengal							
	i	Bator, Howrah	115	168	158	145	-
	ii	Lal Bazar, Dalhousie, Kolkata	N.A.	253	260	244	265
	iii	Kasba, Kolkata	..	214	..	188	218
	iv	Calcutta CESE. Mandevitle Garden	N.A.	..	190	-	-
		PCBL Club	-	-	-	-	129
Chandigarh							
	i	Sector 17 C	N.A.	196	..	208	224
	ii	Punjab Engg. College	-	-	-	-	165
Pondicherry							
	i	Housing Boadd's Office	108	92	91	-	-
	ii	Agriculture Department	..	57	..	-	-
	iii	FRENCH, Institute	N.A.	..	80	-	-
	iv	DSTE Office	-	-	-	80	78
	v	Chamber of Commerce	-	-	-	59	59
Industrial		***Industrial***					
Andhra Pradesh							
	i	C.I.T.D., Balanagar, Hyderabad	249	221	242	240	247
	ii	Nacharam, Hyderabad	N.A.	77	97	108	111
	iii	UPPAL, Hyderabad	149	180	222	196	199
	iv	Industrial Estate, Marripalem,	77	106	172	184	185
Chhattisgarh							
	i	Laghu Udyog Nigam, Bhillai	132	246	281	261	264
	ii	MPCB Sub Station, Birgaon, Raipur	148	..	337	357	
	iii	M/S Wool Worth (I) Ltd	-	-	-	-	416
Delhi							
	i	Shahzada Bagh, Delhi	342	378	468	354	-
	ii	Shahadra, Delhi	282	291	415	343	-
	iii	ESI Disp. Najafgarh Road	N.A.	..	N.A.	-	-
	iv	Maya Puri Industrial Area	-	-	-	425	484
Goa							
	i	Vasco					
	ii	Fuse call Office, Ele. Dept.Vasco	117	196	166	146	156
	iii	Mormugao Port Trust	-	-	-	-	176

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial					
Gujarat							
	i	Shardaben Hospital, Ahemdabad	N.A.	366	344	318	343
	ii	Rallis India Ltd., Ankleshwar	N.A.	..	N.A.	167	167
	iii	C. E. T. P. Nandseri, Vadodara	..	..	..	335	-
	iv	B. R. C. Udhna, Surat	N.A.	..	..	167	170
	v	G. E. B., GIDC, Surat	..	..	..	176	182
	vi	Naroda, G.I.D.C, Ahmedabad	-	-	-	311	-
Haryana							
	i	Shivalic Global, Industries, Faridabad	..	327	..	402	400
	ii	Ballarpur Industries, Yamuna Nagar	220	272	377	291	181
	iii	Escorts Medical Centre, Faridabad	N.A.	..	465	-	-
Himachal							
	i	Gondhpur Industrial Area, Paonta Sahib	162	N.A.	293	382	386
	ii	Asstt. Commissioner Office Building,	..	N.A.	..	246	256
	iii	Tekka Bench Bridge, Shimla	..	N.A.	..	46	-
	iv	V. Farm Indl. Area, Sec. 1, Parwanoo	243	..	211	-	-
	v	P. S. Industrial Area, Paonta Sahib	148	..	217	-	-
Jharkhand							
	i	M.A.D.A. Jharia	373	357	N.A.	284	-
	ii	BIT Sindri	204	220	N.A.	244	-
	iii	Burmamines Water Tower, Jamshedpur	218	241	227	233	-
	iv	Near P-Station (FCI Main Hospital) Sindri	..	..	N.A.	-	-
	v	Bistupur Vehicle Testinh Centre	-	-	-	289	405
	vi	Golmuri Vehicle Testing Centre	-	-	-	286	434
	vii	Sakchi Water Tower, Jamshedpur	-	-	-	239	-
Karnataka							
	i	K. R. Circle, Visw Bldg, Mysore	107	100	107	-	-
	ii	K. I. A. D. B. Bldg, Mysore	91	101	101	-	-
	iii	Graphite India, Bangalore	105	121	116	130	154
	iv	AMCO Batteries, Bangalore	135	116	136	162	166
	v	KHB Industrial Area	-	-	-	-	146
	vi	Peenya Rao Circle	-	-	-	-	150
	vii	Hebbal Industrial Area, Mysore	-	-	-	95	92
	viii	Lakkamanahalli Industrial Area	-	-	-	-	83
Kerala							
	i	M/S Carhurandum Universal Ltd.	..	140	-	207	191
	ii	Eloor, Cochin	113	192	230	126	122
	iii	Irumpanem, Cochin	81	197	130	107	113
	iv	FACT/Udyog Mandal	..	223	..	-	-
	v	Hi-Tech Chakkai, Thiruvananthapuram	..	N.A.	..	158	134
	vi	Chingavanam, Kottayam	N.A.	N.A.	N.A.	-	-
	vii	Mavoor, Nallalam, Kozhikode	..	66	-	105	75
	viii	CRL Guest, House, Cochin	N.A.	..	116	-	-
	ix	Velli, Thiruvanathapuram	..	..	..	-	-
	x	Vadavathor	-	-	-	57	-

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial					
Madhya Pradesh							
	i	Govindpura, Akun, Bhopal	160	N.A.	N.A.	169	191
	ii	M. P. Laghu Udyog, Indore	..	N.A.	N.A.	437	
	iii	Chem. Div. Labour Club, Nagda	64	N.A.	N.A.	185	175
	iv	BCI Labour Club, Nagda	..	N.A.	..		
	v	Industrial Area SD (office), Satna	219	N.A.	N.A.	253	344
	vi	Association of I. Pologround, Indore	354	..	..	-	-
Maharashtra							
	i	Parel, Mumbai	N.A.	220	226	227	237
	ii	Hingna Road, Nagpur	N.A.	133	233	209	239
	iii	MIDC Office, Hingma Rd. Nagpur	N.A.	240	N.A.	219	
	iv	M. I. D. C. Chanderpur	..	173	..	305	265
	v	Bhosari, Pune	..	82	..	199	149
	vi	WIT, Campus, Solapur	390	403	407	396	356
	vii	MIDC Phase-II, Dombivali	..	..	..		207
	viii	VIP Ind. Area, MIDC satpura, Nasik	..	..	..	170	177
Orissa							
	i	Industrial Estate, Angul	..	187	..	164	203
	ii	IDL-Post (Sonaparbat), Rourkela	..	182	..	-	-
	iii	Jaykaypur, Rourkela	122	151	138	119	132
	iv	TTPS Colony, Talcher	145	179	184	154	163
	v	NALCO, Angul	..	..	..	-	-
	vi	Municipality Office, Rourkela	153	..	188	-	-
Punjab							
	i	M. Steel, Gobindgarh	..	310	..	-	-
	ii	Chaudhary Diwan Chand Steel	..	304	..	-	-
	iii	Milk Plant, Ludhiana	203	N.A.	N.A.	NA	-
	iv	Rita Sewing Machines, Ludhiana	354	N.A.	N.A.	NA	-
	v	M/S Punjab Maltee, Jalandhar	..	235	..	392	-
	vi	M/S Hargobing Steel Industries/Raj Steel	-	-	-	317	-
	vii	M/S Modi Oils GT Road, Mandi	-	-	-	308	-
	viii	Jalandhar (Inderson's Leather Pvt. Ltd.)	328	..	N.A.	-	-
	ix	Focal Point, Jalandhar	-	-	-	NA	-
Rajasthan							
	i	RIICO Pump House, Alwar	N.A.	192	243	324	197
	ii	Gaurav Solvex, Alwar	..	537	..	340	203
	iii	Jothwara Indl. Area, Jaipur	N.A.	253	301	283	-
	iv	VKIA, Jaipur	..	335	..	403	312
	v	Basni Indl. Area, Jodhpur	..	474	..	346	-
	vi	R. O. Anantpura, Kota	212	204	303	304	279
	vii	D. I. C. Udaipur	..	255	..	-	-
	viii	Regional Office, Udaipur	..	253	..	384	386
	ix	RICCO, Chittor	..	..	..	-	341
Tamil Nadu							
	i	SIDCO Office, Coimbtore	N.A.	93	213	158	167
	ii	Kalhivakkam, Chennai	80	95	170	164	134

Table 4.1.4(a) : Annual Mean Concentrations of Suspended Particulate Matter (< 10 µm) (SPM10) in Ambient Air-Cont.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial					
	iii	Govt. Higher Secondary School, Chennai	..	114	..	222	-
	iv	Thiruvottiyur Municipal Office, Chennai	76	95	154	137	163
	v	Fenner (I)nLtd., Madurai	..	86	..	158	144
	vi	Municipal K. Mandapa, Chennai	N.A.	..	85	-	-
	vii	Manali Police Station, Chennai	101	..	215	-	192
	viii	Chemical Research Centre, Tuticorin	..	..	51	-	-
		Thiruvottiyur, Chennai	-	-	-	160	136
		Raja Agencies	-	-	-	391	55
Uttaranchal							
	i	Raipur Road, Dehradun	235	283	336	371	-
Uttar Pradesh							
	i	Nunhai, Agra	..	377	..	479	431
	ii	Anpara Colony, Anpara	208	264	313	289	272
	iii	Ranusagar Colony, Anpara	157	186	296	286	261
	iv	Indira Chowk, JP Nagar,Gajroula	289	426	408	228	366
	v	Raunag Auto Ltd., Gajroula	-	-	-	395	-
	vi	M/S Associated Chem. Pvt., Kanpur	..	441	..	439	-
	vii	Lajpat Nagar, Kanpur	N.A.	471	414	-	-
	viii	Talkatora, Luknow	N.A.	239	Inade	423	408
	ix	Bulandshahar Road Indl. Area,	N.A.	306	N.A.	-	374
	x	Shahibabad Industrial Area, Ghaziabad	..	359	..	-	385
	xii	S. P. Engg. Works, Fazalganj, Kanpur	354	-	507	439	-
	xii	Fazalganj	-	-	-		438
	xiii	Jajmau	-	-	-		414
	xiv	M/S GEE PEE Electroplating and Engg. Work Noida	-	-	-	431	379
	xv	Center fof Development of Glass Industry	-	-	-	-	474
West Bengal							
	i	Howrah Municipal Corp., Howrah	144	236	255	249	-
	ii	Bandhaghat, Howrah	124	188	182	152	-
	iii	Kossipore Police Station, Kolkata	N.A.	285	319	320	315
	iv	WBIIDC, Haldia	66	62	111	105	132
	v	Super Market, Haldia	147	101	146	134	155
Chandigarh							
	i	Modern Food Indl. Area	Inade	298	390	341	369
Pondicherry							
	i	PIDC I. Estate, Metropolyam	N.A.	97	83	90	91

Source: Central Pollution Control Board

BDL :Below Detection Limit (<4µg/m^3 for SO_2, <9 µg/m3 for NO_2 and 5< µg/m3 for SPM

NA :Not available

* : Data up to March 2005.

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air

(µg/m³)

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
Urban		**Residential Station**					
Andhra Pradesh	i	Tarnka, Hyderabad	12.80	14.30	19.80	19.5	29
	ii	ABIDS, Hyderabad	27.40	31.60	39.30	34.3	46
	iii	Police Banacks , Hyderabad	..	28.20	..	29.4	32
	iv	Banjara Hills, Hydrabad/Jublee Hills	23.20	30.70	12.60	13.4	17
	v	Panchayat Raj Office, Vishakhapatnam	15.40	19.40	24.20	28.5	-
	vi	Civil Defence Bldg., Vishakhapatnam	27.50	..	24.30	-	-
	vii	Charminar	-	-	-	-	25
	viii	Police Barracks	-	-	-	-	32
	ix	Mindi	-	-	-	-	33
	x	Seerhammadhara	-	-	-	-	32
Assam							
	i	Head Office, Bamuninaidam, Guwahati	42.30	19.40	18.70	20.2	13.0
	ii	Paltan Bazar,Guwahati	-	-	-	25.1	16
Bihar							
	i	Beltron Bhavan, Shastri Nagar, Patna	11.80	10.90	10.50	38.9	-
	ii	Gandhi Maidan, Test Centre, Patna	..	19.80	..	19.2	-
Chhattisgarh							
	i	Visak Hostel, Sec. 4, Bhillai	31.70	31.70	28.50	26.6	26
	ii	5/32, Bungalow Office Building, Bhillai	30.50	28.10	22.40	20.8	19
	iii	Gitanjali Bhavan, Old Bus Stand, Korba	19.30	21.40	N.A.	-	-
	iv	Pragati Nagar, NTPC Colony, Korba	18.50	20.20	N.A.	18.9	19
	v	New HIG-9, Hirapur, Raipur	37.40	39.20	35.60	37.8	37
	vi	M/S Wool Worth India Pvt. Ltd, Urla, Raipur	..	39.60	-	38.7	-
	vii	ITI Rampur	-	-	-		21
	viii	HIG 21,22 MP Nagar	-	-	-	20.3	21
Delhi							
	i	Nizamuddin, Delhi	33.60	35.70	39.30	43.3	-
	ii	Ashok Vihar, Delhi	27.00	19.50	26.00	32.2	-
	iii	Janakpuri, Delhi	32.50	37.30	39.50	44.2	-
	iv	Siri Fort, Delhi	24.60	22.50	27.30	31.8	-
	v	N. Y. School, Sarojini Nagar, Delhi	52.60	52.50	42.60	46.4	-
	vi	ESI Dispensary, Najafgarh Road, Delhi	..	65.40	-	-	-
	vii	Town Hall, Delhi	64.00	70.10	53.30	58.9	-
Goa							
	i	Head Office, Ponda, Goa	13.10	17.80	23.90	-	-
	ii	Infront of Old GSPCB, Patto, Panaji	-	-	-	12.0	11
Gujarat							
	i	L D Engineering College/A & L Behrampur, Ahemdabad	16.60	32.50	34.10	18.5	19
	ii	R. C. High School, Ahemdabad	34.10	38.70	38.30	-	-
	iii	R.O.G.P.C.B. Race Course, Vadodra	..	..	-	19.2	19
	iv	Citi Dondia Bazar, Vadodra	..	..	-	28.3	28
	v	SVR Engg. Collge, Syrat	..	..	N.A.	18.3	24
	vi	Air India Building, Surat	..	..	N.A.	24.9	34
	vii	Vapi Nagar Palika, Vapi	..	..	N.A.	34.4	38
	viii	Cadilla Bridge, Narol	-	-	-	27.5	27
	ix	Durga Traders	-	-	-	28.7	29
	x	Fisheries Office	-	-	-	24.0	22
Haryana							
	i	Near SBI, Chawla Cottege	..	14.90	-	-	-
	ii	Kothi No. 266, Sec. 9, Faridabad	N.A.	..	26.90	-	-
	iii	Regional Office, Haryana State Pollution Control Board, Faridabad	-	-	-	28.8	25

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air-Contd

(µg/m³)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
Himachal Pradesh		**Residential Station**					
	i	Bus Stand, Winterfield, Shimla	11.30	16.10	21.40	20.8	19
	ii	Paonta Sahib	..	8.60		9.1	9
	iii	Regional Office, Parwanoo	9.20	13.50	14.30	12.7	9
	iv	Regional Office, Damtal	..	13.90	..	14.5	15
	v	Old Road, Damtal	..	16.30	..	18.8	18
Jharkhand							
	i	Regional Office, Dhanbad	17.6	32.3	N.A.	65.9	-
	ii	Saachi Water Tower, Jamshedpur	51.8	55.6	60.4	59.8	-
Karnataka							
	i	Annad Rao Circle, bangalore	55.7	23	30.3	44.9	61
	ii	K.R. Circle	-	-	-	18.7	56
	iii	Rani Chennamma Circle	-	-	-	-	157
Kerala							
	i	PHED, Cochin	13.10	14.30	10.00	-	-
	ii	CSIR Complex, (Ernakulam North) Cochin	17.90	10.40	9.50	BDL	-
		Ernakulam (South)				BDL	11
	iii	Town Hall, Cochin	N.A.	22.00	9.50	-	-
	iv	SMV School, Thiruvananthpuram	23.70	16.20	13.40	20.0	28
	v	Pattor R. O. Thiruvananthpuram	..	15.30	..	-	-
	vi	Kottayam, Kottayam	26.30	16.50	10.40	15.9	21
	vii	Palayam, Kozhikode	..	9.70	..	BDL	
	viii	Cochin Port Trust Circle (M. G. Road), Cochin	31.00	..	14.50	-	-
	ix	S. V. Raja School, Thiruvananthpuram	25.50	..	15.60	-	-
	x	Palmood, Thiruvananthpuram	22.80	..	11.80	-	-
	xi	Mavoor, Kozhilode	8.10	..	8.00	-	BDL
	xii	PHED, Cochin	-	-	-		-
	xiii	Sasthamangalam,Thiruvananthpuram	-	-	-	16.4	18
Madhya Pradesh							
	i	Hamida Road, Bhopal	26.20	28.90	24.30	17.4	15
	ii	T. T. Nagar, Bhopal	20.20	18.80	14.60	9.0	10
	iii	Kothari Market, Indore	20.00	14.60	28.50	32.5	-
	iv	Telephone Nagar, Indore	13.20	9.80	17.80	27.6	-
	v	Vijay Nagar, Jabalpur	18.20	17.20	15.40	14.6	13
	vi	Grasim Kalayan Kendra, Nagda	29.40	33.10	37.80	34.7	41
	vii	Vipra Niwas Pushpraj Colony, (Civil Lines)Satna	12.60	11.20	8.40	BDL	
	viii	RO, Satna	-	-	-	-	7
	ix	BCI Labour Club, Nagda	44.80	..	36.90	36.2	40
Maharashtra							
	i	Vinoba Bhawan, Bandra/worli, Mumbai	23.30	28.80	17.30	18.7	16
	ii	Kalbadevi, Mumbai	34.10	24.30	17.00	23.1	21
	iii	Kopri Ward Office, Thane (E), Mumbai	17.70	17.30	16.50	14.9	11
	iv	Sahu Market Naupada, Thane, Mumbai	21.60	19.80	17.40		13
	v	Maskasath, Nagpur	31.50	20.80	16.10	21.3	17
	vi	NEERI, Nagpur	25.50	18.30	13.70	18.9	25
	vii	Institute of Engeeres , Nagpur	..	16.70	..	16.4	20
	viii	Govt. Poly College, Sadar, Nagpur	..	20.30	..	18.2	23
	ix	Administrative Bldg., Chanderpur	25.00	25.00	N.A.		33
	x	Sub Regional Office, B. Nagar, Chanderpur	..	51.00	..	36.4	25
	xi	VIP Ind. Area, MIDC Satpura	..	17.60	..		
	xii	RTO Colony Tank, Nasik	..	20.50	..	22.4	28
	xiii	Nashik Muni. Council Bldg.	..	25.10	..	23.9	30
	xiv	Mandai/Swargate, Pune	..	89.80	..	69.5	51
	xv	Naw Pada, Thane West, Thane	-	-	-	19.0	-

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air-Contd

(µg/m³)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential Station					
	xvi	Poud Phata (Kothrud)/Nal Stop	..	93.60	..	75.8	55
	xvii	Chitalae Clinic, Solapur	47.30	46.80	46.80	45.9	41
	xviii	IWWA, Nagpur	..	..	..	-	-
	xix	Gram Panchayat, Kanhan, Nagpur	..	..	..	-	-
	xx	M/s Chemiquip Ltd., Ambernath,	..	..	..	-	-
	xxi	Pune University, Pune	..	..	N.A.	-	-
	xxii	WIT Campus, Solapur	..	..	..	45.9	-
	xxiii	Govt. Polytechnic, Nagpur	..	..	..	-	-
Meghalaya							
	I	State Board Office premises, Shilong	7.8	6.9	7.1	BDL	5
	ii	State Tuberclosis Hospital	N.A.	9.3	11.9	13.6	19
Orissa							
	I	Nalco, Angul	22.1	23.1	14.6	15.5	17
	ii	Municipality Office, Rourkela	14.70	19.50	10.70		-
	iii	Rayagada, Raourkela	17.10	14.70	12.60	BDL	-
	iv	Regional Office, Angul	29.00	..	17.70	100	-
	v	IDL Police Outpost, Rourkela	-	-	-	BDL	8
	vi	RO, Rourekela	-	-	-	-	9
	vii	RO, Rayagada	-	-	-	BDL	7
	viii	SPCB Building, Bhubaneshwar	-	-	-	-	11
Punjab							
	i	Office of PPCB	..	32.20	..	-	-
	ii	Regional Office, Jalandhar	24.60	21.30	N.A.	25.4	-
	iii	Municipal Council Tubewell No. 27	..	30.30	..	27.1	-
	iv	Clock Tower, Ludhiana, PPCB Post Office	30.80	..	N.A.	40.0	-
	v	Jalandhar (Beat all Sports)	28.50	..	25.00		-
Rajasthan							
	i	Town Hall, Udaipur	..	42.50	..	44.6	48
	ii	Municipal Corporation Bldg., Kota	..	29.10	..	19.0	24
	iii	Salnor Glass, Kota	..	24.70	..	-	-
	iv	Regional Office, Jodhpur	..	13.30	..	-	-
	v	Sojati Gate, Jodhpur	..	18.70	..	16.3	19
	vi	RSPCB Office, Jodhpur	..	22.60	..	-	18
	vii	Ajmeri Gate, Jaipur	..	35.30	..	41.4	38
	viii	Malviya Nagar, Jaipur	..	27.40	..	13.6	-
	ix	Tripolia Bazar, Jaipur	47.40	36.80	30.50	14.9	-
	x	Regional Office, Alwar	78.70	72.00	58.10	34.2	12
	xi	RIICO Pump House, Alwor	..	..	..	-	-
	xii	PHED, Gandhi Nagar, Jaipur	35.20	..	26.40	-	-
	xiii	Barkhera, Kota, *(Sensitive)*	..	..	..	-	-
	xiv	Veternary Hospital, Kota	29.50	..	21.00	-	-
	xv	D.I.C. Udaipur	..	..	..	-	-
	xvi	Regional Office, Udaipur	..	..	..	-	-
	xvii	Maha Mandir Police Thane , Jodhpur	-	-	-	16.0	19
	xviii	Samcore Glass, Kota	-	-	-	18.5	24
	xix	Amabmata, Udaipur	-	-	-	35.9	35
	xx	SPCB Building, Jaipur	-	-	-	21.1	-
Tamil Nadu							
	i	Distt. Collector Office, Coimbatore	N.A.	41.00	57.00	19.0	45
	ii	Sai baba Colony, Coimbtore	..	39.50	..	49.7	-
	iii	Madras Medical College, Chennai	15.30	14.40	8.90	BDL	7
	iv	Zoological Survey of India	..	11.00	..	-	-
	v	MK Evening College Highway Bldg. , Madurai	..	22.00	..	23	20
	vi	Kunnathur Chatram (E), Madurai	..	40.40	..	29.3	24
	vii	Sowdeswari College, Salem	..	9.10	..	33.5	35
	viii	AVM Building, Tutkorin	..	..	15.30	19	18

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air -contd.

(µg/m 3)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential Station					
	ix	Fishries College, Tuticorin	N.A.	..	15.20	17	18
	x	Chemical Research Centre, Tuticorin	..	..	..	46	-
	xi	Madrss (Santhome)	14.30	..	7.80	-	-
	xii	NEERI, CSIR Campus	-	-	-	NA	5
	xiii	Ponnayarajapuram	-	-	-	46.0	43
Uttaranchal							
	i	Clock Tower, Dehradun	18.50	21.40	20.90	22.5	3
Uttar Pradesh							
	i	Tajmahal, Agra	..	9.00	-	-	-
	ii	Regional Office, Bodla, Agra	..	9.70	-	10.0	BDL
	iii	Indira Chowk, Gajroula	N.A.	12.60	N.A.	-	-
	iv	Deputy Ka Porao, Kanpur	17.30	16.20	14.10	18.8	19
	v	Agriculture University, Kanpur	25.90	32.20	27.80	-	-
	vi	Head Post Office, Kanpur	..	35.70	-	-	-
	vii	F & Training Centre, Kanpur	17.10	16.40	14.20	17.3	-
	viii	Kapoor Hotel, Hozratganj, Lucknow	N.A.	30.40	29.10	27.4	30
	ix	Mahanagar, Lucknow	..	30.80		27.4	30
	x	R. O. Jawahar Nagar, Varanasi	..	11.80	11.50	15.4	17
	xi	Kanpur (Kotwali)	36.40	..	33.00	-	-
	xii	Jaipur House, Agra	N.A.	..	11.20	-	-
	xiii	Aminabad	-	-	-	-	35
	xiv	Aliganj Garden	-	-	-	-	37
	xv	Kidwai Nagar	-	-	-	-	20
	xvi	Dabauli	-	-	-	-	21
	xvii	RO Noida	-	-	-	-	41
	xviii	Tilak Nagar	-	-	-	-	26
	xix	Raza ka Tal	-	-	-	-	34
West Bengal							
	I	Bator, Howrah	43.3	49.9	55.5	-	-
	ii	Lal Bazar, Dalhousie, Kolkata	33.4	82	86.8	-	63
	iii	Kasba, Kolkata	--	52.1	--	-	43
	iv	Calcutta, CESE, Mandevitli Garden (Gariohat)	26.7	--	61.8	-	-
	v	PCBL Club	-	-	-	-	38
Chandigarh							
	i	Sector 17 C, Chandigarh	N.A.	N.A.	..	19	26
	ii	Punjab Engg. College	-	-	-	-	26
Pondicherry							
	i	Housing Boadd's Office	22.90	20.40	12.00	-	-
	ii	Agriculture Department	..	13.90	-	-	-
	iii	FRENCH, Institute	N.A.	..	10.20	-	-
	iv	DSTc Office	-	-	-	14	16
	v	Chamber of Commerce	-	-	-	12	16

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air -contd

(µg/m³)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
Industrial City		**Industrial Statiion**					
Andhra Pradesh							
	i	C.I.T.D., Balanagar, Hyderabad	39.40	47.20	35.10	39.3	42
	ii	Nacharam, Hyderabad	7.70	32.30	16.00	15.0	18
	iii	UPPAL, Hyderabad	40.60	39.20	30.00	34.1	38
	iv	Industrial Estate, Marripalem, Vishakhapatnam	19.40	22.00	21.70	23.1	32
Chhattisgarh							
	i	Laghu Udyog Nigam, Bhillai	32.30	33.90	32.30	31.0	29
	ii	MPCB Sub Station, Birgaon, Raipur	37.30	..	37.50		
		M/S Wood worth India Pvt. Ltd,Sarira, Raipur	-	-	-	38.7	38
Delhi							
	i	Shahzada Bagh, Delhi	41.40	35.40	33.90	39.3	-
	ii	Shahadra, Delhi	26.00	22.50	36.30	32.6	-
	iii	ESI Disp. Najafgarh Road	57.00	..	N.A.		-
		Maya Puri Industrial Area	-	-	-	45.2	-
Goa							
	i	Vasco	13.00	19.60	18.00	10.1	10
	ii	Mormugao Port Trust	-	-	-	-	10
Gujarat							
	i	Shardaben Hospital, Ahemdabad	35.20	45.90	42.10	27.4	-
	ii	Rallis India Ltd., Ankleshwar	N.A.	..	..	33.0	-
	iii	C. E. T. P. Nandseri, Vadodara	..	..	..	36.2	30
	iv	B. R. C. Udhna, Surat	N.A.	..	N.A.	24.5	-
	v	G. E. B., GIDC, Surat	..	..	..	39.6	40
	vi	Naroda GIDC	-	-	-	28.0	27
	vii	Udhha	-	-	-	-	34
	viii	Sardhara Industrial Corporation	-	-	-	-	25
Haryana							
	i	Shivalic Global, Industries, Faridabad	..	15.10	..	29.4	25
	ii	Ballarpur Industries, Yamuna Nagar	9.40	12.10	16.60	19.6	20
	iii	Escorts Medical Centre, Faridabad	N.A.	..	26.30	-	-
Himachal Pradesh							
	i	Gondhpur Industrial Area, Paonta Sahib	6.40	7.60	8.20	BDL	-
	ii	Asstt. Commissioner Office Building, Sector 1, Parwanoo	..	16.30	..	14.4	12
	iii	Tekka Bench Bridge, Shimla	..	10.00	..	12.0	-
	iv	V. Farm Indl. Area, Sec. 1, Parwanoo	11.00	..	15.50	-	-
	v	P. S. Industrial Area, Paonta Sahib	7.90	..	8.80	-	BDL
Jharkhand							
	i	M.A.D.A. Jharia	18.50	35.90	N.A.	63.4	-
	ii	BIT Sindri	17.80	38.40	..	62.0	-
	iii	Burmamines Water Tower, Jamshedpur	47.00	48.80	51.9	53.0	-
	iv	Near P-Station (FCI Main Hospital) Sindri	..	..	N.A.	-	-
	v	Bistapur Vehicle Testing Center	-	-	-	58.3	56
	vi	Golmuri Vehiclw Testing Center	-	-	-	53.5	51
	vii	Sakchi Water Tower	-	-	-	59.8	-
Karnataka							
	i	K. R. Circle, Visw Bldg, Mysore	26.80	31.30	27.50	-	-
	ii	K. I. A. D. B. Bldg, Mysore	27.80	30.90	28.00	-	-
	iii	Graphite India, Bangalore	26.90	16.90	19.40	33.1	73
	iv	AMCO Batteries, Bangalore	37.90	27.90	26.70	26.3	84
	v	KHB Industrial Area	-	-	-	-	62
	vi	Peenya Industrial Area	-	-	-	-	67
	vii	Hebbal Industrial Area	-	-	-	18.2	52
	viii	Lakkamanahalli Industrial Area	-	-	-	-	41

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air -contd

($\mu g/m^3$)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial Statiion					
Kerala							
	I	M/S Carhurandum Universal Ltd. Kanjakode	--	22.9	--	10.1	BDL
	ii	Eloor, Cochin	21.3	10.9	9.1	17.0	15
	iii	Irumpanem, Cochin	12.5	16.1	5.9	BDL	BDL
	iv	FACT/Udyog Mandal	--	13.9	--		
	v	Hi-Tech Chakkai, Thiruvananthapuram	..	18.60	..	17.6	18
	vi	Chingavanam, Kottayam	23.50	12.60	6.40	-	-
	vii	Mavoor, Kozhikode	..	7.90	..	-	-
	viii	CRL Guest, House, Cochin	28.00	..	12.50	-	-
	ix	Velli, Thiruvanathapuram	..	..	..	-	-
	x	Nallalam	-	-	-	BDL	BDL
	xi	Vadavathoor	-	-	-	BDL	BDL
Madhya Pradesh							
	i	Govindpura, Akun, Bhopal	26.00	26.20	20.20	12.2	13
	ii	M. P. Laghu Udyog, Indore	..	17.40	N.A.	NA	
	iii	Chem. Div. Labour Club, Nagda	28.20	29.60	22.10	17.6	20
	iv	BCI Labour Club, Nagda	..	25.80	..	-	-
	v	Industrial Area SD (office), Satna	15.80	16.40	10.90	BDL	7
	vi	Association of I. Pologround, Indore	22.00	..	N.A.	-	-
Maharashtra							
	i	Thane (E) Balkum/Kolshet, Mumbai	25.30	18.50	22.10	-	14
	ii	Parel, Mumbai	31.10	27.30	17.80	22.5	18
	iii	Hingma Road, Nagpur	21.10	14.70	12.90	16.6	19
	iv	MIDC Office, Hingma Rd. Nagpur	29.10	17.00	N.A.	20.8	-
	v	M. I. D. C. Chanderpur	..	52.30	..	38.4	22
	vi	Bhosari, Pune	..	52.60	..	39.8	35
	vii	WIT Campus, Solapur	45.80	46.40	47.30	45.3	40
	viii	MIDC Phase-II, Dombivali	..		..		35
	ix	VIP Ind. Area, MIDC satpura, Nasik	..	..	..	21.4	26
	x	PCMC Chingawad, Pune	N.A.	..	N.A.	-	-
	xi	Poud Phata (Kothrud, Pune)	..	..	..	-	-
	xii	Balkum/Kolshet, Thane West, Thane	-	-	-	21.5	-
Orissa							
	i	Industrial Estate, Angul	..	26.00	..	12.8	8
	ii	IDL-Post (Sonaparbat), Rourkela	..	12.80	..	-	-
	iii	Jaykaypur, Rourkela	24.90	20.60	18.40	9.4	9
	iv	TTPS Colony, Talcher	19.70	30.60	26.60	21.9	20
	v	NALCO, Angul	..	..	..	-	-
	vi	Municipality Office, Rourkela	21.90	..	14.00	-	-
Punjab							
	i	M. Steel, Gobindgarh	..	33.90	..	33.6	-
	ii	Chaudhary Diwan Chand Steel	..	34.30	..		-
	iii	Milk Plant, Ludhiana	30.00	30.70	N.A.	31.4	-
	iv	Rita Sewing Machines, Ludhiana	30.40	31.70	33.40	35.9	-
	v	M/S Punjab Maltee, Jalandhar	..	25.90	..	26.1	-
	vi	P. Steel, Gobindgarh	..	..	..	-	-
	vii	M/s Zed Sporto, Jalandhar	..	..	..	-	-
	viii	Jalandhar (Inderson's Leather Pvt. Ltd.)	34.50	..	..	-	-
	ix	M/S Modi Oils GT Road Mandi, Gobindgarg	-	-	-	33.4	-
	x	Focal Point, Jalandhar	-	-	-	28.0	-
Rajasthan							
	i	RIICO Pump House, Alwar	80.70	72.70	54.80	32.3	10
	ii	Gaurav Solvex, Alwar	..	70.80	..	31.7	14
	iii	Jothwara Indl. Area, Jaipur	47.70	36.70	31.60	15.1	
	iv	VKIA, Jaipur	..	28.10	..	39.2	34
	v	Basni Indl. Area, Jodhpur	..	22.70	..	16.4	
	vi	R. O. Anantpura, Kota	26.70	26.80	19.50	19.0	25
	vii	D. I. C. Udaipur	..	59.40	..		

Table 4.1.4 (b) : Annual Mean Concentrations of Nitrogen Dioxide (NO2) in Ambient Air- concld.

(µg/m³)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial Statiion					
	viii	Regional Office, Udaipur	..	35.50	..	68.6	64
	ix	RICCO Office, Jodhpur	..	..	..		20
TamilNadu							
	I	SIDO Office, Coimbotore	--	39.1	54.1	55.8	51
	ii	Kathivakkam, Chennai	13.5	22.2	24.9	35.2	32
	iii	Govt. Higher Secondary School, Chennai	--	20.5	--	36.6	..
	iv	Thiruvottiyur Municipal Office, Chennai	13.5	20.1	21.4	NA	7
	v	Fenner (I)nLtd., Madurai	..	29.50		25.3	25
	vi	Municipal K. Mandapa, Chennai	16.00	..	13.50	..	..
	vii	Manali Police Station, Chennai	13.50	..	22.90	..	35
	viii	Chemical Research Centre, Tuticorin	..	..	13.90	..	..
		Thiruvottiyur, Chennai	..	..	..	31.6	34
		Raja Agencies	..	..	..	..	19
Uttaranchal							
	i	Rai Pur Road, Dehradun	18.30	19.70	20.80	23.4	
Uttar Pradesh							
	i	Nunhai, Agra	..	N.A.	..	10.2	BDL
	ii	Anpara Colony, Anpara	67.60	59.40	42.00	31.3	29
	iii	Ranusagar Colony, Anpara	67.10	57.30	41.60	30.7	30
	iv	Raunag Auto Ltd., Gajroula	11.60	15.10	15.50	15.8	16
	v	M/S Associated Chem. Pvt., Kanpur	..	17.80		17.9	
	vi	Lajpat Nagar, Kanpur	39.00	35.80	33.00		
	vii	Talkatora, Lucknow	..	N.A.	N.A.	29.2	32
	viii	Bulandshahar Road Indl. Area, Ghaziabad	..	23.70	N.A.	-	24
	ix	Shahibabad Industrial Area, Ghaziabad	..	24.60	N.A.	-	26
	x	S. P. Engg. Works, Fazalganj, Kanpur	N.A.	..	15.40	-	-
	xi	Fazalganj	-	-	-	-	18
	xii	Jajmau	-	-	-	-	22
	xiii	M/S GEE PEE Electorplating and Engg. Works	-	-	-	NA	55
	xiv	Centre for Development of Glass Industry	-	-	-		33
	xv	Indira Chowk,J.P.Nagar, Gajraula	-	-	-	NA	
West Bengal							
	i	Howrah Municipal Corp., Howrah	59.50	70.90	80.50	82.7	
	ii	Bandhaghat, Howrah	50.20	57.80	80.60	67.2	
	iii	Kossipore Police Station, Kolkata	44.20	86.70	96.40	83.3	73
	iv	WBIIDC, Haldia	60.20	38.00	23.10	22.3	25
	v	Super Market, Haldia	77.00	62.00	29.50	27.4	28
	vi	Dew India Ltd.	-	-	-	-	46
	vii	Kwality Hotel	-	-	-	-	43
	viii	Asansol Municipal Corporation	-	-	-	-	46
Chandigarh							
	i	Modern Food Indl. Area	N.A.	N.A.	10.10	30.5	37
Pondicherry							
	i	PIDC I. Estate, Metropolyam	..	16.50	15.90	21.5	21

Source: Central Pollution Control Board

* : Data up to March 2005.

BDL : Below detection limit

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air

(µg/m ^{3})

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential Station					
Andhra Pradesh							
	i	Tarnka, Hyderabad	11.1	10	9.6	9.7	10
	ii	ABIDS, Hyderabad	14.7	13.7	10.9	10.7	11
	iii	Police Banacks , Hyderabad	..	14.9	-	6.0	-
	iv	Banjara Hills, Hydrabad/Jublee Hills	12.6	9.8	3.1	BDL	BDL
	v	Panchayat Raj Office, Vishakhapatnam	19	13.3	9.1	7.0	-
	vi	Civil Defence Bldg., Vishakhapatnam	16.3	..	8.1	-	-
	vii	Charminar	-	-	-	-	4
	viii	Mindi	-	-	-	-	11
	ix	Seethammadhara	-	-	-	-	10
	x	Police Barracks ,Visakhapatnam	-	-	-	-	10
Assam							
	i	Head Office, Bamuninaidam, Guwahati	6.8	3.7	3.2	BDL	BDL
	ii	Paltan Bazar,Guwahati	-	-	-	BDL	4
Bihar							
	i	Beltron Bhavan, Shastri Nagar, Patna	9.5	9.5	8.4	16.5	-
	ii	Gandhi Maidan, Test Centre, Patna	..	16.6	-	11.9	-
Chandigarh							
	i	Sector 17 C	N.A.	N. A.	..	BDL	5
	ii	Punjab Engg. College	-	-	-	-	6
Chhattisgarh							
	i	Visak Hostel, Sec. 4, Bhillai	26.50	26.70	23.30	22.1	21
	ii	5/32, Bungalow Office Building, Bhillai	2.40	3.30	2.70	BDL	BDL
	iii	Gitanjali Bhavan, Old Bus Stand, HIG 21,22 MP Sector, Korba	13.50	13.70	N.A.	13.3	13
	iv	Pragati Nagar, NTPC Colony, Korba	13.60	12.70	N.A.	12.5	13
	v	New HIG-9, Hirapur, Raipur	11.10	10.30	8.80	8.4	10
	vii	ITI Rampur	-	-	-	-	14
Delhi							
	i	Nizamuddin, Delhi	18.20	16.90	13.10	12.2	-
	ii	Ashok Vihar, Delhi	11.60	8.20	6.40	6.1	-
	iii	Janakpuri, Delhi	18.60	16.40	13.70	11.7	-
	iv	Siri Fort, Delhi	15.90	13.80	11.80	9.0	-
	v	N. Y. School, Sarojini Nagar, Delhi	8.30	7.60	7.30	7.2	-
	vi	ESI Dispensary, Najafgarh Road, Delhi	..	13.90			-
	vii	Town Hall, Delhi	14.30	13.30	11.50	11.5	-
Goa							
	i	Head Office, Ponda, Goa	3.60	4.40	2.90		
	ii	Infront of Old GSPCB, Patto, Panaji	-	-	-	BDL	BDL
Gujarat							
	i	L D Engineering College/A & L Behrampur, Ahemdabad	6.90	10.30	8.10	10.4	11
	ii	R. C. High School, Ahemdabad	9.40	9.60	8.80	-	-
	iii	R.O.G.P.C.B. Race Course, Vadodra	N.A.	..	N.A.	10.7	11
	iv	Citi Dondia Bazar, Vadodra	..	..		19.1	18
	v	SVR Engg. Collge, Surat	N.A.	..	N.A.	13.4	18
	vi	Air India Building, Surat	N.A.	..	N.A.	17.3	24
	vii	Vapi Nagar Palika, Vapi	N.A.	..	N.A.	20.4	25
	viii	Candilla Bridge, Narol	-	-	-	19.1	18
	ix	Ankaleshwar	-	-	-	18.0	23
	x	Fisheries office, Jamnagar	-	-	-	9.8	10

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air - Contd.

(µg/m³)

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential Station					
Haryana							
	i	Near SBI, Chawla Cottege	-	23.20	-	-	-
	ii	Kothi No. 266, Sec. 9, Faridabad	N.A.	..	12.90	-	-
		Regional Office, Haryana State Pollution	-	-	-	9.5	8
Himachal Pradesh							
	i	Bus Stand, Winterfield, Shimla	3.50	4.00	6.10	5.7	6
	ii	Paonta Sahib	..	2.00	-	BDL	BDL
	iii	Regional Office, Parwanoo	1.50	3.80	3.20	BDL	BDL
	iv	Regional Office, Damtal	..	3.10	-	BDL	4
	v	Old Road, Damtal	..	3.40	-	4.3	5
Jharkhand							
	i	Regional Office, Dhanbad	16.50	17.30	N.A.	15.9	-
	ii	Sakchi Water Tower, Jamshedpur	53.00	48.60	48.00	-	-
Karnataka							
	i	Anand Rao Circle, Bangalore	24.20	19.50	11.20	10.8	7
		K.R. Circle, Visvesvaraya Bldg. Mysore	-	-	-	11.2	11
		Hubli	-	-	-	-	15
Kerala							
	i	S. V. Raja School, Thiruvananthpuram	20.30	10.30	15.50	-	-
	ii	CSIR Complex, (Ernakulam North) Cochin	22.10	10.60	3.30	-	-
	iii	Town Hall, Cochin	N.A.	15.90	..	-	-
	iv	SMV School, Thiruvananthpuram	12.80	10.69	11.90	13.7	9
	v	Pattor R. O. Thiruvananthpuram	-	9.20	-	-	-
	vi	Kottayam, Kottayam	0.80	2.00	2.00	BDL	BDL
	vii	Palayam, Kozhikode	-	2.00	-	BDL	BDL
	viii	Cochin Port Trust Circle (M. G. Road), Cochin	10.00	10.30	12.30	-	-
	xi	PHED, Cochin	11.60	-	11.40	-	-
	xii	Palmood. Thiruvananthpuram	10.30	-	9.40	-	-
	xiii	Mavoor, Kozhikode	0.90	-	2.00	-	-
	xiv	Ernakulum south	-	-	-	BDL	5
	xv	Sasthamangalam	-	-	-	12.0	6
Madhya Pradesh							
	i	Hamida Road, Bhopal	22.30	25.70	17.40	9.0	7
	ii	T. T. Nagar, Bhopal	17.20	15.80	10.80	4.3	5
	iii	Kothari Market, Indore	26.60	21.90	12.20	14.9	-
	iv	Telephone Nagar, Indore	19.20	15.40	8.20	11.2	-
	v	Vijay Nagar, Jabalpur	N.A.	N.A.	2.00	BDL	BDL
	vi	Grasim Kalayan Kendra, Nagda	51.20	45.40	28.60	22.1	20
	vii	Vipra Niwas Pushpraj Colony, (Civil Lines)Satna	11.00	10.10	7.80	-	-
	viii	BCI Labour Club, Nagda	24.80	..	17.20	18.0	19
	ix	RO, Satna	-	-	-	BDL	BDL
Maharashtra							
	i	Vinoba Bhawan, Bandra/worli, Mumbai	9.40	13.30	8.80	7.7	8
	ii	Kalbadevi, Mumbai	8.40	10.00	8.70	8.0	6
	iii	Kopri Ward Office, Thane (E), Mumbai	10.50	17.60	16.10	8.1	7
	iv	Sahu Market Naupada, Thane, Mumbai	13.50	20.60	17.00	9.4	8
	v	Maskasath, Nagpur	7.00	6.80	6.60	6.3	-
	vi	NEERI, Nagpur	6.30	6.30	6.30	6.5	5
	vii	Institute of Engeeres , Nagpur	..	9.30	..	8.8	-
	viii	Govt. Poly College, Sadar, Nagpur	-	10.90	-	9.5	

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air - Contd.

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential Station					
	ix	Administrative Bldg., Chanderpur	12.90	11.30	N.A.	-	21
	x	Sub Regional Office, B. Nagar, Chanderpur	..	24.90	-	18.2	16
	xi	VIP Ind. Area, MIDC Satpura	..	19.70	-	-	-
	xii	RTO Colony Tank, Nasik	..	27.30	-	26.6	32
	xiii	Nashik Muni. Council Bldg.	..	31.50	-	29.6	35
	xiv	Mandai/Swargate, Pune	..	47.30	-	33.9	30
	xv	Poud Phata (Kothrud)/Nal Stop	..	45.60	-	35.8	31
	xvi	Chitalae Clinic, Solapur	19.40	19.70	19.80	19.8	18
	xvii	IWWA, Nagpur	..	..	-	-	-
	xviii	Gram Panchayat, Kanhan, Nagpur	..	..	-	-	-
	xix	M/s Chemiquip Ltd., Ambernath, Dowbiwali	..	..	-	-	-
	xx	Pune University, Pune	..	..	N.A.	-	-
	xxi	WIT Campus, Solapur	..	..	-	-	-
	xxii	Govt. Polytechnic, Nagpur	..	..	-	-	-
Nagaland							
	i	Bank Colony, Dimapur	-	-	-	NA	-
	ii	Hong-Kong Market, Dimapur	-	-	-	NA	69
Meghalaya							
	i	Board Office Permises, Motinagar	1.20	2.00	2.00	BDL	BDL
	ii	State Tuberculosis Hospital	N.A.	5.40	5.90	BDL	5
Orissa							
	i	Nalco, Angul	6.30	6.20	14.30	BDL	BDL
	ii	Municipality Office, Rourkela	14.60	9.30	7.10	4.9	4
	iii	RO, SOCB, Rourkela	10.50	9.30	8.00	BDL	BDL
	iv	Regional Office, Angul, RO	5.60	..	16.70	-	-
	v	RO , Rourkela	-	-	-	-	5
	vi	Bhubneshwar	-	-	-	-	BDL
	vii	IDL Police out-post, sonaparbat, Roukela	-	-	-	4.5	-
Punjab							
	i	Office of PPCB	..	12.30	-	-	-
	ii	Regional Office, Jalandhar	18.60	16.20	N.A.	9.9	-
	iii	Municipal Council Tubewell No. 27	..	21.30	-	10.7	-
	iv	PPCB Building, Ludhiana	11.70	..	N.A.	12.4	-
	v	Jalandhar (Beat all Sports)	22.60	..	13.00	-	-
Rajasthan							
	i	Town Hall, Udaipur	..	5.80	-	6.0	6
	ii	Municipal Corporation Bldg., Kota	..	6.70	-	5.7	6
	iii	Salnor Glass, Kota	..	6.50	-	-	6
	iv	Regional Office, Jodhpur	..	4.60	-	-	
	v	Sojati Gate, Jodhpur	..	9.10	-	9.5	7
	vi	RSPCB Office, Jaipur	..	6.00	-	BDL	4
	vii	Ajmeri Gate, Jaipur	..	8.50	-	5.4	5
	viii	Malviya Nagar, Jaipur	..	8.30	-	10.2	-
	ix	Tripolia Bazar, Jaipur	21.20	12.70	15.70	10.2	-
	x	Regional Office, Alwar	16.80	16.00	16.70	11.5	6
	xi	RIICO Pump House, Alwar	..	..	-	-	-
	xii	PHED, Gandhi Nagar, Jaipur	15.00	..	12.70	-	-
	xiii	Barkhera, Kota,	..	..		-	-
	xiv	Veternary Hospital, Kota	7.00	..	6.10	-	-

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air - Contd.

(µg/m ^{3})

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Residential Station					
	xv	D.I.C. Udaipur	..	..	-	-	-
	xvi	Regional Office, Udaipur	..	..	-	-	-
	xvii	Amabmata	-	-	-	4.6	5
	xviii	Maha Mandir Police	-	-	-	9.0	6
	xix	Sancire Glass, Kota	-	-	-	5.8	
Tamil Nadu							
	i	Distt. Collector Office, Coimbatore	N.A.	8.60	N.A.	9.5	8
	ii	Sai baba Colony, Coimbtore	..	5.60	-	-	-
	iii	Madras Medical College, Chennai	7.10	6.70	6.10	6.6	5
	iv	Zoological Survey of India	..	6.70	-	-	-
	v	MK Evening College Highway Bldg. , Madurai	..	4.90	-	6.7	10
	vi	Kumathur Chatram (E), Madurai	..	5.80	-	7.2	10
	vii	Sowdeswari College, Salem	..	4.40	-	7.8	7
	viii	AVM Building, Tutkorin	..	..	10.90	17.8	20
	ix	Fishries College, Tuticorin	N.A.	..	9.90	15.8	20
	x	Chemical Research Centre, Tuticorin	..	..	-	-	-
	xi	Santhome, Chennai	7.30	..	6.10	-	-
	xii	NEERI CSIR Campus	-	-	-	6.1	4
	xiii	Ponniyarajapuram	-	-	-	8.9	8
Uttaranchal							
	i	Clock Tower, Dehradun	18.10	19.20	18.50	18.0	2
Uttar Pradesh							
	i	Tajmahal, Agra ***(Sensitive)***	..	10.50	-	-	-
	ii	Regional Office, Bodala, Agra	..	11.10	-	7.2	8
	iii	Indira Chowk, Gajroula	N.A.	27.30	N.A.	-	-
	iv	Deputy Ka Porao, Kanpur	20.20	19.10	7.00	7.2	9
	v	Agriculture University, Kanpur	15.50	14.00	11.90	-	-
	vi	Head Post Office, Kanpur	..	16.10	-	-	-
	vii	F & Training Centre, Kanpur	21.50	19.30	7.00	7.1	
	viii	Kidwai Nagar,Kanpur	-	-	-	-	10
	ix	Dabauli, Kanpur	-	-	-	-	9
	x	Kapoor Hotel, Hozratganj, Lucknow	N.A.	28.30	23.60	17.6	15
	xi	Mahanagar, Lucknow	..	28.20	-	17.7	14
	xii	Aminabad, Lucknow	-	-	-	-	16
	xiii	Aliganj garden, Lucknow	-	-	-	-	19
	xiv	R. O. Jawahar Nagar, Varanasi	..	11.30	10.50	14.4	16
	xv	Kotwali, Kanpur	17.40	..	14.20	-	-
	xvi	Jaipur House, Agra	N.A.	-	5.70	-	-
	xvii	RO, Noiida	-	-	-	-	28
	xviii	Tilak Nagar, Firozabad	-	-	-	-	19
	xix	Raza ka Tal, Firozabad	-	-	-	-	21
West Bengal							
	i	Bator, Howrah	11.10	9.10	7.10	4.2	
	ii	Lal Bazar, Dalhousie, Kolkata	14.90	17.40	11.70	18.0	10
	iii	Kasba, Kolkata	..	13.50	..	15.6	8
	iv	Calcutta CESE. Mandevitle Garden (Gariohat)	12.10	..	9.30	-	-
	v	PCBL, Durgapur	-	-	-	-	4

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air - Contd.

(µg/m³)

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
Pondicherry							
	i	Housing Boadd's Office	17.90	12.20	16.10	-	-
	ii	Agriculture Department	..	11.40	-	-	-
	iii	FRENCH, Institute	N.A.	..	14.30	-	-
	iv	DSTE Office	-	-	-	18.9	21
	v	Chamber of Commerce	-	-	-	17.2	22
Industrial city		**Industrial Station**					
Andhra Pradesh							
	i	C.I.T.D., Balanagar, Hyderabad	11.50	10.90	6.30	4.2	4
	ii	Nacharam, Hyderabad	7.50	10.10	9.10	8.5	8
	iii	UPPAL, Hyderabad	17.10	14.00	4.60	BDL	4
	iv	Industrial Estate, Marripalem, Vishakhapatnam	14.00	13.10	6.70	4.9	10
Chhattisgarh							
	i	Laghu Udyog Nigam, Bhillai	27.10	28.10	26.80	25.7	24
	ii	MPCB Sub Station, Birgaon, Raipur	9.60	28.10	8.50	-	-
	iii	M/S Wool Worth India Pvt. Ltd, Urla, Raipur	..	9.30	-	8.1	11
Delhi							
	i	Shahzada Bagh, Delhi	17.00	13.60	9.70	6.9	-
	ii	Shahadra, Delhi	17.70	13.00	16.70	11.4	-
	iii	ESI Disp. Najafgarh Road	14.80	..	N.A.	-	-
	iv	Maya Puri Industrial Area	-	-	-	13.4	-
Goa							
	i	Vasco	3.50	5.30	2.90	BDL	BDL
	ii	Mormugao	-	-	-	-	BDL
Gujarat							
		Naroda GIDC	-	-	-	18.7	18
	i	Shardaben Hospital, Ahemdabad	9.00	11.20	10.00	11.6	-
	ii	Rallis India Ltd., Ankleshwar	N.A.	..	..	21.6	24
	iii	C. E. T. P. Nandseri, Vadodara	..	..	..	26.5	20
	iv	Udhna	-	-	-	21.6	25
	v	Sardhara Industrial Corp. Rajkot	-	-	-	-	12
	vi	GEB, GIDC, Vapi	-	-	-	26.8	-
	vii	B. R. C. Udhna, Surat	N.A.	..	..	-	-
	viii	G. E. B., GIDC, Surat	..	..	..	-	27
Haryana							
	i	Shivalic Global, Industries, Faridabad	..	23.10	..	9.5	10
	ii	Ballarpur Industries, Yamuna Nagar	18.90	22.10	28.60	28.2	29
	iii	Escorts Medical Centre, Faridabad	N.A.	..	13.10	-	-
Himachal Pradesh							
	i	Gondhpur Industrial Area, Paonta Sahib	0.50	2.00	1.90	BDL	-
	ii	Asstt. Commissioner Office Building, Sector 1,	..	4.40	-	BDL	BDL
	iii	Tekka Bench Bridge, Shimla	..	3.00	-	BDL	-
	iv	V. Farm Indl. Area, Sec. 1, Parwanoo	1.90	..	3.80	-	-
	v	P. S. Industrial Area, Paonta Sahib	0.50	..	2.00	-	BDL
Jharkhand							
	i	M.A.D.A. Jharia	22.30	16.30	N.A.	16.1	-
	ii	BIT Sindri	21.00	17.10	N.A.	14.5	-
	iii	Burmamines Water Tower, Jamshedpur	46.80	39.00	37.60	40.0	-
	iv	Near P-Station (FCI Main Hospital) Sindri	..	..	N.A.	14.5	-

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air - Contd.

(µg/m ^{3})

States/Union Territories		Station	Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial Station					
	v	Bistupur Vehicle Testing Centre	-	-	-	46.8	44
	vi	Golmuri Vehicle Testing Centre	-	-	-	41.7	40
	vii	Sakchi water Tower, Jamshedpur	-	-	-	48.0	-
Karnataka							
	i	K. R. Circle, Visw Bldg, Mysore	30.70	22.50	20.40	-	-
	ii	K. I. A. D. B. Bldg, Mysore	30.70	24.10	20.60	-	-
	iii	Graphite India, Bangalore	18.70	19.90	17.00	18	9
	iv	AMCO Batteries, Bangalore	19.10	19.30	12.10	7.6	8
	v	KHB Industrial Area	-	-	-	-	10
	vi	Lakkamanahalli Industrial Area	-	-	-	-	8
	vii	Peenya Industrial Area, Bangalore	-	-	-	-	9
	viii	Hebbal Industrial Area	-	-	-	11.2	11
Kerala							
	i	M/S Carhurandum Universal Ltd. Kanjakode	..	14.60	..	4.2	BDL
	ii	Eloor. Cochin	41.60	24.60	31.50	23.4	32
	iii	Irumpanem. Cochin	20.20	9.90	2.90	BDL	
	iv	FACT/Udyog Mandal	..	14.80	..	-	4
	v	Hi-Tech Chakkai, Thiruvananthapuram	..	13.60	..	19.8	22
	vi	Chingavanam, Kottayam	0.60	2.00	2.00	-	-
	vii	Mavoor, Kozhikode	..	2.00	..	-	-
	viii	CRL Guest, House, Cochin	14.30	..	17.60	-	-
	ix	Velli, Thiruvanathapuram	..	..	..	-	-
	x	Vadavathoor	-	-	-	BDL	BDL
	xi	Nallalam	-	-	-	BDL	BDL
Madhya Pradesh							
	i	Govindpura, Akun, Bhopal	22.00	23.10	15.30	5.9	6
	ii	M. P. Laghu Udyog, Indore	..	24.50	N.A.	NA	
	iii	Chem. Div. Labour Club, Nagda	52.60	46.50	36.50	36.5	37
	iv	BCI Labour Club, Nagda	..	22.40	..	-	-
	v	Industrial Area SD (office), Satna	13.70	13.30	8.40	BDL	5
	vi	Association of I. Pologround, Indore	28.50	..	..	-	-
Maharashtra							
	i	Thane (E) Balkum/Kolshet, Mumbai	18.90	23.10	21.10	-	-
	ii	Parel, Mumbai	11.80	12.00	9.70	7.4	6
	iii	Hingna Road, Nagpur	9.30	8.80	8.70	9.4	4
	iv	MIDC Office, Hingma Rd. Nagpur	..	9.80	N.A.	6.5	-
	v	M. I. D. C. Chanderpur	..	28.00	-	20.4	25
	vi	Bhosari, Pune	..	37.30	-	-	-
	vii	WIT Campus, Solapur	18.90	19.40	20.10	19.9	18
	viii	MIDC Phase-II, Dombivali	..	..	-	-	10
	ix	VIP Ind. Area, MIDC satpura, Nasik	..	..	-	25.7	32
	x	PCMC Chingawad, Pune	N.A	N.A.	-	-	-
	xi	Poud Phata (Kothrud, Pune)	..	..	-	-	-
	xii	Balkum/Kolshe, Thane			-	11.2	9
	xiii	Bhosari, Pune			-	32.0	28
Orissa							
	i	Industrial Estate, Angul	..	11.00	..	6.0	5.0
	ii	IDL-Post (Sonaparbat), Rourkela	..	9.40	..	-	-
	iii	Jaykaypur, Rourkela	14.50	12.50	10.90	4.8	BDL

Table 4.1.4 (c) : Annual Mean Concentrations of Sulphur Dioxide (SO_2) in Ambient Air - Contd.

(µg/m^3)

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial Station					
	iv	TTPS Colony, Talcher	5.60	6.80	9.70	6.3	5
	v	NALCO, Angul	..	..	..	-	-
	vi	Municipality Office, Rourkela	16.60	..	7.60	-	-
Punjab							
	i	M. Steel, Gobindgarh	..	11.80	..	11.6	-
	ii	Chaudhary Diwan Chand Steel	..	11.80	..		-
	iii	Milk Plant, Ludhiana	11.40	11.70	N.A.	10.4	-
	iv	Rita Sewing Machines, Ludhiana	11.80	12.10	12.30	11.8	-
	v	M/S Punjab Maltee, Jalandhar	..	21.00	..	10.0	-
	vi	P. Steel, Gobindgarh	..	..	..	-	-
	vii	M/s Zed Sporto, Jalandhar	..	..	..	-	-
	viii	Jalandhar (Inderson's Leather Pvt. Ltd.)	22.60	..	N.A.	-	-
	ix	M/S Modi Oils, GT Road, Mandi, Gobindgarh	-	-	-	10.7	-
	x	Focal Point, Jalandhar	-	-	-	11.1	-
Rajasthan							
	i	RIICO Pump House, Alwar	14.70	13.80	14.30	10.2	6
	ii	Gaurav Solvex, Alwar	..	17.40	..	12.4	7
	iii	Jothwara Indl. Area, Jaipur	23.20	14.20	15.20	10.6	-
	iv	VKIA, Jaipur	..	13.40	..	11.9	11
	v	Basni Indl. Area, Jodhpur	..	13.90	..	9.7	-
	vi	R. O. Anantpura, Kota	6.40	7.20	5.40	5.6	7
	vii	D. I. C. Udaipur	..	8.90	..	-	-
	viii	Regional Office, Udaipur	..	5.00	..	9.8	9
	ix	RICCO, Chittor	..	..	..	-	6
Tamil Nadu							
	i	SIDCO Office, Coimbtore	..	6.70	N.A.	11.9	10
	ii	Kalhivakkam, Chennai	20.10	26.10	40.90	26.3	19
	iii	Govt. Higher Secondary School, Chennai	..	21.80		23.0	-
	iv	Thiruvottiyur Municipal Office, Chennai	..	23.00	31.80	7.3	6
	v	Fenner (I) Ltd., Madurai	..	5.90		18.8	19
	vi	Municipal K. Mandapa, Chennai	10.10	..	7.30	-	-
	vii	Manali Police Station, Chennai	..	..	31.80	-	20
	viii	Chemical Research Centre, Raja Agencies Tuticorin	..		N.A.	-	23
	ix	Thiruvottiyur	-	-	-	22.5	19
	x	Raja Agencies	-	-	-	-	-
Uttaranchal							
	i	Rai Pur Road, Dehradun	19.10	19.60	17.60	18.2	-
Uttar Pradesh							
	i	Nunhai, Agra	..	N.A.	..	7.0	7
	ii	Anpara Colony, Anpara	64.60	53.00	30.10	18.7	18
	iii	Renusagar Colony, Anpara	63.80	51.10	29.60	18.7	18
	iv	Raunag Auto Ltd., Gajroula	26.60	35.50	41.10	39.3	36
	v	M/S Associated Chem. Pvt., Kanpur	..	20.40	..	7.1	-
	vi	Lajpat Nagar, Kanpur	17.80	15.20	13.70		-
	vii	Talkatora, Luknow	..	N.A.	Inadequate data	19.7	16
	viii	Bulandshahar Road Indl. Area, Ghaziabad	..	23.00	..	-	17
	ix	Shahibabad Industrial Area, Ghaziabad	..	25.70	..	-	18
	x	S. P. Engg. Works, Fazalganj, Kanpur	..	..	7.30	-	10
	xi	Jajmau	-	-	-	-	9

Table 4.1.4 (c) : Annual Mean Concentrations of Suphur Dioxide (SO_2) in Ambient Air - Concld

(µg/m ^{3})

States/Union Territories	Station		Annual Mean Concentration				
			2000	2001	2002	2003	2004
		Industrial Station					
	xii	M/S GEE PEE Electroplating and Engg, works	-	-	-	NA	24
	xiii	Centre for Development of Glass Industry	-	-	-	-	25
	xiv	Indira Chowk, JP Nagar, Gajraula	-	-	-	NA	-
West Bengal							
	i	Howrah Municipal Corp., Howrah	13.60	12.20	11.90	7.9	-
	ii	Bandhaghat, Howrah	13.40	10.90	14.40	10.2	-
	iii	Cossipore Police Station, Kolkata	25.30	21.90	13.30	18.1	10
	iv	WBIIDC, Haldia	25.20	12.70	6.60	5.0	7
	v	Super Market, Haldia	33.80	17.10	8.50	6.8	7
	vi	Dew India Ltd	-	-	-	-	13
	vii	Kwality Hotel	-	-	-	-	6
	viii	Asansol Municipal Corporation	-	-	-	-	6
Chandigarh							
	i	Modern Food Indl. Area	Inadequate data	N.A.	9.00	4.2	7
Pondicherry							
	i	PIDC I. Estate, Metropolyam	N.A.	17.50	19.80	25.3	24

Surce: Central Polution Control Board
BDL : Below detection limit

TABLE 4.1.5 (a) : NUMBER OF MOTOR VEHICLES REGISTERED IN INDIA (TAXED AND TAX-EXEMPTED)
(As on 31st March)

(Number)

Sl. No.	Year/State/UT	Two-Wheelers	Auto-Rickshaws	Jeeps	Cars	Taxis	Buses	Goods Vehicles #	Misce-llaneous ##	Total No. of Vehicles
1	2	3	4	5	6	7	8	9	10	11
	1992-93	17183224	720364	512602	2550286	297941	363962	1752536	2124433	25505348
	1993-94	18898701	771117	552038	2654232	362622	392148	1828117	2200903	27659878
	1994-95	20831428	897383	614567	2875651	350331	423383	1938422	2769990	30294656
	1995-96	23252287	1010344	671682	3150951	381011	448415	2030728	2966042	33911460
	1996-97	25728982	1175283	727965	3527303	417013	484099	2343000	2927887	37331532
	1997-98	28642351	1360151	824525	3829209	484374	537237 (b)	2535930	3154263	41368040
	1998-99	31327607	1495200	837700	4201774	516449	539819 (b)	2553689	3403087	44875325
	1999-2000	34117662	1583561	919067	4647969	575612	562308	2715005	3735620	48856804
	2000-01	38556026	1777130	1126148	5297219	634357	633900	2948300	4017946	54991026
	2001-02	41581058	1881085	1168868	5717456	688204	518658	3044976	4219191	58819496
	2002-03	47525161	2114668	1196058	6597325	825638	727109	3487538	4559535	67033032
	2002-2003									
	State:									
1	Andhra Pradesh	3985049	245935	54631	312096	66200	46524	182889	108299	5001623
2	Arunachal Pradesh	10605	1430	2260	2340	299	665	2878	667	21144
3	Assam	372825	24886	13861	95063	9646	9702	92394	38286	656663
4	Bihar	709213	66316	@	61832	21149	15493	64919	182476	1121398
5	Chhattisgarh	881248	6593	7127	34365	18979	1900	51511	74328	1076051
6	Goa	280787	8975	@	64735	7720	4504	26586	4139	397446
7	Gujarat	4702529	275740	104263	504801	36917	45519	362572	476029	6508370
8	Haryana	1356957	33258	69692	238816	12752	8091	175269	383654	2278489
9	Himachal Pradesh	149286	2611	8777	34472	13909	5213	38175	15902	268345
10	Jammu & Kashmir	230577	13808	10579	64307	8918	19253	39338	11702	398482
11	Jharkhand	844973	33261	21756	82907	20256	9098	60601	28264	1101116
12	Karnataka	2527674	187262	40944	405621	36939	65692	183509	290760	3738401
13	Kerala	1449154	276244	70864	336540	108503	88868	193061	28937	2552171
14	Madhya Pradesh	2600989	43055	35111	134045	54949	23895	99688	467256	3458988
15	Maharashtra	5587662	463550	244025	831261	94920	64384	456355	391680	8133837
16	Manipur	68975	2395	7474	6560	357	2808	6829	1948	97346
17	Meghalaya	21050	2934	9401	14595	5030	2827	14028	3517	73382
18	Mizoram	16941	858	6622	4146	3343	794	3948	552	37204
19	Nagaland	44401	11279	35831	36328	3316	4855	45510	15213	196733
20	Orissa	1074873	19667	28986	59296	14870	15939	77692	67263	1358586
21	Punjab	2414928	34442	29791	239210	11180	17601	105508	454944	3307604
22	Rajasthan	2429892	59125	120685	179969	27989	53036	166576	449407	3486679
23	Sikkim	4441	..	2473	1176	4064	287	1714	4	14159
24	Tamil Nadu	6260093	147087	53142	690271	110080	91068	458290	194951	8004982
25	Tripura	32634	7901	1344	4954	1375	1985	5775	1460	57428
26	Uttaranchal	346784	6222	6238	34877	12486	4653	12976	33218	457454
27	Uttar Pradesh	4488426	74692	86035	326604	29522	40994	143296	738826	5928395
28	West Bengal	1429818	42362	@	482429	63390	35226	239166	74025	2366416
	Union Territory:									
1	A & N Islands	21743	784	1033	1693	436	459	1519	789	28456
2	Chandigarh	399797	..	..	148959	1173	1309	10503	34	561775
3	Dadra & Nagar Haveli	15435	470	410	8356	102	144	6288	49	31254
4	Daman & Diu	28031	782	156	11356	42	328	3410	280	44385
5	Delhi	2517788	15567	118545	1096148	23145	39593	145781	14303	3970870
6	Lakshadweep	3656	402	83	17	..	5	224	537	4924
7	Pondicherry	215927	4775	3919	47180	1682	4397	8760	5836	292476
	INDIA	**47525161**	**2114668**	**1196058**	**6597325**	**825638**	**727109**	**3487538**	**4559535**	**67033032**

Source: Transport Research Wing, Ministry of Road Transport & Highways 2003.

: Includes trucks three and four wheelers used for carrying goods.

: Includes tractors and trailers.

(b) : Includes Omini Buses

@ : Included in cars

TABLE 4.1.5 (b) : TOTAL REGISTERED MOTOR VEHICLES IN INDIA BY STATES/Uts

(as on 31st March, 2003)- Provisional

(Number)

Sl. No.	Name of City	Transport					
		Multi-axied/Articulated Vehicles Trucks & Lorries	Light Motor Vehicles (Goods)	Buses	Taxies	Light Motor Vehicles (Passengers-Auto)	Total Transport
1	2	3	4	5	6	7	8
1	Andhra Pradesh	124691	58198	14130	66200	245935	509154
2	Arunachal Pradesh	2323	555	665	299	1430	5272
3	Assam	79743	12651	9702	9646	24886	136628
4	Bihar	48212	16707	15493	21149	66316	167877
5	Chhattisgarh	36785	14726	1900	18979	6593	78983
6	Goa	26586	..	4504	7720	8975	47785
7	Gujarat	174062	188510	44250	36917	275740	719479
8	Haryana	126109	49160	8091	12752	33258	229370
9	Himachal Pradesh	27445	10730	5190	13909	2611	59885
10	Jammu & Kashmir	28099	11239	19253	8918	13808	81317
11	Jharkhand	60601	..	9098	20256	33261	123216
12	Karnataka	96144	87365	29239	36939	187262	436949
13	Kerala	70668	122393	62075	108503	276244	639883
14	Madhya Pradesh	72267	27421	23895	54949	43055	221587
15	Maharashtra	228198	228157	51785	94920	463550	1066610
16	Manipur	5812	1017	2358	357	2395	11939
17	Meghalaya	14028	..	2827	5030	2934	24819
18	Mizoram	2742	1206	794	3343	858	8943
19	Nagaland	43516	1994	4441	3316	11279	64546
20	Orissa	52301	25391	14734	14870	19667	126963
21	Punjab	73741	31767	17601	11180	34442	168731
22	Rajasthan	155932	10644	53036	27989	59125	306726
23	Sikkim	1486	228	287	4064	..	6065
24	Tamil Nadu	263221	195069	71111	110080	147087	786568
25	Tripura	4499	1276	1985	1375	7901	17036
26	Uttaranchal	8584	4392	4265	12486	6222	35949
27	Uttar Pradesh	92863	50433	25357	29522	74692	272867
28	West Bengal	239166	..	35226	63390	42362	380144
	Union Territory:						
1	A & N Islands	1519	..	459	436	784	3198
2	Chandigarh	1637	8866	1309	1173	..	12985
3	Dadra & Nagar Haveli	5200	1088	138	102	470	6998
4	Daman & Diu	1791	1619	324	42	782	4558
5	Delhi	75380	70401	34795	23145	15567	219288
6	Lakshadweep	..	224	..	..	402	626
7	Pondicherry	6799	1961	1837	1682	4775	17054
	Total (P)	2252150	1235388	572154	825638	2114668	6999998

Source : Motor Transport Statistics of India,Transport Research Wing, Ministry of Road Transport & Highways

(c) LMV (passengers) includes 5726 Motorcycles on hire also.

.. Not indicated

(P) : Total are provisional -representing summation of available data.

TABLE 4.1.5 (b) : TOTAL REGISTERED MOTOR VEHICLES IN INDIA BY STATES/UTs

(as on 31st March, 2003)- Provisional

(Number)

Sl. No.	Name of City	Non-Transport								Grand Total (Transport +Non-Tpt.)
		Two Wheelers	Cars	Jeeps	Omni Buses	Tractors	Trailers	Others	Total Non-Tpt.	
1	2	9	10	11	12	13	14	15	16	17
1	Andhra Pradesh	3985049	312096	54631	32394	60325	44489	3485	4492469	5001623
2	Arunachal Pradesh	10605	2340	2260	..	333	155	179	15872	21144
3	Assam	372825	95063	13861	..	9801	8572	19913	520035	656663
4	Bihar	709213	61832	@	@	111200	66497	4779	953521	1121398
5	Chhattisgarh	881248	34365	7127	..	38598	33861	1869	997068	1076051
6	Goa	280787	64735	@	..	451	..	3688	349661	397446
7	Gujarat	4702529	504801	104263	1269	267113	194501	14415	5788891	6508370
8	Haryana	1356957	238816	69692	..	358983	..	24671	2049119	2278489
9	Himachal Pradesh	149286	34472	8777	23	11763	483	3656	208460	268345
10	Jammu & Kashmir	230577	64307	10579	..	10149	547	1006	317165	398482
11	Jharkhand	844973	82907	21756	..	12381	10328	5555	977900	1101116
12	Karnataka	2527674	405621	40944	36453	119040	119905	51815	3301452	3738401
13	Kerala	1449154	336540	70864	26793	8702	1823	18412	1912288	2552171
14	Madhya Pradesh	2600989	134045	35111	..	304760	151529	10967	3237401	3458988
15	Maharashtra	5587662	831261	244025	12599	194902	186100	10678	7067227	8133837
16	Manipur	68975	6560	7474	450	1186	549	213	85407	97346
17	Meghalaya	21050	14595	9401	..	441	2304	772	48563	73382
18	Mizoram	16941	4146	6622	..	..	..	552	28261	37204
19	Nagaland	44401	36328	35831	414	2584	1062	11567	132187	196733
20	Orissa	1074873	59296	28986	1205	29954	25176	12133	1231623	1358586
21	Punjab	2414928	239210	29791	..	450552	404	3988	3138873	3307604
22	Rajasthan	2429892	179969	120685	..	389489	55865	4053	3179953	3486679
23	Sikkim	4441	1176	2473	..	4	..	..	8094	14159
24	Tamil Nadu	6260093	690271	53142	19957	88117	38946	67888	7218414	8004982
25	Tripura	32634	4954	1344	..	143	1050	267	40392	57428
26	Uttaranchal	346784	34877	6238	388	30563	708	1947	421505	457454
27	Uttar Pradesh	4488426	326604	86035	15637	709797	12367	16662	5655528	5928395
28	West Bengal	1429818	482429	@	..	43803	#	30222	1986272	2366416
	Union Territory:									
1	A & N Islands	21743	1693	1033	..	261	67	461	25258	28456
2	Chandigarh	399797	148959	..	..	34	..	..	548790	561775
3	Dadra & Nagar Haveli	15435	8356	410	6	32	17	..	24256	31254
4	Daman & Diu	28031	11356	156	4	146	104	30	39827	44385
5	Delhi	2517788	1096148	118545	4798	4808	99	9396	3751582	3970870
6	Lakshadweep	3656	17	83	5	40	..	497	4298	4924
7	Pondicherry	215927	47180	3919	2560	2239	1619	1978	275422	292476
	Total (P)	47525161	6597325	1196058	154955	3262694	959127	337714	60033034	67033032

Source : Motor Transport Statistics of India,Transport Research Wing, Ministry of Road Transport & Highways

@' : Included in cars

: Included in Tractors

.. : Not Indicated

(P) : Total are provisional -representing summation of available data.

TABLE 4.1.6 : TOTAL REGISTERED MOTOR VEHICLES IN METROPOLITAN CITIES OF INDIA

(as on 31st March, 2003)- Provisional

(Number)

Sl. No.	Name of City	Transport					
		Multi-axied/Articulated Vehicles Trucks & Lorries	Light Motor Vehicles (Goods)	Buses	Taxies	Light Motor Vehicles (Passengers-Auto)	Total Transport
1	2	3	4	5	6	7	8
1	Ahmedabad	8809	10251	15016	4845	42354	**81275**
2	Bangalore	28482	21372	12330	16250	74160	**152594**
3	Bhopal	4241	4109	2637	6107	9566	**26660**
4	Chennai	75007	53416	26057	36835	51065	**242380**
5	Cochin **	11290	6415	3018	3786	6405	**30914**
6	Coimbatore	75380	70401	34795	23145	15567	**219288**
7	Delhi	22505	21983	2618	4817	71988	**123911**
8	Hyderabad $	25212	6936	4231	12191	10186	**58756**
9	Indore	29176	2416	15424	7168	9068	**63252**
10	Jaipur	8253	3077	977	445	2816	**15568**
11	Kanpur	5786	9826	12597	10173	8327	**46709**
12	Kolkata *	67491	..	10112	35669	15074	**128346**
13	Lucknow	7557	5435	3359	5364	8324	**30039**
14	Ludhiana ***	13670	11916	1453	2097	8206	**37342**
15	Madurai	6048	2859	2208	3603	7090	**21808**
16	Mumbai	18405	37725	13148	54809	98527	**222614**
17	Nagpur	8899	9084	2746	711	10186	**31626**
18	Patna	15595	..	4096	2998	32370	**55059**
19	Pune	19639	15206	7597	3896	44960	**91298**
20	Surat	2982	6175	839	958	30138	**41092**
21	Vadodara	6438	10985	2771	5026	26252	**51472**
22	Varanasi	5817	2266	1081	688	4972	**14824**
23	Visakhapatnam $	7471	3671	834	3939	18191	**34106**
Total		**474153**	**315524**	**179944**	**245520**	**605792**	**1820933**

Source : Motor Transport Statistics of India 2001-02, Transport Research Wing, Ministry of Road Transport & Highways

* : Data relates to 1997-98
** : Data relates to 1996-97
(--) : Nil
$: Data relates to1998-99
(a) : Included in cars
(b) : Included in tractors
*** : Data relates to 2000-01
N. A . : Not Available

TABLE 4.1.6 : TOTAL REGISTERED MOTOR VEHICLES IN METROPOLITAN CITIES OF INDIA-Concld.

(as on 31st March, 2003) Provisional

(Number)

Sl. No.	Name of City	Non-Transport								
		Two Wheelers	Cars	Jeeps	Omni Buses	Tractors	Trailers	Others	Total Non-Transport	Grand Total (Transport +Non Transport)
1	2	9	10	11	12	13	14	15	16	17
1	Ahmedabad	758412	125869	10113	.	109	172	1784	**896459**	**977734**
2	Bangalore	1325317	237988	7081	16471	8847	7383	15249	**1618336**	**1770930**
3	Bhopal	292522	24916	3044		9512	3548	651	**334193**	**360853**
4	Chennai	1265443	320641	12097	8769	2305	11597	31587	**1652439**	**1894819**
5	Cochin **	477312	56379	4213	303	5868	83	2884	**547042**	**577956**
6	Coimbatore	2517788	1096148	118545	4798	4808	99	9396	**3751582**	**3970870**
7	Delhi	992415	162489	28466	10190	281		786	**1194627**	**1318538**
8	Hyderabad $	460131	49223	4305		10837	7443	1658	**533597**	**592353**
9	Indore	564419	77121	22621		21939	2745	548	**689393**	**752645**
10	Jaipur	352698	44094	4397	2040	4238	425	1192	**409084**	**424652**
11	Kanpur	81783	27630	5745	3817	403	159	235	**119772**	**166481**
12	Kolkata *	374409	312911	(a)		4821	(b)	21043	**713184**	**841530**
13	Lucknow	491012	66881	11185		11737	911	3029	**584755**	**614794**
14	Ludhiana ***	562995	77687	3472		45333	311	524	**690322**	**727664**
15	Madurai	233171	18042	1200	77	3732	1194	2163	**259579**	**281387**
16	Mumbai	527108	341774	21081	3950	1392	1065	4578	**900948**	**1123562**
17	Nagpur	424379	29243	8957	497	3555	3780	543	**470954**	**502580**
18	Patna	227572	36651	..		8143	6609	1589	**280564**	**335623**
19	Pune	517137	73520	11426	613	1115	1045	839	**605695**	**696993**
20	Surat	535765	51675	3685		145	209	469	**591948**	**633040**
21	Vadodara	429862	50832	6152		1582	3256	2468	**494152**	**545624**
22	Varanasi	304724	20694	2699		20705	1303	964	**351089**	**365913**
23	Visakhapatnam $	326295	26665	2225	1185	2139	52	624	**359185**	**393291**
Total		**14042669**	**3329073**	**292709**	**52710**	**173546**	**53389**	**104803**	**18048899**	**19869832**

Source : Motor Transport Statistics of India 2001-02, Transport Research Wing, Ministry of Road Transport & Highways

* : Data relates to 1997-98
** : Data relates to 1996-97
(--) : Nil
(a) : Included in cars
(b) : Included in tractors
*** : Data relates to 2000-01
$: Data relates to1998-99
N. A . : Not Available

With the increasing urbanization and industrialization, the transport demand has also increased consequently. The total number of vehicles in India has increased from about 11 million in 1986 to more than 59 million, in 2001-02, of which about 30% is concentrated in the 23 metropolitan cities. This has increased the vehicular pollution. The different factors are the types of engines used, the age of the vehicles, poor road conditions and congested traffic. The principal vehicular pollutants are Carbon Monoxide, Oxides of Nitrogen, Hydrocarbons, suspended and particulate matters, a varying amount of Sulphur Dioxide depending on the Sulphur content of the fuel and lead compounds.

TABLE 4.1.7 : WORKING OF STATE TRANSPORT UNDERTAKINGS

(2003-04)

Sl. No.	Year/State/UT	Fleet Strength (Buses) (no.)	Vehicles in Bus Scheduled Service (No.)	Passenger Kilometres Performed (Lakh km.)	Gross Revenue Receipts (Rs. Lakh)	Current Expenditure (Total Operating Cost) (Rs. Lakh)	Net Revenue (Rs. Lakh)
1	2	3	4	5	6	7	8
	1990-91	100182	85481	3766032	509351	571019	-61668
	1991-92	96909	85099	3956416	608679	669574	-60895
	1992-93	105214	92089	4152713	691882	763124	-71242
	1993-94	102913	91835	4111659	777344	842947	-65603
	1994-95	90566	80213	3713205	613420	688359	-74939
	1995-96	91144	80572	3916078	657591	759655	-102064
	1996-97	88479	78896	3816364	632465	735700	-103234
	1997-98	101514	91916	4067927	831140	941947	-110807
	1998-99	105336	95092	4243137	902597	1080743	-178147
	1999-2000	115034	103392	4608822	1102700	1303904	-201204
	2000-01	114970	104629	4553052	1532556	1727202	-194646
	2001-02	114689	103328	4414562	1604050	1823316	-219266
	2003-04	**114875**	**99749**	**4280342**	**1661835**	**1814309**	-152474
	State:						
1	Andhra Pradesh	18108	17702	745688	287998	306172	-18174
2	Arunachal Pradesh	228	--	--	--	--	--
3	Assam	447	--	--	--	--	--
4	Bihar	1540	--	--	--	--	--
5	Goa	375	292	8686	4172	4549	-377
6	Gujarat	9896	8203	364236	135809	159683	-23874
7	Haryana	3403	3364	140652	57181	62429	-5248
8	Himachal Pradesh	1711	1676	39515	23707	26693	-2986
9	Jammu and Kashmir	700	--	--	--	--	--
10	Karnataka	12312	11662	550213	194783	188648	6135
11	Kerala	4404	--	--	--	--	--
12	Madhya Pradesh	1699	1665	55354	22675	32668	-9993
13	Maharashtra	22292	19689	676562	365290	391617	-26327
14	Manipur	25	--	--	--	--	--
15	Meghalaya	128	--	--	--	--	--
16	Mizoram	84	33	236	209	952	-743
17	Nagaland	170	83	968	567	1515	-948
18	Orissa	250	241	8629	3270	3219	56
19	Punjab	2632	2500	87607	37955	48954	-10999
20	Rajasthan	4371	4157	181939	67593	71670	-4077
21	Sikkim	105	76	411	1740	2280	-540
22	Tamil Nadu	16672	15092	1071703	323062	323147	-85
23	Tripura	89	57	905	340	1128	-788
24	Uttar Pradesh	6554	5700	217847	81238	86757	-5519
25	West Bengal	3011	1697	45554	25008	33715	-8707
26	**Union Territory:**						
27	A. & N. Island	170	--	--	--	--	--
28	Chandigarh	417	--	--	--	--	--
29	Delhi	3082	2496	100573	35157	80269	-45112

Source: Central Institute of Road Transport

TABLE 4.1.8(a) : AMBIENT AIR QUALITY IN DELHI

Sr. No.	Parameters/Area	Year				
		1999	2000	2001	2002	2003
1	2	3	4	5	6	7
1	**Sulphur Dioxide (µg/m^3)**					
	Industrial Area	19.5	19.0	13.0	13.0	9.0
	Residential Area	17.0	17.0	14.0	11.0	10.0
	Traffic Intersection	20.0	18.0	15.0	10.0	9.0
2	**Nitrogen Dixoide ((µg/m3)**					
	Industrial Area	33.5	36.0	29.0	35.0	36.0
	Residential Area	26.5	31.0	29.0	33.0	38.0
	Traffic Intersection	60.0	59.0	67.0	75.0	94.0
3	**Suspended Particulate**					
	Industrial Area	361.0	433.0	358.0	400.0	352.0
	Residential Area	349.0	370.0	344.0	384.0	314.0
	Traffic Intersection	418.0	490.0	476.0	523.0	509.0
4	**Lead (µg/m3)**					
	Residential Area	46.0	40.0	47.0	NA	NA
	Traffic Intersection	70.0	102.0	103.0		
5	**Carbon Mono-oxide (µg/m3)**					
	Traffic Intersection	4241.0	4686.0	4183.0	3258.0	2831.0

Source: Central Pollution Control Board

TABLE 4.1.8 (b): AMBIENT AIR QUALITY IN MAJOR CITIES

(Average)

DELHI					
Location	**Type of Area**	**Sulphur dioxide**	**Nitrogen dioxide**	**Respirable Suspended Particulate Matter**	**Suspended Particulate Matter**
Mayapuri Industrial Area	I	16	57	256	480
Sarojini Nagar	**R**	**4**	**71**	**180**	**284**
Town Hall	R	5	93	216	425
MUMBAI					
Parel	I	7	24	123	218
Worli	**R**	**7**	**28**	**123**	**327**
Kalbadevi	R	6	22	108	347
CHENNAI					
Thiruvottiyur Municipal Office	I	9	12	60	188
Kathivakkam	**I**	**27**	**31**	**62**	**92**
Manali	I	32	31	108	204
Thiruvottiyur	I	25	19	86	120
Madras Medical College	R	8	11	48	154
NEERI CSIR Campus	R	4	5	39	134
KOLKATA					
Cossipore	I	13	71	219	426
Lal Bazaar	**R**	**12**	**61**	**184**	**355**
Kasba	R	6	41	151	278
MADURAI					
Fenner (I) Ltd	I	13	26	74	195
Highway Building	**R**	**9**	**21**	**59**	**135**
Kunathurchatram	R	8	23	167	274
TUTICORIN					
Parel	I	19	16	39	68
Worli	**R**	**16**	**14**	**38**	**57**
Kalbadevi	R	15	11	40	70
SOWDESHWARI COLLEGE (RES.AREA), SALEM					
Parel	I	6	25	57	122
Worli	**R**	**6**	**33**	**45**	**99**
Kalbadevi	R	7	32	41	78

Source : Central Pollution Control Board, January,2005
Note : I : Industrial Area, R : Residential and Other areas
Average : Average concentration in u g/m3

TABLE 4.1.9: EMISSION LIMITS FOR DIESEL DRIVEN VEHICLES

Test	Light absorption Coefficient (Millilitre)	Maximum Smoke Density	
		Bosch Units	HartridgeUnit
2	3	4	5
Full load at a speed of 60 to 70 per cent of maximum engine rated speed specified by the manufacturer	3.1	5.2	75.0
Free acceleration	2.3	---	65.0

Source : TERI Energy Data Directory and Yearbook, 2004-05

TABLE 4.1.10 : PHASED TIGHTENING OF EXHAUST EMISSION STANDARDS FOR INDIAN AUTOMOBILES

Sl. No.	Category	1991	1996	2000 (Euro II)	2005 (Euro III)
1	2	3	4	5	6
1	**Petrol Vehicles : (in grams/km)**				
I.	**Two wheelers**				
	(a) CO	12-30	4.5	2.0	-
	(b) HC	8-12	-	-	-
	(c) ($HC+NO_X$)	-	3.6	2.0	-
II.	**Three Wheelers**				
	(a) CO	12-30	6.75	4.0	-
	(b) HC	8-12	-	-	-
	(c) ($HC+NO_X$)	-	5.40	2.0	-
III.	**Cars with CC :**				
	(a) CO	-	4.34-6.20	2.72	2.2
	(b) HC	-	-	-	-
	(c) ($HC+NO_X$)	-	1.5-2.18	0.97	0.5
IV.	**Cars without CC :**				
	(a) CO	14.3-27.1	8.68-12.4	2.72	2.2
	(b) HC	2.0-2.9	-	-	-
	(c) ($HC+NO_X$)	-	3.00-4.36	0.97	0.5
2	**Diesel Vehicles :**				
	A : Gross Vehicles Weight > 3.5 ton (Heavy Duty Vehicles)-in grams/kWh				
	(a) CO	14.0	11.2	4.5	4
	(b) HC	3.5	2.4	1.1	1.1
	(c) NO_X	18.0	14.4	8.0	7
	(d) PM > 85 KW/g/KWh	-	-	0.36	0.15
	(e) PM < 85 KW/g/KWh	-	-	0.61	0.15
	B : Gross Vehicles Weight < 3.5 ton (Light duty Vehicles)*-in grams/km				
	(a) CO	14.3-27.1	5.0-9.0	2.72-6.90	1.06
	(b) ($HC+NO_X$)	2.7-6.9	2.0-4.0	0.97-1.70	0.71
	(c) NO_X	-	-	-	0.566
	(d) PM	-	-	0.14-0.25	0.080

Source : The Energy Resources Institute.

CO : Carbon Monoxide CC : Catalytic Converter

HC : Hydrocarbon PM : Particulate matter

NO_X : Oxides of Nitrogen

* : The test cycle is as per 13 mode cycle or a chasis dynamometer.

Euro I w.e.f. 1-6-99 and Euro II w.e.f. 1-4-2000 for private (non-commercial) vehicles in NCR.

Stricter emission norms for new vehicles effective from 1.4.2000 have been notified by the Ministry of Surface Transport and has come into force. The Progressive tightening of emission norms for vehicles at manufacturing stage has brought about significant improvement in exhaust emission of new vehicles after March, 2000.

TABLE 4.1.11 (a) : PRODUCTION OF ODS IN INDIA

(MT)

Sl. No.	ODS	1998	1999	2000	2001	2002	2003	2004
1	2	3	4	5	6	7	8	9
1	CFC-11	6291.0	6057.0	5634.0	4514.0	3689.0	2609.0	2429.0
2	CFC-12	13721.0	16442.0	14777.0	14164.0	13167.0	12373.0	10611.0
3	CFC-113	--	38.0	5.0	14.0	35.0	32.0	30.0
4	H-1211	--	-	-	-	-	-	-
5	H-1301	--	-	-	-	-	-	-
6	CTC	19225.0	20138.0	17509.0	16459.0	18957.0	18239.0	16631.0
7	MCF	11426	-	-		-	-	-
8	HCFC-22		15412	14061	14868	14606	19216	25592.0
9	MBr	-	-	107	85	37914.0	-	-
Total		50663.0	58087.0	51986.0	50019.0	50454.0	52469.0	55293.0

Source : Ozone cell, Ministry of Environment and Forests

TABLE 4.1.11(b) TOTAL CONSUMPTION OF ODS

(MT)

Sl. No.	ODS	2000	2001	2002	2003	2004
1	2	3	4	5	6	7
1	CFC-11	3002.0	2196	1680.0	829	426
2	CFC-12	2612.0	2315	2210.0	1777	1808
	CFC-113	-	5	29.0	4	10
3	CTC	11043.0	8471	9510.0	9798	6781
4	HCF-22	3583.0	2973	3207.0	3648	7228
5	HCF-123	20.0	25	25.0	0	60
6	HCF-141b	483.0	359	1401.0	952	1357
7	MBr	-	27	9510.0	-	-
Total		20743	16371	27572.0	17008	17670

Source : Ozone cell, Ministry of Environment and Forests

TABLE 4.2.1 : INSTALLED CAPACITY OF POWER UTILITIES on 31st March, 2004

(Mega Watts)

Sl. No.	State/Union Territory	Hydro	Thermal			Wind	Nuclear	Total
			Steam	Diesel	Gas			
1	2	3	4	5	6	7	8	9
I	**Northern Region**	**10588.39**	**15914.50**	**14.99**	**3213.20**	**178.50**	**1180.00**	**31089.58**
1	Haryana	883.87	1102.50	3.92	0.00	0.00	0.00	1990.29
2	Himachal Pradesh	709.00	0.00	0.13	0.00	0.00	0.00	709.13
3	Jammu & Kashmir	309.15	0.00	8.94	175.00	0.00	0.00	493.09
4	Punjab	2402.17	2130.00	0.00	0.00	0.00	0.00	4532.17
5	Rajasthan	968.75	2420.00	0.00	113.80	178.50	0.00	3681.05
6	Uttar Pradesh	518.60	4102.00	0.00	0.00	0.00	0.00	4620.60
7	Uttaranchal	986.85	0.00	0.00	0.00	0.00	0.00	986.85
8	Chandigarh	0.00	0.00	2.00	0.00	0.00	0.00	2.00
9	Delhi	0.00	320.01	0.00	612.40	0.00	0.00	932.41
10	Central sector	3810.00	5840.00	0.00	2312.00	0.00	1180.00	13142.00
II	**Western region**	**4986.58**	**20691.50**	**17.48**	**5035.72**	**632.46**	**760.00**	**32123.74**
1	Gujarat	561.00	4819.00	17.48	1863.72	202.19	0.00	7463.39
2	Madhya Pradesh	931.42	2157.50	0.00	0.00	22.65	0.00	3111.57
3	Chhatisgharh	120.00	1280.00	0.00	0.00	0.00	0.00	1400.00
4	Maharashtra	2874.16	8075.00	0.00	1832.00	407.40	0.00	13188.56
5	Goa	0.00	0.00	0.00	48.00	0.22	0.00	48.22
6	Dadra & Nagar Haveli	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Daman & Diu	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Central sector	500.00	4360.00	0.00	1292.00	0.00	760.00	6912.00
III	**Southern region**	**10363.07**	**13492.50**	**949.29**	**2650.40**	**1671.66**	**780.00**	**29906.92**
1	Andhra Pradesh	3586.12	2952.50	36.80	1112.40	98.80	0.00	7786.62
2	Karnataka	2973.50	1730.00	234.42	220.00	209.20	0.00	5367.12
3	Kerala	1807.60	0.00	256.44	174.00	2.03	0.00	2240.07
4	Tamil Nadu	1995.85	3220.00	411.66	761.50	1361.63	0.00	7750.64
5	Lakshadweep	0.00	0.00	9.97	0.00	0.00	0.00	9.97
6	Pondicherry	0.00	0.00	0.00	32.50	0.00	0.00	32.50
7	Central sector	0.00	5590.00	0.00	350.00	0.00	780.00	6720.00
IV	**Eastern region**	**2455.77**	**14527.38**	**71.25**	**190.00**	**5.18**	**0.00**	**17249.58**
1	Bihar	44.90	553.50	0.00	0.00	0.00	0.00	598.40
2	Jharkhand	130.00	1500.00	0.00	0.00	0.00	0.00	1630.00
3	Orissa	1877.92	420.00	0.00	0.00	2.98	0.00	2300.90
4	West Bengal	161.70	4506.38	12.20	100.00	2.20	0.00	4782.48
5	D.V.C.	144.00	2637.50	0.00	90.00	0.00	0.00	2871.50
6	A. & N. Islands	5.25	0.00	54.05	0.00	0.00	0.00	59.30
7	Sikkim	32.00	0.00	5.00	0.00	0.00	0.00	37.00
8	Central sector	60.00	4910.00	0.00	0.00	0.00	0.00	4970.00
V	**North-eastern region**	**1113.02**	**330.00**	**119.82**	**750.50**	**0.32**	**0.00**	**2313.66**
1	Assam	2.00	330.00	20.69	269.00	0.00	0.00	621.69
2	Manipur	1.50	0.00	45.41	0.00	0.00	0.00	46.91
3	Meghalaya	185.52	0.00	2.05	0.00	0.00	0.00	187.57
4	Nagaland	25.50	0.00	2.00	0.00	0.16	0.00	27.82
5	Tripura	16.00	0.00	4.85	106.50	0.00	0.00	127.35
6	Arunachal Pradesh	18.50	0.00	15.88	0.00	0.00	0.00	34.38
7	Mizoram	4.00	0.00	28.94	0.00	0.00	0.00	32.94
8	Central sector	860.00	0.00	0.00	375.00	0.00	0.00	1235.00
All-India		**29506.83**	**64955.88**	**1172.83**	**11839.82**	**2488.12**	**2720.00**	**112683.48**

Source : Central Electricity Authority

TABLE 4.2.2 : GENERATING CAPACITY AND ELECTRICITY GENERATION

Parameter	1980-81	1990-91	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04
2	3	4	5	6	7	8	9	10	11	12	13
Generating capacity*											
All-India (Utilities + Non-Utilities)	**33316**	**74699**	**95081**	**97874**	**102268**	**107355**	**113220.67**	**117782.57**	**122191.16**	**126239.99**	**131423.8**
Total (Utilites)	**30214**	**66086**	**83294**	**85795**	**89102**	**93255**	**97884.47**	**101626.21**	**105045.96**	**107877.36**	112683.5
Public sector	28832	63344	79418	80783	82846	85430	88934.88	91690.03	94246.01	96526.32	100358.8
Private sector	1382	2742	3876	5012	6256	7825	8949.59	9936.18	10799.95	11351.04	12324.63
Average annual growth rate (per cent) during the decade	7.46	8.14	5.94	5.7	5.1	4.68					
Non-utilities(including railways)	**3102**	**8613**	**11787**	**12079**	**13166**	**14100**	**15336.20**	**16156.36**	**17145.20**	**18361.62**	**18740.31**
Hydro	3	4	3	3	21	21	46.80	46.72	51.10	51.10	61.97
Steam	2137	5010	6324	6171	6648	6950	7675.66	7996.79	8354.03	9094.16	8585.28
Gas	54	475	956	1166	1330	1950	1816.89	1823.31	2125.91	2385.15	2745.74
Diesel and wind	908	3124	4504	4739	5167	5179	5796.85	6289.54	6614.16	6831.21	7347.32
Electricity Generation**											
All-India (Utilities + Non-Utilities)	**119260**	**289439**	**418043**	**436729**	**465825**	**494143**	**536452.35**	**560842.03**	**579120.06**	**596542.86**	**633274.8**
Total (Utilities)	**110844**	**264329**	**379877**	**395889**	**421747**	**448563**	**481055.19**	**501204.07**	**517439.24**	**532692.96**	**565101.7**
Public sector	104114	251382	361725	374126	395593	416726	438658.49	457223.29	474322.96	484648.12	509730.1
Private sector	6730	12947	18152	21763	26154	31837	42396.70	43980.78	43116.28	48044.84	55371.57
Average annual growth rate (per cent) during the decade	7.10	9.08	8.35	7.75	7.63	7.32					
Non-utilities(including Railways)	**8416**	**25110**	**38166**	**40840**	**44078**	**45580**	**55397.16**	**59637.96**	**61680.82**	**63849.90**	**68173.12**
Hydro	15	15	17	29	79	80	98.36	99.85	116.59	90.32	97.49
Steam	7232	20017	28754	29130	30686	31900	34813.90	40256.24	41853.85	42229.66	39610.29
Gas	102	1845	4576	5039	5776	5900	9932.01	7782.34	8835.19	10198.16	14874.38
Diesel and wind	1067	3233	4819	6642	7537	7700	10552.89	11499.53	10875.19	11331.76	13590.96

Source : Central Electricity Authority

* : in megawatts

** : in gigawatts-hours

TABLE 4.2.3 : ACTUAL POWER SUPPLY POSITION

(All figures in MU net)

Sl. No.	Region/ State/ System	April 2004 to March 2005				April 2003-March 2004			
		Requirement	Availability	Shortage	Shortage %	Requirement	Availability	Shortage	Shortage %
1	2	3	4	5	6	7	8	9	10
I.	**Northern Region**	**175498**	**159358**	**-16140**	**-9.2**	**161595**	**152743**	**-8852**	**-5.5**
1	Chandigarh	1157	1148	9	0.8	1088	1087	**-1**	**-0.1**
2	Delhi	21157	20952	-205	-1.0	20440	20160	**-280**	**-1.4**
3	Haryana	21801	20562	-1239	-5.7	20743	19779	**-964**	**-4.6**
4	Himachal Pradesh	4000	3917	-83	-2.1	3439	3424	**-15**	**-0.4**
5	Jammu & Kashmir	8138	7387	-751	-9.2	7105	6780	**-325**	**-4.6**
6	Punjab	33393	30383	-3010	-9.0	31420	30520	**-900**	**-2.9**
7	Rajasthan	29207	28974	-233	-0.8	26611	26486	**-125**	**-0.5**
8	Uttar Pradesh	52017	41565	-10452	-20.1	46552	40399	**-6153**	**-13.2**
9	Uttaranchal	4628	4470	-158	-3.4	4197	4108	**-89**	**-2.1**
II.	**Western Region**	**204048**	**181010**	**-23038**	-11.3	**191680**	**171236**	**-20444**	**-10.7**
1	Chhatisgarh	11747	11553	**-194**	-1.7	10147	9876	**-271**	**-2.7**
2	Gujarat	59681	52724	**-6957**	-11.7	57171	50292	**-6879**	**-12.0**
3	Madhya Pradesh	34810	30097	**-4713**	-13.5	32744	28417	**-4327**	**-13.2**
4	Maharashtra	92715	81541	**-11174**	-12.1	87933	78966	**-8967**	**-10.2**
5	Daman & Diu	1119	1119	**0**	0.0	633	633	**0**	**0.0**
6	Dadar Nagar Haveli	1830	1830	**0**	0.0	1073	1073	**0**	**0.0**
7	Goa	2146	2146	**0**	0.0	1979	1979	**0**	**0.0**
III.	**Southern Region**	**147672**	**145395**	**-2277**	**-1.5**	**144372**	**136844**	**-7528**	**-5.2**
1	Andhra Pradeash	50416	50061	**-355**	-0.7	48080	46680	**-1400**	**-2.9**
2	Karnataka	35156	33687	**-1469**	-4.2	36153	31145	**-5008**	**-13.9**
3	Kerala	12691	12540	**-151**	-1.2	12995	12498	**-497**	**-3.8**
4	Tamil Nadu	47872	47570	**-302**	-0.6	45665	45042	**-623**	**-1.4**
5	Pondicherry	1537	1537	**0**	0.0	1479	1479	**0**	**0.0**
IV.	**Eastern Region**	**57036**	**55678**	**-1358**	-2.4	**54977**	**52287**	**-2690**	**-4.9**
1	Bihar	7201	6476	**-725**	-10.1	7588	5878	**-1710**	**-22.5**
2	D.V.C.	9070	8988	**-82**	-0.9	8390	8265	**-125**	**-1.5**
3	Jharkhand	3630	3550	**-80**	-2.2	3298	3161	**-137**	**-4.2**
4	Orissa	13980	13875	**-105**	-0.8	13610	13375	**-235**	**-1.7**
	West Bengal+ Sikkim	23155	22789	**-366**	-1.6	22091	21608	**-483**	**-2.2**
V.	**North-Eastern Region**	**7119.0**	**6674.0**	**-445**	-6.3	**6640.0**	**6288.0**	**-352**	**-5.3**
1	Arunachal Pradesh	158.0	158.0	**0**	0.0	177	175	**-2**	**-1.1**
2	Assam	3787.0	3582.0	**-205**	-5.4	3527	3321	**-206**	**-5.8**
3	Manipur	537.0	523.0	**-14**	-2.6	480	469	**-11**	**-2.3**
4	Meghalaya	1374.0	1228.0	**-146**	-10.6	1151	1076	**-75**	**-6.5**
5	Mizoram	236.0	222.0	**-14**	-5.9	283	279	**-4**	**-1.4**
6	Nagaland	330.0	324.0	**-6**	-1.8	306	300	**-6**	**-2.0**
7	Tripura	700.0	641.0	**-59**	-8.4	716.0	671	**-45**	**-6.3**
	All India	**591373.0**	**548115.0**	**-43258**	-7.3	**559264**	**519398**	**-39866**	**-7.1**

Source : Central Electricity Authority

- : Indicates Surplus

MU : Million Units

TABLE 4.2.4 : ANNUAL GROSS GENERATION OF POWER BY SOURCE

(in MU units)

Sl. No.	Year	Hydro	Steam @	Diesel & Wind @	Gas	Nuclear	Thermal*	Total
1	2	3	4	5	6	7	8	9
1	1980-81	46541.8	60713.8	61.5	522.0	3001.3	-	110840.4
2	1985-86	51020.6	112540.1	50.6	1756.9	4981.9	-	170350.1
3	1990-91	71641.3	178321.7	111.3	8113.2	6141.1	-	264328.6
4	1991-92	72757.1	197163.2	134.0	11450.0	5524.4	-	287028.7
5	1992-93	69869.2	211123.5	162.3	13480.4	6726.3	-	301361.7
6	1993-94	70462.7	233150.7	310.9	14727.6	5397.7	-	324049.6
7	1994-95	82712.0	243110.2	545.2	18474.8	5648.2	-	350490.4
8	1995-96	72759.2	273743.5	714.4	24858.4	7981.7	-	380057.2
9	1996-97	68900.8	289378.3	1554.3	26984.9	9071.1	-	395889.4
10	1997-98	74581.7	300730.5	1929.3	34423.2	10082.6	-	421747.3
11	1998-99	82690.0	308056.0	2136.0	43480.0	12015.0	353662.0	448367.0
12	1999-00	80637.0	377814.0	3989.0	49773.0	13267.0	386776.0	480680.0
13	2000-01	74481.0	357006.0	3822.0	48311.0	16928.0	408139.0	499548.0
14	2001-02	73579.9	370883.5	6402.7	47098.6	19474.6	424385.8	517439.2
15	2002-03	64014.0	389550.3	7052.4	52686.6	19390.0	449289.3	532693.3
16	2003-04	75242.5	407283.8	6867.0	57928.4	17780.0	472079.2	565101.7

Source: Central Electricity Authority, TEDDY 2003-04

* : Including Coal, Lignite, Diesel & Gas based stations

@' : CEA are not monitoring Captioc Power Plants Wind & Generation of small stations i.e. Mini & Micro Hydel

MU : Million Units

The power generating capacity , owned and operated by utilities, has grown at a rate of over 10% per year since 1950. The shares of hydro power and thermal power have changed substantially. The share of hydro capacity declined from 43.4% in 1970-71 to 42% in 1980-81 and further reduced to 17.7% in 1997-98 and 12% in 2002-03.Further, its' share in 2003-04 has increased to 13.2%.

It is difficult to strike an optional balance between Hydro and Thermal power, as it may depend upon the system load curve, performance of various types of plants etc.

Perhaps, one of the most important reasons for the decline in the share of hydro electricity is that its gestation period is larger than that of thermal capacity. This is, because, equipment and construction procedures for thermal projects are largely independent of site conditions and can, therefore, be standardized. Hydro-development has also lagged behind due to inter-state disputes and sharing of water, inadequate funding and on account of environmental considerations with addition to installed capacity, gross utility generation also increased rapidly

TABLE 4.2.5 : NUMBER OF TOWNS AND VILLAGES ELECTRIFIED IN INDIA

(As on 31.03.2005)

Sl. No.	State/Union Territory	Towns		Villages	
		Total	Electrified	Total	Electrified (provisional)
1	2	3	4	5	6
I.	**Northern Region**	**1342**	**1342**	**193577**	**150813**
1	Haryana	94	94	6759	6759
2	Himachal Pradesh	58	58	16997	16897
3	Jammu & Kashmir	58	58	6477	6304
4	Punjab	120	120	12428	12428
5	Rajasthan	222	222	37889	37441
6	Uttar Pradesh	753	753	97122	56977
7	Uttaranchal			15681	13783
8	Chandigarh	5	5	25	25
9	Delhi	32	32	199	199
II.	**Western Region**	**1099**	**1099**	**130421**	**127822**
1	Gujarat	264	264	18028	17940
2	Madhya Pradesh	465	465	51806	50474
3	Chhatisgharh			19720	18602
4	Maharashtra	336	336	40412	40351
5	Goa	31	31	360	360
6	Daman & Diu	2	2	24	24
7	Dadra & Nagar Haveli	1	1	71	71
III.	**Southern Region**	**1251**	**1251**	**71128**	**70813**
1	Andhra Pradesh	264	264	26586	26565
2	Karnataka	306	306	27066	26772
3	Kerala	197	197	1384	1384
4	Tamil Nadu	469	469	15822	15822
5	Pondicherry	11	11	263	263
6	Lakshadweep	4	4	7	7
IV.	**Eastern Region**	**786**	**786**	**153363**	**119054**
1	Bihar	271	271	67513	48300
2	Jharkhand				
3	Orissa	124	124	46989	37502
4	West Bengal	382	382	37910	32346
5	A & N Islands	1	1	504	501
6	Sikkim	8	8	447	405
V.	**North-Eastern Region**	**195**	**195**	**38769**	**30470**
1	Assam	93	93	24685	19350
2	Manipur	31	31	2182	2020
3	Meghalaya	12	12	5484	3775
4	Nagaland	9	9	1216	1216
5	Tripura	18	18	855	821
6	Arunachal Pradesh	10	10	3649	2593
7	Mizoram	22	22	698	695
Total (All India)		**4673**	**4673**	**587258**	**498972**

Source : Central Electricity Authority

TABLE 4.2.6 : STATEWISE PRODUCTION OF COAL AND LIGNITE

(Million tonnes)

Sl. No.	States	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04(P)	2004-05
1	2	4	5	6	7	8	9	10	11
I.	**Coal**	**300.403**	**296.508**	**304.103**	**313.696**	**327.787**	**341.272**	**361.156**	**382.615**
1	Andhra Pradesh	28.941	27.326	29.556	30.274	30.811	33.236	33.854	35.303
2	Assam	0.687	0.637	0.572	0.660	0.640	0.633	0.733	0.628
3	Bihar	81.274	76.161	76.533	41.896				
4	Chhatisgarh				22.803	53.621	56.758	61.505	69.253
5	Jammu & Kashmir	0.005	0.010	0.028	0.033	0.035	0.025	0.019	0.023
6	Jharkhand				33.520	76.813	78.628	79.533	78.038
7	Madhya Pradesh	84.753	84.937	87.901	69.927	44.156	45.736	49.826	52.511
8	Maharashtra	26.171	25.279	27.698	28.754	30.830	31.359	32.912	34.529
9	Meghalaya	3.234	4.238	4.060	4.065	5.149	4.406	5.439	5.345
10	Orissa	42.162	43.512	43.554	44.803	47.805	52.229	60.049	66.604
11	Uttar Pradesh	15.781	15.646	16.220	16.863	16.533	17.783	15.791	16.804
12	West Bengal	17.395	18.762	17.981	20.098	21.394	20.479	21.495	23.577
II.	**Lignite**	**23.231**	**23.419**	**22.475**	**24.247**	**24.813**	**26.018**	**27.958**	**30.337**
1	Gujarat	4.943	5.002	4.701	5.858	6.167	6.921	6.724	8.222
2	Rajasthan	0.179	0.249	0.222	0.217	0.277	0.473	0.678	0.548
3	Tamilnadu	18.109	18.168	17.552	18.172	18.369	18.624	20.556	21.567

Source : Office of the Coal Controller

P : Provisional

Coal is the most abundant source of commercial energy in India. Coal resources are continually assessed by the Geological Survey of India through regional mapping and exploratory drilling. The total coal reserves (as on 1 January, 2005) have been assessed at about 248 billion tonnes of which 93 billion tonnes are proven resources.

Coal production increased rapidly after the nationalisation of coal mines. From about 72.9 million ton in 1970/71, it raised to 211.7 million ton in 1990/91 and to 383 million ton in 2004-2005 making India the world's fourth largest coal producer. The increase is predominantly in non-coking coal production. One of the major constraints on the profitability of the coal sector is the low productivity levels in underground mines. The underground mines employ 80% of manpower, but contribute to only 30% of the total output. Since the nationalisation of the coal industry, India's mine planners have chosen opencast mining over underground methods, to enhance productivity and meet production targets. The drawback of extracting the majority of the coal with opencast methods is that its quality is unavoidably affected by contamination of overburden mixes into the coal.

TABLE 4.2.7 : PRODUCTION OF COAL FROM OPENCAST WORKING BY MECHANISATION AND OVERBURDEN REMOVED DURING THE YEAR, 2002

(Tonnes)

Sl. No.	States	Total Opencast Output	Mechanisation			Overburden Removed (in '000 Cubic metres)
			Fully Mechanised	Semi Mechanised	Manual	
1	2	3	4	5	6	7
I	**COAL**	**272949129**	**272943054**	**---**	**6075**	**1824222**
1	Andhra Pradesh	19459353	19459353	---	---	89533
2	Assam	534096	534096	---	---	4579
3	Chhattisgarh	48192345	48192345	---	---	704405
4	Jharkhand	69190665	69184590	---	6075	128711
5	Madhya Pradesh	29415081	29415081	---	---	102833
6	Maharashtra	27749893	27749893	---	---	99734
7	Orissa	49483751	49483751	---	---	484662
8	Uttar Pradesh	20076000	20076000	---	---	176199
9	West Bengal	8847945	8847945	---	---	33566
II	**LIGNITE**	**25032574**	**25032574**	**--**	**---**	**143244**
1	Gujarat	6888879	6888879	---	---	28744
2	Rajasthan	406580	406580	---	---	3808
3	Tamilnadu	17737115	17737115	---	---	110692

Source : Directorate General of Mines Safety, Dhanbad

TABLE 4.2.8 : PRODUCTIVITY IN COAL MINES IN THE YEAR, 2002

(Tonnes)

Sl. No.	State	Output Per Man Year			Output Per Manshift		
		Belowground	Opencast	Overall	Belowground	Opencast	Overall
1	2	3	4	5	6	7	8
I	**COAL**	**291**	**4285**	**818**	**0.94**	**11.36**	**2.62**
1	Andhra Pradesh	295	3266	545	0.98	10.67	1.82
2	Assam	129	919	230	0.43	2.90	0.76
3	Jharkhand	210	2422	603	0.69	7.65	1.96
4	Jammu & Kashm	39	---	31	0.13	---	0.10
5	Madhya Pradesh	450	5923	869	1.42	17.91	2.71
6	Maharashtra	343	4142	1038	1.09	12.52	3.22
7	Orissa	360	10211	3142	1.17	31.64	9.90
8	Uttar Pradesh	---	5959	3312	---	18.59	10.37
9	West Bengal	231	2574	263	0.75	8.17	0.85
II	**LIGNITE**	**---**	**5029**	**2743**	**---**	**16.20**	**8.83**
1	Gujarat	---	7080	4140	---	23.55	13.76
2	Rajasthan	---	3598	2525	---	11.80	8.33
3	Tamil Nadu	---	4557	2429	---	14.56	7.76

Source : Directorate General of Mines Safety, Dhanbad

TABLE 4.2.9 : STATEWISE INVENTORY OF GEOLOGICAL RESERVES OF COAL

(Million tonnes)

Sl No.	State	As on	Proved	Indicated	Inferred	Total
1	2	3	4	5	6	7
1	**Andhra Pradesh (Gondawana)**	1-1-2003	7944	6122	2518	16584
		1-1-2004	8091	6092	2514	16697
		1-1-2005	8263	6079	2584	16926
2	**Arunachal Pradesh (Tertiary)**	1-1-2003	31	40	19	90
		1-1-2004	31	40	19	90
		1-1-2005	31	40	19	90
3	**Assam (Tertiary)**	1-1-2003	279	27	34	340
		1-1-2004	279	27	34	340
		1-1-2005	279	27	34	340
4	**Jharkhand (Gondawana)**	1-1-2003	35266	29552	6326	71144
		1-1-2004	35305	30211	6348	71864
		1-1-2005	35417	30438	6348	72204
5	**Bihar (Gondawana)**	1-1-2003	0	0	160	160
		1-1-2004	0	0	160	160
		1-1-2005	0	0	160	160
6	**Madhya Pradesh (Gondawana)**	1-1-2003	7100	7888	3217	18205
		1-1-2004	7503	8233	2924	18660
		1-1-2005	7513	8815	2904	19232
7	**Chhatisgarh (Gondawana)**	1-1-2003	8561	25410	4165	38135
		1-1-2004	8771	26419	4355	39545
		1-1-2005	9373	26191	4411	39975
8	**Maharashtra (Gondawana)**	1-1-2003	4508	2151	1534	8194
		1-1-2004	4652	2156	1605	8413
		1-1-2005	4652	2309	1620	8581
9	**Meghalaya (Tertiary)**	1-1-2003	118	41	301	459
		1-1-2004	118	41	301	460
		1-1-2005	118	41	301	459
10	**Nagaland (Tertiary)**	1-1-2003	3	1	15	20
		1-1-2004	4	1	15	20
		1-1-2005	3	1	15	20
11	**Orissa (Gondawana)**	1-1-2003	14301	29516	15285	59103
		1-1-2004	14613	31239	15135	60987
		1-1-2005	15161	30976	14846	60983
12	**Uttar Pradesh (Gondawana)**	1-1-2003	766	296	0	1062
		1-1-2004	766	296	0	1062
		1-1-2005	766	296	0	1062
13	**West Bengal (Gondawana)**	1-1-2003	11207	11570	4475	27252
		1-1-2004	11383	11523	4488	27394
		1-1-2005	11383	11876	4553	27813
	India (Total)	**1-1-2003**	**90085**	**112613**	**38050**	**240748**
		1-1-2004	**91516**	**116281**	**37901**	**245692**
		1-1-2005	**92960**	**117090**	**37797**	**247850**

Source : Office of Coal Controller, Kolkata

Note: (i) Data may not add up to respective total due to rounding off.
(ii) Singrimari coalfield of Assam (Non- coking) is included in Gondawana coalfield, not considered in Tertiary coalfields.

TABLE 4.2.10 : INVENTORY OF GEOLOGICAL RESERVES OF COAL BY TYPE

(Million tonnes)

Sl. No	Types of Coal	As on	Proved	Indicated	Inferred	Total
1	2	3	4	5	6	7
1	**Coking**					
	I. Prime coking	1-1-2003	4614	699	0	**5313**
		1-1-2004	4614	699	0	**5313**
		1-1-2005	4614	699	0	**5313**
	II. Medium coking	1-1-2003	11325	11839	1889	**25053**
		1-1-2004	11325	11839	1889	**25053**
		1-1-2005	11417	11765	1889	**25070**
	III. Blendable/semi-coking	1-1-2003	482	907	222	**1610**
		1-1-2004	482	1003	222	**1707**
		1-1-2005	482	1003	222	**1707**
2	**Non-coking** (Including High Sulphur)	1-1-2003	73664	99168	35940	**208772**
		1-1-2004	75096	102736	35787	**213619**
		1-1-2005	76447	103623	35686	**215756**
Total		**1-1-2003**	**90085**	**112613**	**38050**	**240748**
		1-1-2004	**91517**	**116277**	**37898**	**245692**
		1-1-2005	**92960**	**117090**	**37797**	**247847**

Source : Office of the Coal Controller, Kolkata

TABLE 4.2.11 : ESTIMATED POTENTIAL FOR RENEWABLE ENERGY TECHNOLOGIES IN INDIA

Sl. No.	Source/Systems	Approximate Potential
1	Biogas Plants	120 lakh
2	Improved Chulhas	1200 lakh
3	Wind	45000 MW
4	Small Hydro	15000 MW
5	Biomas Power/Cogeneration	19500 MW
6	Biomass Gasifiers	--
7	Solar PV	20 MW/sq.km
8	Waste -to -Energy	2500 MW
9	Solar Water Heating	140 Million sq.m Collector Area.

Source: Ministry of Non-Conventional Energy Sources

The Ministry of Non-Conventional Energy Resources was created in 1992. The main responsibilities of the ministry include the development and utilization of new and renewable sources of energy such as biogas, biomass, solar energy, wind energy, small hydro power, ocean energy, geothermal energy, hydrogen and drought animal power.

TABLE 4.2.12 (a) : STATE-WISE WIND POWER INSTALLED CAPACITY

(Mw) (As on 30.09.2005)

Sl No.	State	Wind Power Installed Capacity (Mw)				
		2001-02	2002-03	2003-04	2004-05	2005-06
1	2	3	4	5	6	7
1	Andhra Pradesh	0.7	0.0	6.2	21.8	0.0
2	Gujarat	0.0	6.2	28.9	51.5	4.0
3	Karnataka	24.0	55.6	84.9	201.5	32.7
4	Kerala	0.0	0.0	0.0	0.0	0.0
5	Madhya Pradesh	0.0	0.0	0.0	6.3	0.0
6	Maharashtra	209.4	2.0	6.2	48.8	125.0
7	Rajasthan	8.8	44.6	117.8	106.3	75.0
8	Tamil Nadu	44.0	133.6	371.2	675.5	395.2
9	West Bengal	0.6	0.0	0.0	0.0	0.0
9	Others	0.0	0.0	0.0	0.0	0.0
Total		287.5	242.0	615.2	1111.7	631.9

Source : Environment in the Indian Parliament: An Analysis, 2005, Supported by Ministry of Environment and Forests.

Table 4.2.12 (b) : DETAILS OF ACHIEVEMENT OF RENEWABLE POWER GENERATION AND DISTRIBUTION

S.No	Scheme/Programme	Unit	10th Plan Targets	Achievements during the first 3 years (2002-05)
A. Power from Renewables				
1	Wind Power	MW	1500	1968.10
2	Small Hydro Power (up to 20 MW)	MW	600	267.03
3	Biomass Power/Co-generation	MW	700	368.23
4	Biomass Gasifiers	MW	50	15.17
5	Solar Photovoltaic Power	MW	145	0.73 *
6	Waste-to- Energy	MW	80	23.4 **
	Sub Total (Power from Renewables)	MW	3075	2642.6
B. Distributed Generation				
7	Remote Village Electr No. of villages	5000	1514	
C. Decentralised/Standalone (Systems/Devices):				
8	Biogas Plants	Nos. in lakh	10	3.76
9	Solar Photovoltaic (SPV):			
	SPV Home Lighting systems SPV Lante	Nos.	250000	121513
	SPV Street Lighting Systems	Nos.	600000	35374
	SPV Power Plants (off-grid)	Kwp		8606
		Nos.	4000	372.90
10	SPV Water Pumping Systems	Nos.	8000	2280
11	**Solar Thermal Energy**			
	Solar Water Heating Systems	squre meter	505000	350000
	Solar Cookers	(collector area		
		Nos.)	205200	50000
12	**Wind pumps and Hybrid Systems:**			
	Wind pumps	Nos.	800	2.14
	Hybrid Systems	kw	800	260

Source : Environment in the Indian Parliament: An Analysis, 2005, Supported by Ministry of Environment and Forests.

Note : MW = Megawatt, kWp = Kilowatt peak, kW = kilowatt.

* Programme discontinued because grid-interactive solar power is not economically viable at this juncture.

** MSW -to - Energy programme kept in abeyance on interim orders of the Hon'ble Supreme Court of India.

TABLE 4.2.13 : DOMESTIC PRODUCTION OF PETROLEUM PRODUCTS IN INDIA

(000' Tonne)

Sl. No.	Year	Light Distillates			Middle Distillates			
		Liquified Petroleum Gas @	Motor Gasoline (Petrol)	Naphtha	Kerosene	Aviation Turbine Fuel	High Speed Diesel oil	Light Diesel Oil
1	2	3	4	5	6	7	8	9
1	1970-71	169	1526	1205	2896	710	3840	986
2	1971-72	195	1615	1217*	2995	808	4356	1065
3	1972-73	227	1581	1330*	2813	801	4598	1010
4	1973-74	259	1647	1438*	2613	875	5039	1079
5	1974-75	278	1298	1720	2052	837	6034	1084
6	1975-76	331	1275	1910	2439	925	6285	946
7	1976-77	363	1340	1986	2581	1001	6399	1047
8	1977-78	383	1423	2120	2450	1077	7129	1224
9	1978-79	403	1515	2262	2514	1177	7350	1227
10	1979-80	406	1512	2415	2539	1104	7975	1230
11	1980-81	366	1519	2115	2396	1001	7371	1108
12	1981-82	410	1614	3004	2907	1009	9042	949
13	1982-83	406	1797	2986	3393	1137	9761	1121
14	1983-84	514	1937	3578	3528	1195	10862	1081
15	1984-85	596	2144	3470	3364	1297	11086	1253
16	1985-86	867	2309	4955	4030	1519	14624	1177
17	1986-87	995	2515	5437	4912	1553	15450	1172
18	1987-88	1026	2662	5462	5104	1695	16296	1259
19	1988-89	1034	2822	5378	5201	1753	16656	1468
20	1989-90	1179	3328	5227	5700	1575	17737	1540
21	1990-91	1221	3552	4859	5471	1801	17185	1509
22	1991-92	1250	3420	4546	5339	1539	17404	1482
23	1992-93	1249	3709	4586	5199	1636	18289	1453
24	1993-94	1314	3843	4666	5270	1788	18809	1474
25	1994-95	1432	4129	5662	5261	1968	19593	1364
26	1995-96	1539	4462	5975	5267	2127	20661	1351
27	1996-97	1598	4704	6123	6236	2119	22202	1286
28	1997-98	1666	4849	6103	6701	2147	23354	1246
29	1998-99	1724	5573	6081	5341	2289	26716	1336
30	1999-00	2487	6232	8170	5735	2292	34793	1624
31	2000-01	4088	8070	9908	8714	2513	39052	1481
32	2001-02	4778	9699	9180	9681	2595	39899	1703
33	2002-03	4903	10361	9650	10028	3053	40207	2079
34	2003-04	5348	10999	11317	10187	4289	43316	1659
35	2004-05	5569	11017	14315	9300	5201	45880	1546

P : Provisional

@ : Excludes LPG production from natural gas.

Source : Ministry of Petroleum & Natural Gas.

* : Estimated from calendar year figures

** : Includes those of light distillates, middle distillates and heavy ends.

TABLE 4.2.13 : DOMESTIC PRODUCTION OF PETROLEUM PRODUCTS IN INDIA - Concld.

(000' Tonne)

Sl. No.	Year	Heavy Ends				Others**	Total
		Fuel Oil	Lubricants	Petroleum Coke	Bitumen		
1	2	10	11	12	13	14	15
1	1970-71	4090	231	151	805	501	17110
2	1971-72	4098	140*	142*	1009*	999	18639
3	1972-73	3688	304*	132*	1109*	267	17830
4	1973-74	3931	318*	131*	1093*	1072	19495
5	1974-75	4243	387	137	873	668	19603
6	1975-76	5083	342	160	697	436	20829
7	1976-77	4728	368	163	945	471	21432
8	1977-78	5332	413	155	992	521	23219
9	1978-79	5644	490	122	962	527	24193
10	1979-80	6351	487	99	1103	573	25794
11	1980-81	6120	426	86	1082	533	24123
12	1981-82	6908	407	141	1298	493	28182
13	1982-83	7964	434	149	1397	528	31073
14	1983-84	8000	470	136	1069	556	32926
15	1984-85	7886	414	181	944	601	33236
16	1985-86	7955	501	192	1107	645	39881
17	1986-87	8011	491	264	1224	737	42761
18	1987-88	8466	478	257	1370	653	44728
19	1988-89	8171	497	275	1548	896	45699
20	1989-90	8952	547	275	1671	959	48690
21	1990-91	9429	561	229	1603	1142	48562
22	1991-92	9637	390	216	1710	1416	48349
23	1992-93	10403	533	221	1862	1219	50359
24	1993-94	10304	489	233	1874	1020	51084
25	1994-95	9822	504	259	1845	1088	52927
26	1995-96	9579	633	256	2032	1199	55081
27	1996-97	10298	619	246	2283	1291	59005
28	1997-98	11080	593	282	2158	1129	61308
29	1998-99	11030	586	286	2419	1163	64544
30	1999-00	11352	728	465	2485	3048	79411
31	2000-01	11392	684	2473	2721	4518	95614
32	2001-02	12227	651	2784	2561	4246	100004
33	2002-03	12167	684	2659	2941	5408	104140
34	2003-04	13372	666	2743	3397	6170	113463
35	2004-05	14780	646	3158	3349	3472	118233

Source : Ministry of Petroleum & Natural Gas.

* : Estimated from calendar year figures

** : Includes those of light distillates, middle distillates and heavy ends.

P : Provisional

TABLE 4.2.14: AVAILABILITY OF CRUDE OIL AND PETROLEUM PRODUCTS IN INDIA

(000' Tonne)

Sl. No.	Year	Crude Oil			Petroleum Products		
		Production	Net Imports	Gross Availability	Production	Net Imports	Gross Availability
1	2	3	4	5	6	7	8
1	1970-71	6822	11683	18505	17110	752	17862
2	1971-72	7299	12951	20250	18639	2011	20650
3	1972-73	7321	12084	19405	17830	3399	21229
4	1973-74	7189	13855	21044	19495	3387	22882
5	1974-75	7684	14016	21700	19603	2473	22076
6	1975-76	8448	13624	22072	20829	2048	22877
7	1976-77	8898	14048	22522	21432	2550	23982
8	1977-78	10763	14507	25270	23219	2832	26051
9	1978-79	11633	14657	26290	24193	3834	28027
10	1979-80	11766	16121	27887	25794	4636	30430
11	1980-81	10507	16248	26755	24123	7253	31376
12	1981-82	16194	14460	30654	28182	4829	33011
13	1982-83	21063	12397	33460	31073	4233	35306
14	1983-84	26020	10445	36465	32926	2856	35782
15	1984-85	28990	7164	36154	33236	5159	38395
16	1985-86	30168	14616	44784	39881	1902	41783
17	1986-87	30480	15476	45956	42761	556	43317
18	1987-88	30357	17734	48091	44728	739	45467
19	1988-89	32040	17815	49855	45699	4200	49899
20	1989-90	34087	19490	53577	48690	3971	52661
21	1990-91	33021	20699	53720	48562	6012	54574
22	1991-92	30346	23994	54340	48349	6509	54858
23	1992-93	26950	29247	56197	50359	7564	57923
24	1993-94	27026	30822	57848	51084	8042	59126
25	1994-95	32239	27349	59588	52927	10697	63624
26	1995-96	35167	27342	62509	55081	16900	71981
27	1996-97	32900	33906	66806	59005	17103	76108
28	1997-98	33858	34493	68351	61308	20589	81897
29	1998-99	32722	39808	72530	64544	23052	87596
30	1999-00	31949	57805	89754	79411	15862	95273
31	2000-01	32426	74097	106523	95614	902	96516
32	2001-02	32032	78706	110738	100004	-3056	96948
33	2002-03	33042	81989	115033	104140	-3061	101079
34	2003-04	33373	90434	123807	113463	-6619	106844
35	2004-05	33981	95857	129838	118233	-8652	109581

Source : Ministry of Petroleum & Natural Gas.

P : Provisional

TABLE 4.2.15 : GROSS AND NET PRODUCTION & UTILISATION OF NATURAL GAS IN INDIA

(Million cubic metre)

Sl. No.	Year	Gross Production	Re-injected	Flarred	Net Production (Utilisation)
1	2	3	4	5	6
1	1970-71	1445	36	762	647
2	1971-72	1535	49	768	718
3	1972-73	1565	141	653	771
4	1973-74	1713	115	836	762
5	1974-75	2041	139	951	951
6	1975-76	2368	162	1082	1124
7	1976-77	2428	190	857	1381
8	1977-78	2839	184	1191	1464
9	1978-79	2812	148	953	1711
10	1979-80	2767	127	964	1676
11	1980-81	2358	67	769	1522
12	1981-82	3851	110	1519	2222
13	1982-83	4936	91	1888	2957
14	1983-84	5961	45	2517	3399
15	1984-85	7241	48	3052	4141
16	1985-86	8134	66	3118	4950
17	1986-87	9853	63	2718	7072
18	1987-88	11467	54	3445	7968
19	1988-89	13217	84	3883	9250
20	1989-90	16988	96	5720	11172
21	1990-91	17998	102	5130	12766
22	1991-92	18645	132	4072	14441
23	1992-93	18060	90	1854	16116
24	1993-94	18335	71	1924	16340
25	1994-95	19381	23	2020	17338
26	1995-96	22639	17	1437	21202
27	1996-97	23255	0	1760	21495
28	1997-98	26401	0	1879	24522
29	1998-99	27428	0	1712	25716
30	1999-00	28446	0	1560	26886
31	2000-01	29477	0	1617	27860
32	2001-02	29714	0	1677	28037
33	2002-03	31389	0	1425	29964
34	2003-04	31962	0	1056	30906
35	2004-05	31777	0	989	30788

Source : Ministry of Petroleum & Natural Gas.

P : Provisional

TABLE 4.2.16 : INDUSTRY-WISE OFF-TAKE OF NATURAL GAS IN INDIA.

(Million Cubic Me

Sl No.	Year	Energy Purposes				Non-Energy Purposes		Grand T
		Power Generation	Industrial Fuel	Tea Plantation	Others*	Fertilizer Industry	Others @	
1	2	3	4	5	6	7	8	9
1	1970-71	261	116	15	68	187	-	647
2	1971-72	313	129	19	61	196	-	718
3	1972-73	339	148	20	63	201	-	771
4	1973-74	323	157	22	81	179	-	762
5	1974-75	354	164	29	86	318	-	951
6	1975-76	366	143	33	117	463	2	1124
7	1976-77	344	155	38	157	663	24	1381
8	1977-78	372	165	39	184	673	31	1464
9	1978-79	560	175	43	189	721	23	1711
10	1979-80	514	156	39	187	755	25	1676
11	1980-81	492	163	45	190	611	21	1522
12	1981-82	612	166	47	379	991	27	2222
13	1982-83	1025	185	51	513	1155	28	2957
14	1983-84	1209	230	56	588	1283	33	3399
15	1984-85	1454	250	62	739	1603	33	4141
16	1985-86	1299	223	78	816	2500	34	4950
17	1986-87	2041	257	93	1320	3335	26	7072
18	1987-88	2721	281	99	1347	3490	30	7968
19	1988-89	1823	526	87	1371	5334	109	9250
20	1989-90	2140	695	78	1567	6578	114	11172
21	1990-91	3634	827	89	1825	5612	779	12766
22	1991-92	4774	766	108	2237	5509	1047	14441
23	1992-93	4967	1450	105	2103	6672	819	16116
24	1993-94	4785	1794	121	2466	6499	675	16340
25	1994-95	5229	1927	134	2420	6936	693	17339
26	1995-96 $	6836	2301	111	767	7602	474	18091
27	1996-97 $	6935	2631	130	802	7625	509	18632
28	1997-98 $	8114	3106	117	775	8752	649	21513
29	1998-99 $	8714	3005	147	1104	8869	650	22489
30	1999-2000	8829	2329	140	5126	8592	1869	26885
31	2000-2001	8801	2870	151	5377	8480	2181	27860
32	2001-2002	9214	2979	147	5894	7957	1846	28037
33	2002-03	10510	2939	119	6199	7955	2242	29964
34	2003-04	11478	3099	142	6221	7889	2077	30906
35	2004-05(P)	12099	3569	142	5518	8173	1273	30774

Source : Ministry of Petroleum & Natural Gas.

P : Provisional

* : Includes domestic fuel, captive use & LPG shrinkage.

@ : Includes petro-chemicals.

TABLE 4.2.17 : THE STATUS OF BIOMASS PROJECTS

Sl. No.	Project Status	Biomass Power		Cogeneration		Total	
		MW	Nos	MW	Nos	MW	Nos
1	2	3	4	5	6	7	8
1	Commissioned	290	52	437	57	727	109
2	Under implementation	284	41	323	35	607	76

Source : TERI Energy Data Directory and Yearbook, 2004-2005

TABLE 4.2.18 : STATEWISE AND YEARWISE COMPOSITION OF COMMISSIONED BIOMASS POWER PROJECTS

(MW)

Sl. No.	State	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
1	2	4	5	6	7	8	9	10	11	12	13	14
1	Andhra Pradesh	-	-	1.0	-	10.0	1.0	--	--	--	--	--
2	Gujarat	-	-	-	-	0.5	-	--	--	--	--	--
3	Haryana	-	-	-	-	-	-	--	--	--	--	--
4	Karnataka	-	-	1.0	-	10.0	26.0	--	--	--	--	--
5	Madhya Pradesh	-	-	-	-	5.0	-	--	--	--	--	--
6	Maharashtra	1.5	4.5	1.5	-	-	-	--	--	--	--	--
7	Punjab	-	-	-	-	-	-	--	--	--	--	--
8	Tamil Nadu	-	19.0	25.5	33.5	10.0	-	--	--	--	--	--
9	Uttar Pradesh	4.0	6.5	-	8.0	8.0	24.0	--	--	--	--	--
Total		**5.5**	**30.0**	**29.0**	**41.5**	**43.5**	**51.0**	**70.3**	**89.0**	**103**	**129.5**	**115**

Source : TERI Energy Data Directory and Yearbook, 2004-2005

TABLE 4.2.19 : NATIONAL PROGRAMME ON IMPROVED CHULLAHS

(Number)

Sl. No.	State / UT / Agency	Annual Target		Achievements (April - December 2001)		2002-03
		No. of Villages	No. of Chulhas	Target	Achievement	Target
1	2	3	4	5	6	7
	States					
1	Andhra Pradesh	800	175000	87500	34824	25000
2	Assam	300	12500	6250	32	-
3	Bihar	80	6000	3000	2178	2000
4	Chhattisgarh	150	15000	7500	-	5000
5	Gujarat	490	105000	52500	48926	10000
6	Goa	20	4000	2000	1510	100
7	Haryana	300	60000	30000	28482	-
8	Himachal Pradesh	6	1000	500	510	500
9	Jammu & Kashmir	100	30000	15000	-	5000
10	Jharkhand	100	16000	8000	-	5000
11	Karnataka	300	60000	30000	32179	10000
12	Kerala	200	40000	20000	20443	10000
13	Madhya Pradesh	10	1500	750	-	1000
14	Maharashtra	540	86000	43000	16071	10000
15	Manipur	100	5000	2500	1231	-
16	Meghalaya	100	5000	2500	-	-
17	Mizoram	150	5000	2500	-	-
18	Nagaland	150	5000	2500	1660	-
19	Orissa	700	200000	100000	138636	30000
20	Punjab	250	35000	17500	-	-
21	Rajasthan	150	30000	15000	6234	-
22	Sikkim	100	5000	2500	4096	-
23	Tamil Nadu	300	60000	30000	45312	15000
24	Tripura	200	18000	9000	4157	-
25	Uttranchal	40	2000	1000	154	400
26	Uttar Pradesh	800	150000	75000	52384	10000
27	West Bengal	1300	325000	162500	191086	20000
	Union Territories					
1	Andaman and Nicobar Isla	8	1200	600	841	-
2	Dadar and Nagar Haveli	5	500	250	-	-
3	Delhi	12	2000	1000	-	-
4	Lakshadweep	2	300	150	-	-
5	Pondicherry	15	4000	2000	1435	1000
	Agency					
1	KVIC	1970	260000	130000	65517	-
2	AIWC	220	25000	12500	2448	-
3	Biotech	50	5000	2500	-	-
Total		**10018**	**1755000**	**877500**	**700346**	**165000**

Source: The Energy and Resources Institute
KVIC : Khadi and Village Industries Commission
AIWC : All India Women's Conference

TABLE 4.2.20 : DISTRIBUTION OF FAMILY -TYPE BIOGAS PLANTS (NUMBER OF INSTALLATIONS)

Sl. No.	State/UT	Estimated Potential	Cumulative Achievement as on 31-12-96 #	Cumulative Achievement 2001 02	Achievement 2002 (April-December)
1	2	3	4	5	6
	State				
1	Andhra Pradesh	1065600	172410	334054	8023
2	Arunachal Pradesh	7500	139	1514	49
3	Assam	307700	12629	51269	--
4	Bihar	939900	74499	121913	12
5	Chhattisgarh	--		3047	2215
6	Goa	8000	2212	3355	32
7	Gujarat	554000	237513	351745	3501
8	Haryana	300000	28896	44160	1095
9	Himachal Pradesh	125600	34871	43933	190
10	Jammu & Kashmir	128500	1068	1965	--
11	Jharkhand	--		400	--
12	Karnataka	680000	135428	340270	8986
13	Kerala	150500	37374	79532	618
14	Madhya Pradesh	1491200	86461	204100	3347
15	Maharashtra	897000	535279	675177	3539
16	Manipur	38700	1038	1956	16
17	Meghalaya	24000	329	2309	--
18	Mizoram	3000	1178	2818	53
19	Nagaland	6700	401	1667	75
20	Orissa	605000	106156	185690	4285
21	Punjab	411600	31235	68745	1877
22	Rajasthan	915300	55304	66552	162
23	Sikkim	7300	1622	3475	255
24	Tamil Nadu	615800	169605	201295	1210
25	Tripura	28500	3576	1719	16
26	Uttar Pradesh	2021000	241396	370219	4600
27	Uttaranchal	--		1547	288
28	West Bengal	695000	76713	203679	7983
	Union Territory				
1	Andaman and Nicobar Islands	2200	117	137	--
2	Chandigarh	1400	87	97	--
3	Dadra and Nagar Haveli	2000	157	169	--
5	Delhi	12900	624	676	--
6	Pondicherry	4300	517	573	-
	Agencies				
1	KVIC, Mumbai	--	--	--	11649
2	AIWC, New Delhi	--	--	--	--
3	SDA, Kanjirapally	--	--	--	5810
4	Biotech	--	--	--	525
Total		**12049900**	**2048834**	**3369757**	**70411**

Source : The Energy and Resources Institute

: These figures are lower estimates of the actual installations.

KVIC : Khadi and Village Industries Commission

SDA : Sustainable Development Agency

AIWC : All India Women's Conference

TABLE 4.3.1 : NUMBER OF REGISTERED FACTORIES BY MANUFACTURING INDUSTRIES

Sl. No.	Year	Manufacturing	Electricity, Gas & Water	Repair Services & Cold Storage	All Activities
1	2	3	4	5	6
1	1987-88	98379	458	3759	102596
2	1988-89	99724	481	3872	104077
3	1989-90	103373	493	4126	107992
4	1990-91	105511	518	4150	110179
5	1991-92	107454	505	4327	112286
6	1992-93	113890	961	4643	119494
7	1993-94	116227	542	4825	121594
8	1994-95	117564	554	4892	123010
9	1995-96	125281	4013	5277	134571
10	1996-97	125166	4160	5230	134556
11	1997-98	126272	3856	5423	135551
12	1998-99 *	130222	143	1341	131706
13	1999-2000 *	130035	158	1365	131558
14	2000-01 *	127036	163	4069	131268
15	2001-02 *	124099	170	4279	128548
16	2002-03 *	123401	182	4374	127957

Source : Central Statistical Organisation

* : From 1998-99, all electricity undertakings other than Captive Units have been kept outside the purview of ASI

TABLE 4.3.2 : SUMMARY STATUS OF POLLUTION CONTROL IN 17 CATEGORIES OF INDUSTRIES

(As on 31-03-2004)

Sl. No.	Category	Total No. of Units	Status (No. of Units)		
			Closed	Comply #	Defaulter
1	2	3	4	5	6
1	Aluminium	7	1	6	0
2	Caustic	33	0	33	0
3	Cement	205	17	182	6
4	Copper	4	0	4	0
5	Distillery	209	39	167	3
6	Dyes & Dying Industries	102	10	90	2
7	Fertilizer	124	13	109	2
8	Iron and Steel	19	1	14	4
9	Leather	94	15	75	4
10	Pesticide	111	8	102	1
11	Petrochemicals	75	0	74	1
12	Pharmaceuticals	401	41	350	10
13	Pulp & Paper	136	26	108	2
14	Refinery	16	0	16	0
15	Sugar	462	50	409	3
16	TPP	151	3	133	15
17	Zinc	6	1	5	0
Total		**2155**	**225**	**1877**	**53**

Source: Ministry of Environment & Forests, Annual Report 2003-2004
: Having adequate facilities to comply with the standards

Air-borne emissions emitted from various industries are a cause of major concern. These emissions are of two forms, viz., solid particles (SPM) and gaseous emission (SO_2, NOx, CO etc.). Liquid effluents, generated from various industries, containing organic and toxic pollutants are also a cause for severe concern. Heavily polluting industries were identified which are included under the 17 categories of highly polluting industries for the purpose of monitoring and regulating pollution from them.

There are 2155 industries in the country falling under the 17 categories of highly polluting industries. Thermal power and fertilizer industries are defaulting in meeting air pollution standards; sugar and pulp & paper industries are the major defaulters in complying with the norms for liquid effluents.

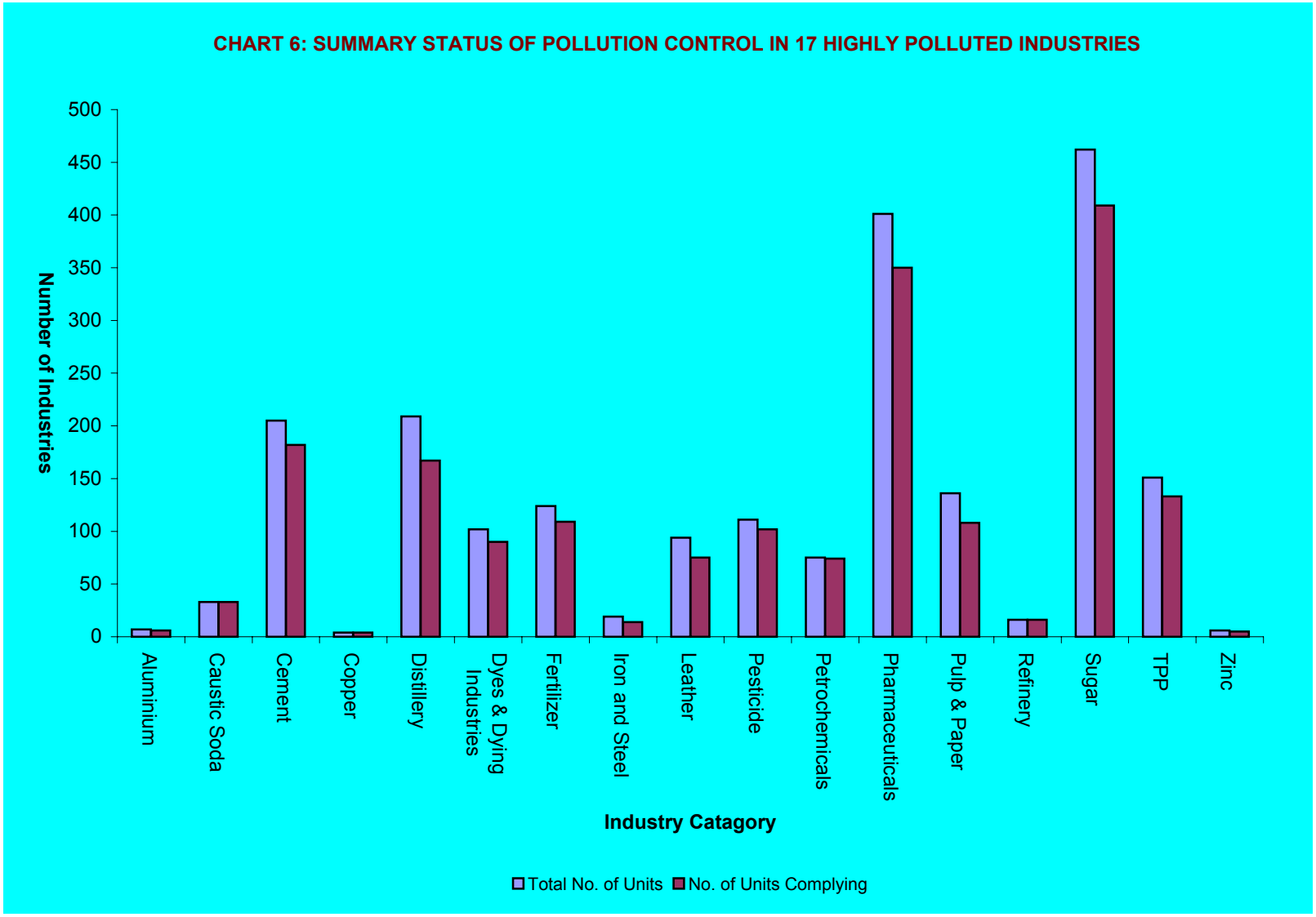
CHART 6: SUMMARY STATUS OF POLLUTION CONTROL IN 17 HIGHLY POLLUTED INDUSTRIES
Number of Industries
500
450
400
350
300
250
200
150
100
50
0
Aluminium
Caustic Soda
Cement
Copper
Distillery
Dyes & Dying Industries
Fertilizer
Iron and Steel
Leather
Pesticide
Petrochemicals
Pharmaceuticals
Pulp & Paper
Refinery
Sugar
TPP
Zinc
Industry Catagory
Total No. of Units
No. of Units Complying

TABLE 4.3.3: STATE-WISE SUMMARY STATUS OF THE POLLUTION CONTROL IN PRE AND POST-91 UNITS OF 17 CATEGORIES OF INDUSTRIES

Sl. No.	State/UT	Total No. of Units	Status (No. of Units)		
			Closed	Comply#	Defaulters
1	2	3	4	5	6
	States				
1	Andhra Pradesh	269	29	240	0
2	Arunachal Pradesh	0	0	0	0
3	Assam	16	3	12	1
4	Bihar	46	19	27	0
5	Chhattisgarh	25	2	21	2
6	Goa	8	0	8	0
7	Gujarat	283	10	272	1
8	Haryana	107	24	69	14
9	Himachal Pradesh	11	0	11	0
10	Jammu & Kashmir	10	3	7	0
11	Jharkhand	21	3	16	2
12	Karnataka	116	17	99	0
13	Kerala	43	6	37	0
14	Madhya Pradesh	78	15	61	2
15	Maharashtra	392	26	356	10
16	Manipur	0	0	0	0
17	Meghalaya	1	0	1	0
18	Mizoram	0	0	0	0
19	Nagaland	0	0	0	0
20	Orissa	29	3	21	5
21	Punjab	72	9	60	3
22	Rajasthan	108	8	96	4
23	Sikkim	1	0	1	0
24	Tamil Nadu	156	2	154	0
25	Tripura	0	0	0	0
26	Uttaranchal	20	0	20	0
27	Uttar Pradesh	263	27	232	4
28	West Bengal	66	17	44	5
	Union Territories				
29	Andaman & Nicobar	0	0	0	0
30	Chandigarh	1	0	1	0
31	Daman & Diu, Dadra & Nagar Haveli	0	0	0	0
32	Delhi	5	1	4	0
33	Lakshadweep	0	0	0	0
34	Pondicherry	8	1	7	0
Total		**2155**	**225**	**1877**	**53**

Source : Annual Report 2003-2004, Ministry of Environment & Forests

: Having adequate facilities to comply with the standards

TABLE 4.3.4 : SUMMARY STATUS OF POLLUTION CONTROL IN GROSSLY POLLUTING INDUSTRIES DISCHARGING THEIR EFFLUENTS INTO RIVERS AND LAKES

(As on 30.09.2003)

Sl. No.	Name of the State/Union Territory	No. of Defaulters Units	No. of Units Closed	No. of Units Which Have Provided Requisite Treatment/Disposal Facilities after Issuance of Directions	No. of Defaulting Units
1	2	3	4	5	6
1	Andhra Pradesh	60	18	42	0
2	Assam	7	6	1	0
3	Bihar	14	4	10	0
4	Gujarat	17	3	14	0
5	Haryana	21	9	12	0
6	Karnataka	20	2	18	0
7	Kerala	36	4	32	0
8	Madhya Pradesh	2	1	0	1
9	Maharashtra	6	3	3	0
10	Orissa	9	3	4	2
11	Pondicherry	4	0	4	0
12	Punjab	18	1	16	1
13	Tamil Nadu	366	118	248	0
14	Uttar Pradesh	241	59	181	1
15	West Bengal	30	7	23	0
	Total	**851**	**238**	**608**	**5**

Source : Ministry of Environment & Forests, Annual Report 2003-2004

TABLE 4.3.5 : MAXIMUM PERMISSIBLE LIMITS FOR INDUSTRIAL EFFLUENT DISCHARGES

(Mg/Litre)

Sl. No.	Parameter	Into Inland Surface Waters Indian Standards 2490 (1974)	Into Public Sewers Indian Standards: 3306 (1974)	Onland for Irrigation Indian Standards: 3307 (1974)	Marine Coastal Area
1	2	3	4	5	6
1	pH	5.5-9.0	5.5-9.0	5.5-9.0	5.5-9.1
2	Biological oxygen demand (for 5 days at 20°C)	30.00	350.00	100.00	100.00
3	Chemical oxygen demand	250.00	-	-	250
4	Suspended solids	100.00	600.00	200.00	
5	Total dissolved solids (inorganic)	2100.00	2100.00	2100.00	-
6	Temperature (°C)	40.00	45.00	-	45.00
7	Oil and grease	10.00	20.00	10.00	20.00
8	Phenolic Compounds	1.00	5.00	-	5.00
9	Cyanides	0.20	2.00	0.20	0.20
10	Sulphides	2.00	-	-	5.00
11	Fluorides	2.00	15.00	-	15.00
12	Total residual chlorine	1.00	-	-	1.00
13	Pesticides	-	-	-	-
14	Arsenic	0.20	0.20	0.20	0.20
15	Cadmium	2.00	1.00	-	2.00
16	Chromium (hexavalent)	0.10	2.00	-	1.00
17	copper	3.00	3.00	-	3.00
18	Lead	0.10	1.00	-	1.00
19	Mercury	0.01	0.01	-	0.01
20	Nickel	3.00	3.00	-	5.00
21	Selenium	0.05	0.05	-	0.05
22	Zinc	5.00	15.00	-	15.00
23	Chlorides	1000.00	1000.00	600.00	-
24	Boron	2.00	2.00	2.00	-
25	Sulphates	1000.00	1000.00	1000.00	-
26	Sodium (%)	-	60.00	60.00	-
27	Ammoniacal nitrogen	50.00	50.00	-	50
28	Radioactive materials				
29	Alpha emitters (milli curie/millilitre)	10^{-7}	10^{-7}	10^{-8}	10^{-7}
30	Beta emitters (μ curie/millilitre)	10^{-6}	10^{-6}	10^{-7}	10^{-6}

Source : Central Pollution Control Board

TABLE 4.3.6 : EFFLUENT STANDARDS FOR SUGAR INDUSTRY

Sl. No.	Parameter	Permissible Limits (Mg/Litres)	
		Disposal on Land	Disposal in Surface Water
1	2	3	4
1	Biological Oxygen Demand (5 days at 20^0C)	100	30
2	Suspended Solids	100	30

Source : TERI Energy Data Directory and Yearbook, 2002-2003

TABLE 4.3.7 : EFFLUENT STANDARDS FOR LARGE PULP AND PAPER INDUSTRIES

Capacity (Tonnes a year)	Parameter	Permissible Limits
1	2	3
Above 24,000	pH	7.0-8.5
	Biological Oxygen Demand at 20^0C	30 mg/litre
	Chemical Oxygen Demand	350 mg/litre
	Suspended solids	50 mg/litre
	Total organic chloride	2.0 kg/tonne of paper produced
	Flow (total waste water discharge)	--
	Large pulp and paper[a]	200 m^3/tonne of paper produced
	Large rayon grade newsprint	150 m^3/tonne of paper produced

Source : TERI Energy Data Directory and Yearbook, 2002-2003

a : the standards with respect to total waste water discharge for large pulp and paper mills established from 1992 will meet the standards of 100 m^3/tonne of paper produced

TABLE 4.3.8 : EFFLUENT STANDARDS FOR OIL REFINERIES

(Mg/Litre)

Sl. No.	Parameter	Permissible Limit	Quantum (Kg/Thousand Tonnes of Crude Processed)
1	2	3	4
1	Oil and grease	10.0	7.00
2	Phenol	1.0	0.70
3	Sulphide	0.5	0.35
4	Biological Oxygen Demand (5 days at 20^0C)	15.0	10.50
5	Suspended Solids	20.0	14.00
6	pH	--	6.00-8.50

Source : TERI Energy Data Directory and Yearbook, 2002-2003

TABLE 4.3.9 : EFFLUENT STANDARDS FOR ALUMINIUM INDUSTRY

Sl. No.	Plant	Parameters	Permissible Limits
1	2	3	4
1	**Alumina Plant**		
	Raw material handling	Primary and secondary crusher particulate matter	150 mg/m^3
	Precipitation area : calcination	Particulate matter	250 mg/m^3
		Carbon Mono-oxide	1 % maximum
		Stack Height[a]	
2	**Smelter plant**		
	Green anode shop	Particulate matter	150 mg/m^3
	Anode bake oven	Particulate matter	150 mg/m^3
		Total fluoride	0.3kg/tonne at Al
3	**Potroom**	Particulate matter	150 mg/m^3
		Total fluoride	
		Vertical stud soderberg	4.7 kg/tonne of Al produced
		Horizontal stud soderberg	6.0 kg/tonne of Al produced
		Prebacked side worked	2.5 kg/tonne of Al produced
		Prebacked centre worked	1.0 kg/tonne of Al produced
		Stack Height[a]	

Source : TERI Energy Data Directory and Yearbook, 2002-2003

a $H = 14\ Q^{0.3}$, where Q is the emission rate of sulphur dioxide in Kg/h and H is the stack height in meters.

TABLE 4.3.10 : EFFLUENT STANDARDS FOR PETRO-CHEMICAL (BASIC & INTERMEDIATES) INDUSTRY

(Mg/Litre)

Sl. No.	Parameter	Permissible Limit
1	2	3
1	pH	6.5-8.5
2	Biological Oxygen Demand (5 days at 20^0C)[a]	50.0
3	Phenol[b]	5.0
4	Sulphide (as S)	2.0
5	Chemical Oxygen Demand	250.0
6	Cyanide (as CN)	0.2
7	Fluoride (as F)[c]	15.0
8	Total Suspended Solids	1000.0
9	Hexavalent Chromium	0.1
10	Total Chromium (as Cr)[d]	2.0

Source : TERI Energy Data Directory and Yearbook, 2002-2003

a : The state board may prescribe the biological oxygen demand value of 30 mg/l if the recepient system so demands.

b : The limit for phenol shall be confirmed at the outlet of effluent treatment of phenol plant. However, at the final disposal point, the limit shall be less than 1 mg/l

c : The limit for fluoride shall be confirmed at the outlet of the chrome removal unit. However, at the disposal point, fluoride concentration shall be lower than 5 mg/l

d : The limits for total and hexavalent chromium shall be confirmed at the outlet of the chromate removal. This implies that in the final treated effluent total, and hexavalent chromium shall be lower than prescribed herein

TABLE 4.4.1 : CONTRIBUTION OF GREEN HOUSE GASES TO ATMOSPHERE

Sl. No.	Green Houses Gases	Contribution to atmosphere (%)
1	2	3
1	Carbondioxide	55
2	Methane	15
3	CFCs 11 & 12	17
4	Nitrousoxide	6
5	Others	7

Source : Central Pollution Control Board

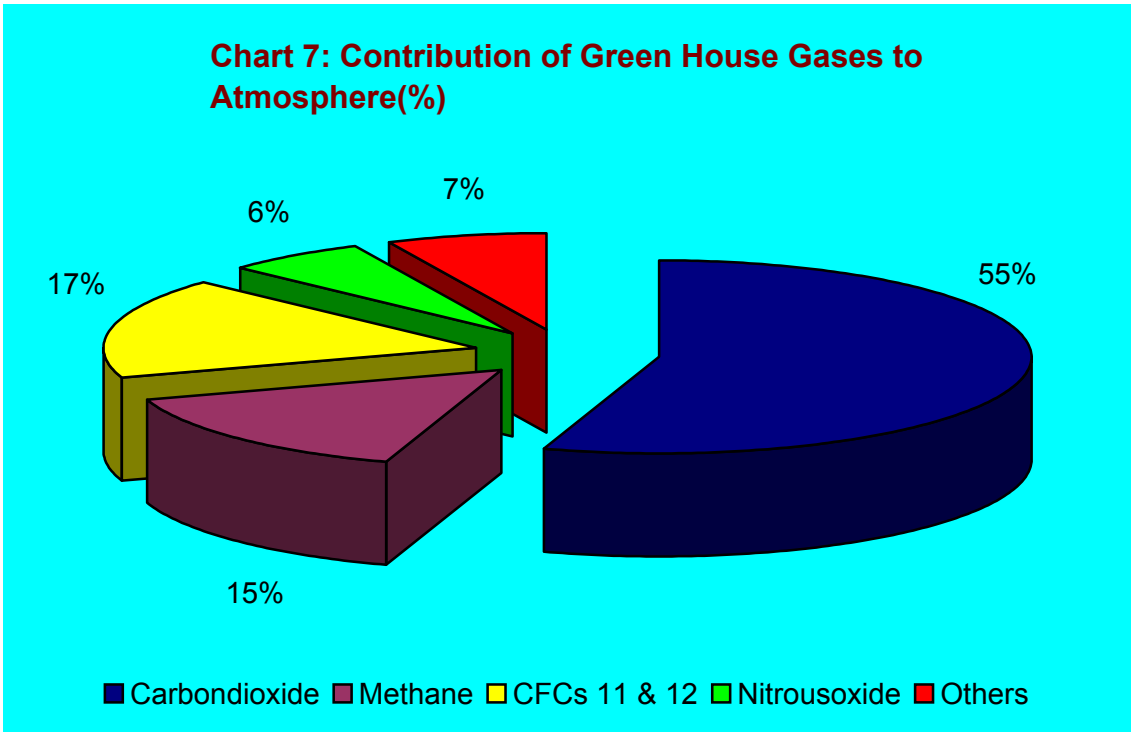

TABLE 4.4.2 : GLOBAL AVERAGE TEMPERATURE AND ATMOSPHERIC CONCENTRATIONS OF CO_2

Sl. No.	Year	Temperature (^{0}C)	Carbon Dioxide (Parts Per Million)	Emissions from Fossil Fuel Burning (Million Tonnes of Carbon)
1	2	3	4	5
1	1950	13.87	--	1612
2	1955	13.88	--	2013
3	1960	14.01	316.80	2535
4	1965	13.90	319.90	3087
5	1966	13.96	321.20	3222
6	1967	14.00	322.00	3334
7	1968	13.94	322.90	3501
8	1969	14.03	324.50	3715
9	1970	14.02	325.50	3997
10	1971	13.89	326.20	4143
11	1972	14.00	327.30	4305
12	1973	14.13	329.50	4538
13	1974	13.89	330.10	4545
14	1975	13.94	331.00	4518
15	1976	13.86	332.00	4776
16	1977	14.11	333.70	4910
17	1978	14.02	335.30	4962
18	1979	14.09	336.70	5249
19	1980	14.16	338.50	5177
20	1981	14.22	339.80	5004
21	1982	14.06	341.00	4961
22	1983	14.25	342.60	4944
23	1984	14.07	344.20	5116
24	1985	14.03	345.70	5277
25	1986	14.12	347.00	5439
26	1987	14.27	348.70	5561
27	1988	14.29	351.30	5774
28	1989	14.19	352.70	5882
29	1990	14.37	354.00	5953
30	1991	14.32	355.50	6023
31	1992	14.14	356.40	5907
32	1993	14.14	357.00	5904
33	1994	14.25	358.90	6055
34	1995	14.37	360.90	6187
35	1996	14.23	362.60	6326
36	1997	14.40	363.80	6422
37	1998	14.56	366.60	6407
38	1999	14.32	368.30	6239
39	2000	14.31	369.40	6315
40	2001	14.36	370.90	6378
41	2002(P)	14.52	372.90	6443

Source: The Energy and Resources Institute
P : Provisional

TABLE 4.5.1 : AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE

Sl. No.	Area	Limits in dB(A)L_{eq}*	
		Day Time	Night Time
1	2	3	4
1	Industrial Area	75	70
2	Commercial Area	65	55
3	Residential Area	55	45
4	Silence Zone	50	40

Source : Central Pollution Control Board

Notes :

1 Day Time -- 06.00 hour to 22.00 hour (16 ho
2 Night time --22.00 hour to 06.00 hour (08 hours)
3 Areas upto 100 metres around certain premises like hospitals, educational institutions and courts, religious places or any other area which is declared as silence zones by the competent authority.
4 Mixed categories of areas may be declared as one of four aforesaid categories by the competent Authority.

-- * dB (A) L_{eq} denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

-- A "decibel" is a unit in which noise is measured.

-- "A", in dB (A) L_{eq} denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

-- L_{eq} : It is an energy mean of the noise level over a specified period.

According to study on occupational hazards, even short exposures to intense noise can shift upward the hearing threshold while prolonged exposure or intermittent exposure over a long period produces a damaging effect on hearing resulting in a permanent threshold shift. Accordingly, the Central Pollution Control Board(CPCB) has prescribed norms for noise levels.

TABLE 4.5.2 : AVERAGE NOISE LEVELS IN VARIOUS METROPOLITAN CITIES

(dB[A])

Sl. No.	Metropolitan Cities	Day/ Night	Industrial Area	Commercial Area	Residential Area	Silence Area
1	2	3	4	5	6	7
1	Kolkata	Day	78	82	79	79
		Night	67	75	65	65
2	Mumbai	Day	76	75	70	66
		Night	65	66	62	52
3	Chennai	Day	71	78	66	63
		Night	66	71	48	49
4	Bangalore	Day	78	76	67	67
		Night	53	57	50	--

Source : TEDDY (TERI Energy Data Directory and Yearbook) 2002/03

The noise pollution has already reached at a high level in most of the metropolitan cities in all the residential, commercial, industrial and silence zones. The increasing noise pollution may be attributed to increase in no. of vehicles, urbanization and industrialization. The increase in noise levels may cause impaired hearing ability.

TABLE 4.5.3 : EFFECTS OF NOISE POLLUTION ON HUMAN HEALTH

A. Noise Hazards	
Stage : I Threat to Survival (a) Communication interference (b) Permanent hearing loss	**Stage : II** Causing Injury (a) Neural -humoral stress response (b) Temporary hearing loss (c) Permanent hearing loss
B. Noise Nuisances	
Stage III Curbing Efficient Performance (a) Mental Stress (b) Task Interference (c) Sleep Interference	**Stage IV** Diluting Comfort and Enjoyment (a) Invasion of Privacy (b) Disruption of Social Interaction (c) Hearing Loss

Source: Sound Pollution, During Festivals in West Bengal a growing menace
West Bengal Pollution Control Board