

**EPCA Report No: 13**  
**2<sup>nd</sup> Final Report on Particulate Pollution Reduction Strategy in**  
**Seven Critically Polluted Cities**

In Response to the Hon'ble Supreme Court Order Dated August  
14, 2003  
**(In the matter of W.P.(C) No.13029 of 1985; M.C. Mehta v/s UOI**  
**& others)**

**February 2005**

Environment Pollution (Prevention & Control) Authority  
for the National Capital Region

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## 1. Progress and current status

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In August 2003, the Hon'ble Supreme Court directed state governments of Maharashtra (Sholapur), Andhra Pradesh (Hyderabad) Gujarat (Ahmedabad), Uttar Pradesh (Kanpur, Lucknow) Karnataka (Bangalore) and Tamil Nadu (Chennai) to draw up action plans for lowering air pollution in the cities and also directed that the plan, once finalised, should be placed before EPCA.

In November 2003, EPCA submitted an interim report to the Hon'ble Supreme Court, pointing out that the plans submitted by the individual states were weak and lacked data and proposals for controlling pollution. EPCA then assessed each plan and drew up a common format for the cities, so that they could plan for each element of the action strategy. EPCA then discussed these plans with the state governments to draw up the first ever, comprehensive plan for each city.

In January 2004, EPCA submitted a final report to the Hon'ble Supreme Court, which detailed the final plans for each city, as agreed with the state and city administration. The report also outlined the crosscutting issues that needed attention. These air pollution control plans have since become the basis of implementation in these 7 cities. In addition, because of the extremely high rates of air pollution in the city of Pune and its proximity to Sholapur -- a city EPCA is already monitoring -- it has been included in this list.

EPCA has continued to monitor progress over the last year in each city. EPCA members have visited each city to review implementation and to take stock of the situation on the ground. EPCA has now set tight deadlines for implementation in each city, which it will monitor tightly and continue to bring reports on progress to the Hon'ble Supreme Court.

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## 2. Observation and plan of action

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It is clear that all cities face a common threat – health-crippling air pollution because of the rampant growth in the numbers of private vehicles on city roads. This is combined with a steady decline of public transport in each city, as a result of which people have no option but to move towards private two-wheelers and cars. It is well accepted that controlling pollution from each vehicle on the road is difficult because of poor enforcement facilities. In addition, there are large numbers of three-wheelers, trucks and other commercial vehicles plying in city roads, which are old, polluting and often run on adulterated fuel. Other polluting sources – factories, incinerators etc – add to this pollution soup. The effort of EPCA has been to get state and city governments to plan comprehensively for different sources and air contaminants.

ECPA notes the following:

1. This is the first time that each city has a plan to combat air pollution, which can be monitored carefully for implementation. These plans provide the state/city government and different agencies with a road map and overall strategy and as EPCA has found in its meetings in each city, the key effort is to use these plans to bring together the different implementing agencies.
2. For instance, this is literally the first time any city is preparing a plan for transportation, at the insistence of EPCA. Till date, the growth of transportation has been ad hoc and unchecked and unplanned. These transportation plans, being prepared by the city governments, will help to create a policy for public transportation in these cities.
3. In the first year, the cities have implemented parts of the action plan, which has in turn led to some pollution benefits. City governments have taken many actions: to ban sale of loose 2T oil; to check adulteration; to build bypass for the cities; to restrict

plying of old vehicles. But the big changes have to be done in the current year. In most cities, the agreed deadlines involve:

- a. Transition towards gaseous fuels – LPG or CNG – for three wheelers and buses. This move towards gaseous fuels is a key strategy to deal with commercial vehicles, which are aged, running on diesel and grossly polluting.
- b. A substantially upgraded public transportation system – combining investment in new buses with investment in gaseous fuels – to get a win-win solution. In this strategy, based on what has been achieved in Delhi, the cost of infrastructure for gaseous fuels is paid back because of a dedicated demand by buses for this cleaner fuel, while the lower cost of fuel, in turn, creates incentives for public transportation.
- c. An effective pollution under control certification system, to check emissions from in-use vehicles, using the new emission norms and instrumentation mandated by the government.
- d. Continuous and public efforts geared to checking adulteration of fuel.
- e. Improvement in monitoring of pollutants, health impacts and sources of pollutants in the city, to improve policy decisions.

### 3. Issues that impede successful implementation

#### 3.1. Supply of compressed natural gas to cities:

In its presentation to EPCA, dated March 27, 2004, the Gas Authority of India (GAIL) presented its plans for supply of CNG to critically polluted cities. According to the plan, the cities of Kanpur, Lucknow, Ahmedabad, Pune, Sholapur and Hyderabad could get natural gas by mid-2006. However, CNG supply in Kolkata, Chennai and Bangalore was not possible till the completion of the national gas grid. But only in a few cities, the gas has been allocated and therefore, there is no availability of gas for automobiles.

Target dates for supply of CNG as given below:

Sl. No.	City	Mode of Supply	Target date	Allocation (APM)
1.	Kanpur	Pipe Line	2 <sup>nd</sup> half of 2004	0.1 MMSCMD
2.	Lucknow	Pipe Line	2 <sup>nd</sup> half of 2004	0.1 MMSCMD
3.	Pune	Pipe Line	2 <sup>nd</sup> half of 2005	0.4 MMSCMD
4.	Sholapur	By Cascades	2 <sup>nd</sup> half of 2006	--
5.	Hyderabad	By Cascades	2 <sup>nd</sup> half of 2006	--
6.	Ahmedabad	Pipe Line (GSPL)	2 <sup>nd</sup> half of 2005	--
7.	NCR Satellite towns	Pipe Line (GAIL)	2 <sup>nd</sup> half of 2005	0.7 MMSCMD

However, these deadlines, in most cases are not being adhered to. The gas supply to Pune, for instance, scheduled for mid 2005 has been delayed. The delay is jeopardising the air pollution programme in these cities. The programme is dependent on the move to CNG as a clean fuel, combined with upgraded public transportation systems. However, if the availability of gas is delayed, then the entire programme gets derailed. It is important to note that bus manufacturers are maintaining that it is not possible to make a bus that runs on LPG-mode.

#### 3.2 Gas pricing: CNG and LPG

Till now, gas was pumped by the public sector company, the Oil and Natural Gas Commission (ONGC) and piped and sold by another public sector concern, the Gas Authority of India Limited (GAIL). The government administered the price. But with private players entering the fray, there is a demand for a price hike and for deregulation. Already, liquefied natural gas (LNG) — natural gas cooled to minus 160°C for easy transportation and then re-gassed for use — is reaching Indian shores from Qatar.

Price of gas will have big implications for the programme. The gains in combating vehicular pollution in Delhi have come because of this same gas — compressed for use in automobiles. Many other smog-ridden cities are looking to emulate this model, a combined investment in natural gas infrastructure with a substantially increased public transport fleet. The cost of infrastructure is paid back because of a dedicated demand by buses for this cleaner fuel; the lower cost of fuel, in turn, is a fillip to public transport. There is enough evidence that emissions from CNG equal emissions from the cleanest diesel (negligible sulphur content) that India says it is too poor to produce. So, the use of CNG gives these cities a leapfrog option, particularly if combined with substantially enhanced public transport, at costs we can afford. A win-win situation.

But if this same gas loses its price advantage over polluting diesel, the strategy becomes unviable. It is important to note that if the price of natural gas is linked to the basket of crude oil, this would create problems. Two years ago, EPCA had estimated that that full price parity with this black basket would increase the cost of CNG sold in Delhi by over Rs 7 per kg, effectively destroying the green fuel programme.

There are key questions: how to balance the price of this imported LNG — it has additional re-gassification costs — with domestic natural gas? What will the price of CNG gas to the consumer? How will the price take into account the infrastructure costs?

There is, as yet, no decision, on how the cost of infrastructure will be paid and what will be the price and profit made by the distributing company. For instance, in the case of Ahmedabad, the private distributing company is proposing a price but there is lack of clarity on the components of the tariff. In its analysis for Delhi, EPCA had found that with all the investment in providing infrastructure to Delhi – over 100 pumps, with a total compression capacity of over 16 lakh kg per day – the company was financially viable at the cost of Rs 16.80 per kg to consumers.

In Delhi, EPCA had noted the following components of the gas price:

Sl.No		Sale price (Rs/Kg)	Percentage to total cost paid by consumer
	ONGC: exploration, drilling and delivery sells to GAIL at:		
1.	<b>ONGC sells to GAIL at:</b>	<b>3.05 per kg</b>	18.12
	Gujarat Tax	0.11 per kg	0.65
	Royalty	0.23 per kg	1.37
	Transportation costs (HBJ)	1.45 per kg	8.62
	Additional transportation costs	0.57 per kg	3.39
2.	<b>GAIL sells to IGL at</b>	<b>5.41 per kg</b>	
	Excise duty	2.32 per kg	13.78
	Total variable cost	1.14 per kg	6.77
	Total fixed cost	4.91 per kg	29.17
	Interest	1.67 per kg	9.92
	Provision for tax	0.51 per kg	3.03
	Margin	0.87 per kg	5.17
3.	<b>IGL sells to consumers</b>	<b>16.83 per kg</b>	

In its earlier report to the Hon'ble Court (*Getting the Prices Right: Promoting Environmentally Acceptable Fuels through Fiscal Measures*), EPCA had pointed out that the need was not to subsidise, CNG but to find ways of rewarding its relative "cleanliness" over polluting fuels. In other words, the government needs a policy for "environmentally acceptable fuels", for

technically, there is really nothing like a clean fuel, as yet. EPCA had recommended that need a separate policy for gas as an auto-fuel.

It is also important to recognise that gas, when used in automobiles, has different markets and different costs associated to the infrastructure of compression and dispensing fuel. In the transport sector, CNG replaces dirty diesel (petrol is much higher-priced because of the cross-subsidy to kerosene). Therefore CNG pricing policy must be linked to the fuel it substitutes: diesel. But the policy must ensure a sufficient price advantage — 20-30 per cent lower — for this environmentally acceptable fuel, compared to the polluting fuel it is replacing.

Again, this price differential does not need new subsidies. What it needs is the creative use of fiscal instruments to see that the “bad” is taxed and the “good” given incentives. Delhi, for instance, does precisely this when it removes the sales tax on CNG, but imposes it on diesel. These fiscal incentives have to become part of the policy of CNG auto-fuel.

Table: Components of the final CNG price in Delhi

Sl No	Component	Per cent of consumer price
1	Taxes/duties/margins	24.00
2.	Gas production (purchase price)	18.12
3.	Gas transportation	12.01
4.	Gas delivery operational costs	45.76

### 3.3 Non-existent public transportation

Take any city's data: the increase in number of vehicles far outstrips growth in human population. Chennai, for instance, has seen a 10 per cent growth in people and a staggering 108 per cent growth in on-road private vehicles in the last decade. This is not accidental. Private vehicle growth has paralleled decline in public transport. Ahmedabad in 1990 had almost 800 buses, or roughly 23 buses per 100,000 people. In the early 1980s, the situation was better: 30 buses per 100,000 people. But by 2003, the city had barely 400 operational buses. The ratio now: Less than 9 buses per 100,000 people. Only Delhi — because of the Hon'ble Supreme Court order that mandated 10,000 buses running on clean fuel — has substantially increased its fleet.

At this point, many might argue that population growth is inevitable. What can city planners do? But human population growth may be ordained. The growth of private vehicles is certainly not. It is evident that the decline in public transport leaves people with no choice but to move towards private vehicles and a substantial modal shift in transportation in these cities.

The problem however, is that, while there are ‘sellers’ of private vehicles, there are no sellers of public transport. In most cities, bus fleets run not as transportation companies, but as employment services. Ahmedabad, for instance, has 8,000 employees to run its mere 400-odd buses. This is the case in virtually all the cities, EPCA has been monitoring. The government cannot retrench its labour and it certainly will not invest in improvements as it argues that there is no money to invest in public transportation.

But there are issues that get neglected in this line of argument. First, every city reluctant to invest in public transport is busy building flyovers to take care of burgeoning traffic. This, when it knows flyovers never solved the problem anywhere. They are like the proverbial Internet, where points of traffic jam shift; even as you invest in more space, cars fill it up. The answer to congestion is not more road space, but less.

Delhi, for instance, according to government documents, is building 42 new structures, which will cost the exchequer not less than Rs 500 crore. Now, we know that private vehicles control over 90 per cent of the road space in our cities. Therefore, this is a subsidy for this mode of transport. On the other hand, the same money spent on public transport would have substantially upgraded services for all. Secondly, private vehicles pay less road tax than public transport vehicles. In almost all cities, the passenger taxes imposed on the public bus service are higher than that paid for by private vehicles.

It is also important to note that even as private vehicles constitute over 90 per cent of all vehicles in our cities, but public transport, however it may exist, still moves over 50-70 per cent of commuters. In other words, this is not the story of the US, where the car replaced the bus. It is the story of poor cities — Bangalore, Chennai, Pune — of a poor country, where the poor have not become rich.

#### Public transport in cities

SI No	City	Bus number (on road)	Population (2001 census)
1.	Chennai	2773	64,25,000
2.	Bangalore	3810	56,87,000
3.	Hyderabad	NA	55,34,000
4.	Pune	849	37,56,000
5.	Sholapur	60	10,00,000
6.	Ahmedabad	400	45,19,000
7.	Lucknow	--	22,67,000
8.	Kanpur	--	26,90,000

It is clear that the upgradation of public transport is a must for the clean air strategy in our cities. It is also equally clear that this public transport must be run on “environmentally acceptable fuels” so that the growth does not lead to pollution. This issue needs to be taken up urgently by the Central and state governments.

### 3.4. Adulteration

In late 2001, the Hon'ble Supreme Court had asked EPCA to conduct an independent investigation on the state of adulteration in the NCR region. The report – based on surprise collections and testing of samples in the Fuel Testing Laboratory – found that over 28 per cent of the samples it sent for testing failed to meet the specifications laid down by the BIS. In other words, were technically adulterated

But the investigations by EPCA had unravelled much more as well. EPCA had sent diesel samples, which were adulterated with kerosene and the laboratory had passed the sample adulterated with 20 per cent kerosene saying, “it met the specifications”. The sample with 10 per cent adulteration also passed. But the sample with 15 per cent adulteration failed, in one parameter. Its sulphur level was found to be high – understandable because sulphur content in kerosene is substantially higher than the diesel being supplied to Delhi. But then why did the sample adulterated with 20 per cent kerosene pass?

The report also found that sulphur levels in both diesel and petrol astonishingly went down as the fuel travelled from the refinery, to the depot and then to the retail outlet where it was dispensed to customers. Therefore, at the refinery, in this case Mathura refinery, the sulphur levels ranged from 300 parts per million (ppm) to 400 ppm. But at Bijwasan – the depot where the pipeline brought the oil from the refinery – the sulphur content dropped to 200-300 ppm and then at retail outlet, further dropped to 100-300 ppm. Clearly, with no “desulphurisation” possible on route, something else was happening.

Could it be dilution with an adulterant? There was no clear clarity on this issue. The oil industry had no clear and convincing explanation. But as the tests only need the fuel to meet the standards -- in this case 500 ppm of sulphur, not being able to explain what is happening to sulphur on route was not an issue.

In fact, as EPCA noted in its report to the Hon'ble Supreme Court, the fuel specifications made adulteration a legal business. The fuel specifications laid down by the BIS allowed for a range – and this range was wide enough to allow for “intelligent” adulteration. In other words, it was possible to adulterate carefully: adulterate petrol with up to 20 per cent naphtha and still meet the BIS specifications. Given the price difference, an outlet could earn a daily profit of Rs 32,000 if it substituted just 15 per cent naphtha in petrol.

EPCA, therefore, suggested that much more needed to be done to control the business of adulteration in the country. Its key recommendations were:

**a. Make oil companies accountable for the quality of fuel at the retail end:** Any extent of vigilance and surveillance will be meaningless unless strict liability is imposed on the oil companies to take full responsibility for the quality of fuels they sell at their retail outlets. As of now, the responsibility and penalty are all fragmented along the supply chain. Though retailers and transporters are penalized by the oil companies if malpractices occur, the oil companies are not held accountable. To put it simply, consumers cannot penalize the oil companies for adulterated fuels. Unless this is done, checks and balances in the system will not work effectively to prevent malpractices at any level.

**b. Tighten fuel quality standards:** The government needs to regulate key parameters like aromatics, and olefins in petrol, and PAH in diesel. It also needs to tighten the range in the specifications so that adulteration can be checked.

**c. Develop alternative testing procedures for more accurate detection:** For more accurate detection, alternative testing methods and protocols should be adopted and applied for surveillance. It is possible to create a library of different refinery samples of automotive fuels and possible adulterants. With the use of the standard library chromatogram, it will be much easier to detect fuel adulteration.

These recommendations need urgent attention in order to deal with the menace of adulteration. For instance, the government of Andhra Pradesh has written to EPCA that it finds “there is also need to provide legal mandate for fuel adulteration check. The BIS tests do not seem to address the adulteration parameters and without being able to prove adulteration, it is not possible to prosecute the persons who are apprehended selling mixed fuels in Civil Supplies inspections. In the above background, the State Government requires assistance to control fuel adulteration by not only kerosene but also solvents and additives that are imported from other states in a mixed form and sold directly to old diesel engine users in all category of vehicles. Imported kerosene also finds its way into the transport sector. This requires national level and inter-state initiatives.”

Without national level action on these key issues, state governments will be unable to check adulteration.



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#### **4. Directions sought from Hon'ble Supreme Court**

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**1. To direct the Gas Authority of India Limited (GAIL) and Union Ministry of Petroleum and Natural Gas to respond on the supply of compressed natural gas to critically polluted cities, with a time-bound action plan.**

**2. To direct the Union ministry of Petroleum and Natural Gas Price to respond on the issue of pricing policy for CNG and other environmentally acceptable fuels.** It has been noted that with deregulation and price reforms underway, there is little elaboration of the issue of CNG as an auto-fuel in official policies to make CNG competitive vis a vis its competing fuels like diesel and petrol. The review of the fuel taxation policies around the world shows that "favourable" taxation is an important instrument to maintain the price differential to encourage environmentally acceptable fuels. The lack of a clear policy on this issue is impeding the successful implementation of air pollution control programmes.

**3. To direct the Ministry of Urban Development to respond on the national level policy on public transport along with a time-bound programme for action on this matter.**

**4. To direct the Union ministry of Petroleum and Natural Gas to respond on the action taken on the recommendations of EPCA on the steps needs to check fuel adulteration as detailed above.**

## Part II: Individual city action plans and status

### 1. Chennai

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The city adds roughly 600 vehicles each day to its already crowded roads. The city has a registered private vehicle population of over 18.5 lakh, the bulk of which are two-wheelers.

On the other hand, its total fleet of buses is 2773, of which 40 per cent are above 8 year old; another 40 per cent between 5-8 years old. In other words, the city has hardly added or replaced bus in the last 5 years, which has lead to increased use of private transportation.

In addition, the city has 51,000 registered autos and roughly 18,000 taxis, which are run on diesel and are highly polluting.

#### LPG strategy

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The city does not have ready access to CNG and as a result its gaseous fuel strategy is based on the introduction of LPG.

The issue for the city is to build the LPG infrastructure and to then plan and implement the strategy for phased in transition to LPG. This strategy is running to problems:

- a. The bus manufacturers are not ready with LPG models. In fact, in the meetings with state agencies, manufacturers have contended that there is no LPG variant in the world for heavy duty vehicles;
- b. The price difference between domestic LPG cylinders (subsidized) and auto-LPG is resulting in illegal use of these cylinders in vehicles, which is extremely dangerous.
- c. The price difference between auto-LPG and diesel is not sufficient to lead to transition to LPG.

#### Auto-LPG economics

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Currently a conversion kit costs roughly Rs 20,000 for cars and Rs 14,000 for autos. The price of LPG is Rs 19.98/ltr as against Rs 24.23/ltr for diesel. Vehicles running on LPG get roughly 85-90% of the mileage of diesel.

Therefore, currently, these vehicles save 0.90 p/km, while running on LPG, which is not sufficient incentive for owners. There is a need to review the pricing of auto-LPG and to link it to the price of diesel – the fuel it is replacing and to ensure that the price differential provides incentives for switchover. In addition, the state government has to consider using fiscal incentives – that is removal of sales tax on LPG and increased sales tax on diesel – to provide incentives for switchover.

#### Auto-LPG infrastructure

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The capacity of tanks is 10,000 litres and a LPG dispenser can dispense gas at the rate of 25 litres per minute from one nozzle. The LPG tank in cars is 35-50 litres and in autos is 15-20 litres. In other words, the stations can fill about 320 vehicles in 16-hour shift through each nozzle. As the number of autos running on LPG increases, the infrastructure will have to keep pace as well.

## Key deadlines

Based on the above discussions the key deadlines agreed are as follows:

1. Creation of LPG infrastructure for the auto-gas supply in the city: 28 stations by **March 2005**;
2. Transition of vehicles to LPG: State government to submit plan by **January 31, 2005** on its programme, with dates and targets, for transition to LPG of autos;
3. Augmentation of public transport: State government to submit plan on substantial upgradation of public transport in the city by **March 31, 2005**;
4. Upgraded PUC: State government to ensure that all PUC stations adhere to the new norms set by Central government and ensure that system is working effectively as detailed in EPCA report on Hon'ble Supreme Court by **March 31, 2005**;
5. Adulteration: State government to organize one large scale (coordinated) and surprise inspection to check adulteration in the city at different points and to submit report to EPCA by **March 31, 2005**.

## Chennai: Action Plan

Sl No	Issues	Original action plan proposed in December 2003	Original deadline in December 2003	Status/remarks	Deadline
1	Emission norms and automotive fuel quality	Euro III for new vehicles except two- and three-wheelers	April 1, 2005	At present Bharat stage II norms being implemented for all vehicles in Chennai city. Metropolitan Transport Corporation 127 Bharat stage II vehicles registered and operated in Chennai	<b>April 1, 2005</b>
		Two- and three-wheelers Bharat-II	April 1, 2005		<b>April 1, 2005</b>
		Low benzene petrol (1 per cent) to be introduced	April 1, 2004	1% benzene content in petrol will be produced from October, 2004	<b>Done</b>
		Ban on supply of loose 2T oil at petrol pumps	Draft notification is under process in government	GOI, MoEF has been addressed in this regard (vide Lr.No.17712/EC-II/2002-11 dated 13.02.2004 by the Secretary to Govt., E&F Dept. Chennai Orders are awaited	<b>March 31, 2005</b>
		Installation of premix oil dispensers for 2-stroke, 2 & 3 wheelers		Continuous efforts are being made by the oil companies to supply premix 2T oil to two and three wheelers	<b>March 31, 2005</b>
2	Alternative fuels:	28 auto LPG dispensing	To be commissioned	Remaining 19 ALDS are yet to be installed	<b>28 stations by March 31,</b>

	infrastructure	stations to be set up. 5 stations functioning, work in 18 ALDS is in progress	by March 2004. Sites have to be identified for 5 stations and are to be set up by June 2004	by oil companies. Deadlines not met by the four oil companies	<b>2005</b>
3.	Alternative fuels: transition	Switchover to LPG for autos and taxis	No schedule given	51,000 autos and roughly 18,000 taxis. Many vehicles running on domestic LPG cylinders, which is very dangerous. But as yet, price of auto LPG is a deterrent for switchover.	<b>State government to give plan for phased transition to LPG to EPCA by January 31, 2005</b>
		Moving buses to clean gaseous fuel		Bus manufacturers are not prepared to make LPG buses, citing lack of international experience	<b>State government to explore options.</b>
3	Public transport system and transportation plan	Finalisation of plans by the state government/local authorities for augmentation of city public transport	Not later than April 1, 2004		<b>Comprehensive plan for upgraded public transport by March 31, 2005</b>
		Improvement of public transport system for discouraging use of private vehicles		The Government of Tamil Nadu has taken a policy decision that out of the 2554 scheduled services of MTC, 1000 services are to be privatised and the balance 1554 services operated by MTC. When this policy decision is implemented all the old buses (1000) will be handed over to the private operators along with permits and in that case there will not be any buses more than 8 years old in the fleet of MTC. MTC replaced 117 buses by complying with Euro II norms during 2002-03 and 25 buses are to be replaced during 2003-04	<b>By transferring more than 8 year old buses to private operators, will not lessen the pollution load of the city.</b>  <b>The city must not consider buying Euro II buses but urgently review option for LPG or at the least Euro III buses.</b>  <b>To include in plan to EPCA on public transportation , March 31, 2005</b>
				Government of Tamil Nadu (GTN) is in the process of awarding a	

				5-month study to Delhi Metro Rail Corporation (DMRC) for examining the feasibility of the system for Chennai	
4	In-use vehicles				
		Phasing out of 15-year-old commercial vehicle and all diesel three wheelers		MTC has 2773 buses out of that, 1005 buses are 8 years old as on 31.10.2004	<b>Deadline as above</b>
5	Vehicle Inspection programme	Setting up of emission testing centres at MTC depots	Another five centres by December 2003		<b>To be complete by March 31, 2005</b>
		Up gradation to Computerised centres	Process to be completed within a month	Government ordered for computerization of all the emission testing centers vide its G.O.Ms.No.11, Home (Tr V) Dept. Dt.5.1.2004 is being implemented	<b>Upgraded PUC to be complete by March 31, 2005</b>
6	Adulteration of fuels	Illegal sale of kerosene to vehicles and checking adulteration of fuels	Periodic checking is being done and will continue		<b>State government to organise one large scale (coordinated) and surprise inspection and to submit report to EPCA by March 31, 2005</b>
7	Fiscal measures to discourage the use of older vehicles			Collection of green tax from 1.8.2003 is being implemented in Tamil Nadu	
8	Control of emissions from Industrial sources	To provide scrubbers to reduce emission from GMR power corporation	June 2004	Not mentioned in the ATR	<b>Status by March 31, 2005</b>
9	Control of emissions from commercial sources	To shift the entire coal and iron ore handling from Chennai to Ennore Port	December 2004	Not mentioned in the ATR	<b>Status by March 31, 2005</b>
10	Air quality monitoring network			The quality control of air quality data is being carried out	
11	Policy			Air pollution inventory	<b>Study</b>

	studies			for the Chennai city is proposed during January, 2005 in coordination with Anna University/IIT, Chennai	<b>finalised by March 31, 2005</b>
				TNPC Board has initiated a study on health impact of air pollution in Chennai city in collaboration with SRMC & RI, Chennai (Estimate both mortality and morbidity impacts through Time series analysis during 2004-2006)	<b>Interim report by March 31, 2005</b>

## 2. Bangalore

The city is bursting with vehicles, leading to both congestion and pollution. Like Chennai, the city also has a large number of autos – over 76,000 registered as of June 30, 2004, large numbers of private vehicles – 400 registered each day. However, unlike most cities, Bangalore operates a financially viable bus transport system. But its fleet number is still too small to become a viable alternative public transportation system for the city's commuters.

Also like Chennai, Bangalore does not have immediate access to CNG. Therefore, given the quality of liquid fuels, the only alternative is to build a LPG infrastructure in the city for its large three-wheeler population.

### Transition to LPG-autos

It had been agreed that the state government would ensure mandatory conversion of in-use 3-wheelers registered after 1991 in a phased manner. By the December 2004, a total of 12,878 autos were plying on a bi-fuel (LPG and petrol) mode.

In addition, it was agreed that the state government would ensure that it would register only 3-wheelers with bi-fuel mode from 1.12.2003. It was reported that the transport authority has made it compulsory to issue new permits or allow replacement of existing vehicles only on bi-fuel mode and 10,433 new autos have been registered by 31.10.2004.

On 18.12.2004, the government issued a notification no TRD 12 TSP setting the time frame to retrofit the existing autos in Bangalore with authorized kits. The city has decided to retrofit based on age, with the newest auto being converted fastest. The deadlines are as follows:

Date of Registration	No. of autos to be retrofitted	Last date for fitment of approved LPG Kit
01.04.1999 and above	18254	18.03.2005
1998-99	2455	18.05.2005
1997-98	4138	18.07.2005
1996-97	6641	18.09.2005
1995-96	6597	18.11.2005
1994-95	3775	18.01.2005
1993-94	3262	18.03.2005
1992-93	3509	18.05.2006
01.04.1991 to 31.03.1992	3306	18.07.2006
<b>Total</b>	<b>51937</b>	<b>18.07.2006</b>

The government has decided to give a subsidy amount of Rs 2000 each to the autos as an incentive to encourage conversion.

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### **Creating the LPG infrastructure**

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It had been agreed that the city would establish 5 auto LPG dispensing stations (ALDS) by March 2004. By December 2004, a total of 13 stations were operating and it was agreed that by March 31, 2005, another 4 stations would be built, taking the total to 17.

By setting the monthwise conversion deadlines, the state government has facilitated the oil companies to set up the required LPG infrastructure as well. EPCA is well aware that it is imperative to plan for a smooth transition to gas.

Currently, the 13 LPG stations have a total of 30 LPG filling pumps and nozzles. Each pump can fill about 400 vehicles a day, which makes the current infrastructure adequate for the vehicles on the road.

But this infrastructure will need to be increased substantially to meet the demand and to ensure that there is no inconvenience to the autos. As per the government notification, another 18,254 autos are to be retrofitted by 18.3.2005 and as per this deadline, another 46 LPG dispensing pumps are required to cater to these vehicles by March. In addition, 2000 more new and replacement autos would be registered by March 2005 and the government has estimated that a total of 51 more LPG pumps are required by end of March 2005. It is imperative that the oil companies adhere to this schedule and increase their infrastructure to ensure the smooth transition in the city.

The state level coordinator has also estimated that based on the current consumption of 80 kl/day of LPG, the requirement of auto LPG by the end of July 2006 (when all autos are converted) will be 430 kl/day for autos only.

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### **Public transport**

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The city registers 1,46,000 new private vehicles each year. A key reason is that public transport in the city carries roughly 11 per cent of the commuting population. This when the city has one of the few financially viable public transport systems, run efficiently by its administrators. The city has also been investing in new buses, unlike almost all other metros in the country. The fleet size of the Bangalore transport corporation has increased from 3106 in January 2004 to 3810 by December 2004. The government has said it would further increase this to 4330 by October 2005.

However, it is also clear that this increase is not adequate. The scale of the problem, demands for a comprehensive public transportation plan, which takes into account current commuter needs and the possible modal shift that from private vehicles to public transportation in the city.

Also the city needs to purchase Euro III buses and not Euro II buses as it is planning today. If the public transport is run on polluting fuel and technology it will not lead to combined benefits of clean air and congestion. It is for this reason that the city must plan for at least Euro III technology, which is going to be introduced in the country by April 2005. This is not the advised option given the problems of adulteration and pollution of diesel vehicles, with sulfur content of Euro III fuel, but nevertheless, given the limited options of the city in terms of gas, will mean a step forward.

## Key deadlines

Based on the above discussions the key deadlines agreed are as follows:

1. Creation of LPG infrastructure for the auto-gas supply in the city: 17 stations **by March 2005 and to ensure that the infrastructure keeps pace with the schedule of retrofitting notified by the government on 18.12.2004;**
2. Transition of vehicles to LPG: All 52,536 (registered autos yet to be retrofitted as of 30.10.2004) to be completely converted to LPG by **July 18, 2006**. Conversion to be done as per schedule given by government in its notification, dated 18.12.2004.
3. Augmentation of public transport: Increase the number of buses State government to submit plan on substantial upgradation of public transport in the city by **March 31, 2005;**
4. Upgraded PUC: State government to ensure that all PUC stations adhere to the new norms set by Central government and ensure that system is working effectively as detailed in EPCA report on Hon'ble Supreme Court by **March 31, 2005;**
5. Air quality monitoring: Karnataka Pollution Control board to set up one online-ambient centre to check PM 2.5, PM 10, Nox, Co and So2 **by March 31, 2005.**

## Bangalore: action plan

SI No	Issues	Action proposed	Status	Deadline
1	Emission norms and automotive fuel quality			
		Reduction in benzene content to 1 % in petrol	Oil companies will do with Euro III introduction only	<b>April 1, 2005</b>
		Installation of pre-mix oil dispensers for two-stroke two- and three-wheelers and measures to ban sale to loose 2T oil.	Department of Forest, Ecology and Environment has issued notification dated 20.11.2004	
2	Alternative fuels	Mandatory conversion of in-use three-wheelers registered after April 1, 1991 to bi-fuel mode and registering only new three-wheelers having bi-fuel mode	By December 2004, a total of 12,878 bi-fuel autos on roads. Government has issued notification, December 2004, with month-wise phase out plan.	<b>Complete conversion by June 2006</b>
		Five auto LPG dispensing stations	By December 13 ALDS operating and another 5 ALDS will be established before March 2005	<b>Not adequate. Oil companies to adhere to deadline set by government for phase-in of LPG vehicles.</b>
		Institutional plan for		



		implementation of gaseous fuel programmes like safety inspection programme, system of authorisation of conversion kits and workshops		
3	Public transport system and transportation plan	To increase the current fleet of 3,116 buses to 4,330 buses	Transport department has informed that the BMTC will meet the targeted fleet size by the end of December 2004	<b>To submit a comprehensive public transportation plan by March 31, 2005</b>
		Metro for city	The Bangalore Metro Rail Project-Phase I envisages 2 Corridors namely East West (18.1 kms) and North South (14.9 kms). Out of length of 33 kms, 6 kms shall be underground and the remaining 26.3 kms elevated/ at ground surface. It is proposed to start construction of the project in April 2005. The project is expected to carry 8.2 lakhs passengers daily in the year 2009, 10.2 lakhs in 2011 and 16.1 lakhs in 2021.	
4	In use vehicles	Phasing out of 15 year old commercial vehicles and all diesel three wheelers	DFEE has issued G.O. No. FEE 69 ENV 2003 dated 23.1.2003. In this regard, the Transport Department has taken the following measures: <ol style="list-style-type: none"> <li>1. Strict inspection for renewal of fitness certificate under the supervision of senior officers.</li> <li>2. Painting red strip around the body of more than 15 years old transport vehicles for easy identification.</li> <li>3. Vehicles not loading and unloading in the city are made to move on outer ring road only.</li> <li>4. Movement of goods vehicles inside the outer ring road is restricted during day time.</li> <li>5. Green tax is introduced with effect from 1.4.2002 for the transport vehicles aged more than 7 years at the rate of Rs.200/- at the time of renewal. Green tax is also being levied on all 15 year old two wheelers and also on other than two wheeler non-transport vehicles at the rate of Rs.250/- and Rs.500/- respectively at the time of renewal registration.</li> </ol> <p>In view of the above, total number of vehicles above 15 years age has drastically come down from 48,659 to 22,925 during the last 2 years.</p>	
		Restriction on plying of interstate/ intercity buses in city	The Police Commissioner has informed that the movement of Inter-State and Inter-City buses are prohibited on 8 roads in Bangalore city.  Bus terminal is being developed on Mysore road and is intended to operate number of schedules going towards Mysore directly from	

			that terminal to decongest the city centre.	
5	Vehicle inspection programme	"No PUC No Fuel" scheme	Food and Civil Supplies Department has reported that there is no provision in the Petroleum Products Control Order and Motor Spirit and High Speed Diesel Control order, 1998 for issue of "No PUC- No Fuel" certificate and has informed the Department of Environment and Ecology to examine under the existing pollution Control laws. The Department is examining the same.	
			220 emission testing centres need to be upgraded on new norms of Central government	<b>Upgrading the PUC centers to meet new norms of government of India by March 31, 2005</b>
6	Fuel adulteration		As parallel marketing of kerosene is stopped, adulteration cases have reduced dramatically. The Food & Civil Supplies department is undertaken regular inspections. Various other measures have also been initiated by all agencies	
7	Air quality monitoring network	Proposed to set up one online ambient air quality monitoring system	KSPCB had floated tenders through M/s RITES and the technical evaluation of the tenders received is in progress. It is proposed to monitor the following parameters viz., PM <sub>25</sub> , PM <sub>10</sub> , NO <sub>x</sub> , CO and SO <sub>2</sub> .	<b>To establish by March 31, 2005</b>
		Emission Inventory study	KSPCB has informed that the emission inventerisation will be completed before December 2005.	
8	Control of emissions from Industrial sources		<p>Department of Ecology and Environment has issued Notification No. FEE 120 ECO 2002, Dt: 16-03-04 for mandatory use of 0.05% Sulphur containing HSD by industries located within ORR limits in DG sets and liquid fuelled boilers.</p> <p>This has been stipulated as a condition in consent order issued by KSPCB. The industries are also required to furnish an affidavit that they are using HSD containing 0.05% sulphur only in DG Sets, boilers etc., All the oil supply companies are supplying 0.05% sulphur containing HSD to the consumers within Outer Ring Road.</p>	

### 3. Hyderabad

The city has similar problems of numbers of vehicles and lack of public transportation system. As far as gaseous fuels are concerned, LPG is already available and there is a possibly availability of CNG as well. These plans have to be expedited. It has a large number of three-wheelers – 63,414 – which it needs to convert to LPG. However, this transition needs to be carefully implemented to ensure that the inconvenience is minimized and oil companies have to provide easy access to LPG.

The state government in its letter to EPCA dated December 16, 2004 has raised key concerns regarding the implementation of the agreed action plan.

These are:

1. In respect of phasing out of 15 years commercial/transport vehicles, the State Government supports the proposal in the Action Plan along with the committed years of implementation. However, in the absence of specific orders of the Honourable Supreme Court of India directing Government of India for amending the CMV Act, it may not be legally feasible to phase out the vehicles based only on their vintage.
2. In respect of "No Fuel without PUC", it was felt that a valid Pollution Under Check (PUC) certificate is compulsory for all categories of vehicles and any vehicle not carrying such certification should be penalized. Similarly, a PUC issuing center should face legal action if the pollution check of a vehicle is not conducted as per procedure. To ensure this, mobile patrolling and checking of visibly polluting vehicles as also the PUC Centres by a Committee consisting of RTA concerned and the Traffic Police in mobile teams is proposed under the overall supervision of the Transport Commissioner. The committee is empowered to check all visibly polluting vehicles including RTC and SETWIN buses. The teams will also verify PUC certificates issued without proper check and the source of such certification, so that action can be taken comprehensively. Considering that the calibration of existing testing equipment due to the addition tests for hydrocarbon for petrol vehicles will take a month or so more, these mobile teams shall start checking from January 2005 onwards. These empowered teams will be given the task of checking both vehicles and PUC Centres and take legal action. At present, there are no provisions in the law to take legal action or penalise visibly polluting vehicles under the CMV Act or Rules. It is, therefore, requested that the Honourable Supreme Court may kindly consider issuing appropriate orders in this regard or propose amending the CMV Act or Rules.
3. In respect of supply of alternate fuels like CNG/LPG/ULSD/Ethanol/bio-diesel for new and converted vehicles within the HUDA area, the EPCA may assist the State Government in expediting the supply of these alternate fuels.
4. There is also need to provide legal mandate for the fuel adulteration check, as the BIS tests do not seem to address the adulteration parameters and without being able to prove adulteration, it is not possible to prosecute the persons who are apprehended selling mixed fuels in Civil Supplies inspections. In the above background, the State Government requires assistance to control fuel adulteration by not only kerosene but also solvents and additives that are imported from other states in a mixed form and sold directly to old diesel engine users in all category of vehicles. Imported kerosene also finds its way into the transport sector. This requires national level and inter-state initiatives.

#### Hyderabad: action plan and deadlines

SI No	Issues	Actions proposed	Status	Deadlines
1	Emission norms and fuel quality	Euro II norms will be applicable to all vehicles	Implemented	
		Reduction in benzene content to 1 per cent in petrol	Implemented	
		Installation of premix oil dispensers and measures to ban sale of loose 2 T oil	280 premix oil dispensers installed @ minimum of 1 dispenser per station. Implemented.	.
2	Alternative fuels	All in-use petrol driven three-wheelers (63,414) to be converted to LPG	Till November 2004, 1475 vehicles are converted to LPG out of 63,414. Faster conversions could lead to traffic hazards and long lines outside the 9 LPG stations	<b>October 2005</b>

		All petrol taxis to be converted to LPG	No petrol driven taxis are plying in the HUDA area .	
		More than 15 year old government vehicles to be replaced by either Euro II compliant vehicles or converted to LPG (477 vehicles)	47 government vehicles replaced by Euro II complaint vehicles	
		Gaseous fuel plan for buses	There is a possible availability of CNG for the city and buses would be targeted for conversion Conversion action plan of the RTC buses is awaited from the transport department in next 1 month	To submit action plan to EPCA
		45 LPG dispensing stations required	HUDA has already notified zoning regulations and according to that commercial and industrial zones can be earmarked for multi-fuel stations.	State government has to coordinate action with oil companies to ensure smooth transition.
3	Public transport system and transportation plan	No action plan proposed	Multi Rail Transport system is in operation to increase the efficiency of the public transport	State government to issue plan to EPCA
4	In-use vehicles	Phasing out of 15 year old commercial vehicle and all diesel three wheelers Above 20 years	The state government supports the action plan but in the absence of specific orders from the apex courts directing the government of India for amending the CMV act, it may not be legally feasible to phase out vehicles based on their age	October 2004
		19-20 years		October 2005
		18-19 years		October 2006
		17-18 years		October 2007
		16-17 years		October 2008
		15-16 years		December 2009
		Restriction on plying of interstate/intercity buses and restriction of entry to non-destined commercial vehicles in city	Being implemented. Non-destined commercial vehicles being diverted	
5	Vehicle Inspection programme	No fuel without PUC	Mobile teams would commence rigorous checks from January 2005. At present there are no provisions in the law to take a legal action or penalise visibly polluting vehicles under the CMV act or rules. Apex court may consider issuing appropriate orders in this regard or propose to amend the CMV act or rules	Implemented

		Improved centralized inspection and maintenance	Seven computerised online PUC centres have been networked on a pilot basis	To submit schedule on upgraded PUC
6	Fuel Adulteration	No action plan proposed	The state government requests the apex court to provide legal mandate for fuel adulteration check as the BIS tests do not seem to address the adulteration parameters	
7	Control of emissions from Industrial sources	Seven non-compliant industries to meet norms	Conducts periodic checks on all the air polluting industries in the HUDA area	To submit status to EPCA
8	Air quality monitoring network	Installation of automatic monitoring stations	APPCB has one online ambient air monitoring station and one mobile air monitoring station	Implemented
		Plans to develop air pollution inventory for the city	APPCB has submitted the proposal to CPCB for technical and financial assistance. However APPCB is carrying out the emission inventory of HUDA area utilising the in-house capabilities	Proposal being submitted to the MoEF-GOI for possibility of funding

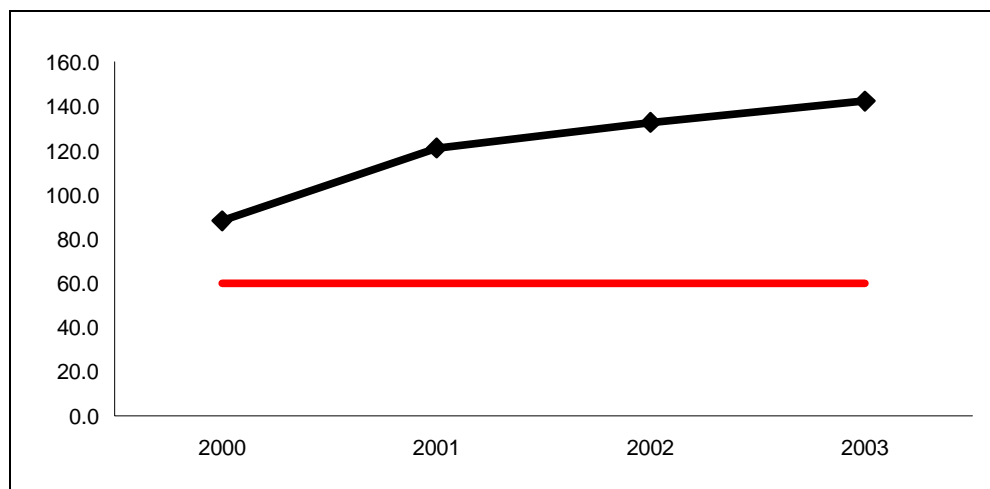
#### 4. Pune

Pune city is not included in the original directions of the Hon'ble Supreme Court to EPCA, but finds mention in the order dated April 5, 2002 and so also in the order dated May 9, 2002, which asked for a preparation of a scheme with regard to improvement of air quality with special reference to vehicular pollution in cities other than Delhi, which are equally or more polluted. The pollution levels in Pune are extremely alarming and because of its proximity to Sholapur, a city EPCA is already monitoring, it decided to include the city in the list.

Like any other city, Pune is also witnessing spurt in the number of vehicles. For example, close to around 10,000 vehicles are added to the Pune roads every month. This not only adds to the congestion, but also deteriorates the air quality of the city. It is estimated that about 60 per cent of the Pune Municipal Corporation (PMC) roads in the heart of the city are congested whereas remaining 40 per cent of the roads in the fringe area have relatively lower traffic volumes.

The air pollution levels in the city shows an increasing trend for key pollutants. The levels of PM10 in the city show a consistent increase over the years.

### PM10 exceeded the safe levels for residential areas by 2.4 times in 2003



Source: City annual averages computed on the basis of National Ambient Air Quality Status report published by Central Pollution Control Board, New Delhi. 2000 – 2003.

### Issues for discussions

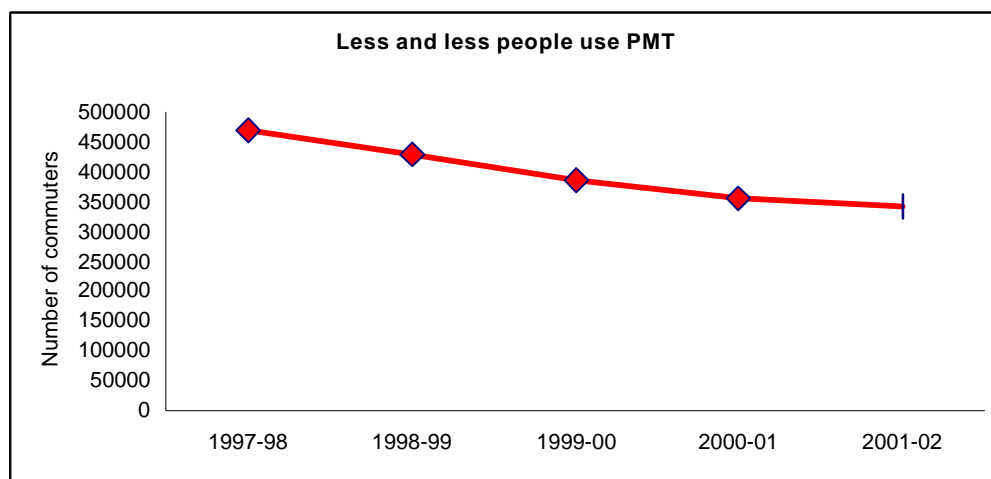
#### Gaseous fuel programme

The Ministry of Petroleum and Natural Gas (MoPNG) in early January 2004 has allocated 0.4 MMSCMD of gas for the Pune city. Pune city has been allocated an Administered Price Mechanism (APM) gas, which would be cheaper than the gas bought from the private players.

- GAIL has already signed joint venture agreements with the BPCL for implementing the city gas project in the city of Pune. For the city, GAIL's proposed Dahej-Uran Pipeline (DUPL) will be extended up to Pune and the project is to be implemented in 2006-07. Mahanagar Gas Limited (MGL), which is managing City gas business in Mumbai shall also be a partner in the Joint Venture Company of Pune.
- The city government has also availability of LPG as an alternative fuel. Already two auto LPG outlets are being operated on trial basis in Pune.

#### Public transport

The public transport situation in the city of the Pune is appalling. The city bus undertaking is not anymore significant in meeting the travel demand for the commuters. A look at the statistics of the Pune Municipal Transport (PMT) shows it all. Similarly the age profile of the city buses is also on a higher side. The government though has initiated process of scrapping their older buses and introducing new buses.



- The passenger load factor of the PMT has over the years shown a consistent decline. Compared to 1990-91 when the load factor was around 64 per cent, it declined to around 45 per cent in the year 2000-01. Though in this year that is the 2003-04 the load factor has improved to around 55 per cent. What this effectively means is that even with 55 per cent load factor, half of the PMT's buses are running empty
- The mobility crisis in Pune is evident from the fact that the trip rate per capita by bus (It is a ratio of average passengers per day/population) is consistently falling, from 0.35 in 1990-91 to just 0.17 in 2000-01. This effectively means that Pune citizens are shifting from bus to other modes. This is the most discouraging factor to solve the mobility crisis. The Pune city action plan actually shows that how less and less commuters are using the PMT for commuting
- Thus the city needs a total overhaul in the mobility patterns. The city government will have to intervene and improve the public transportation systems. Further policy interventions by the government should help in reversing the trip rate per capita by bus for the Pune city

## 2. The key deadlines are as follows:

1. Transition to LPG: The city to convert 20,000 autos, which are pre-1991, to LPG by June 31, 2005;
2. GAIL to ensure that it meets its deadline of December 2005 for supply of CNG to city;
3. City government to submit a comprehensive plan for public transportation to EPCA by April 30, 2006;
4. City government to finalise and implement a parking policy by April 30, 2006;
5. City government to implement an upgraded PUC system, meeting new norms set by Central government by April 30, 2006.
6. Pre-mixed 2-T oil to be made compulsory as of April 2005

## Pune action plan

SI No	Issues	Proposed action	Status	Deadline
1	Emissions norms and automotive fuel quality			
		1 per cent benzene in petrol		April 2005

		Installation of pre-mix oil dispensers for two-stroke two- and three-wheelers	To direct that pre-mix 2T oil to be made compulsory in Municipal Corporation area	April 30, 2005
		Measures to ban sale of loose 2T oil		April 30, 2005
2	Alternative fuels	Introduction of CNG vehicles in the city	0.4 mmscmd gas allocated to Pune. Pipeline delayed. GAIL to ensure speedy completion	June 2006
		LPG fuelled vehicles	Over 55,000 autos in city, of which 20,000 are above 15 years of age. To convert these to LPG or phase out by June 2006	20,000 pre-1991 autos to be converted by June 2005,
3	Public transport system and transportation plan			
		PMT placed order for hiring 150 buses and out of which 45 are already on road	March 2005 for the remaining number of buses	
		PMC has prepared mass rapid transit system plan which includes light rail, trams and sky buses		To submit comprehensive plan for public transport by April 30, 2005
		Parking policy	Submitted policy to the PMC's standing committee	Draft by January 31, and final policy by April 30, 2005
		Bypass traffic	The bypass road for Pune has not been completed.	Maharashtra State Road Transport Development Corporation and NHAI to submit action taken report and plan
4	In-use vehicles	Phasing out of old vehicles		
5	Vehicle inspection programme	PUC system	New upgraded PUC system to be implemented in Pune	April 30, 2005
6	Fuel adulteration			Food and Civil Supplies to file report on action taken and proposals for strengthening mechanisms for enforcement.
7	Air quality and the issues in air quality monitoring		MoEF and USEPA have signed an MOU	
		Expanding the monitoring network	To expand the programme and get the	April 30, 2005



			requisite support from CPCB	
		Source apportionment studies	Source apportionment at the exposure sites would be carried out for specific recommendations on air quality improvement	1st report by April 30, 2005
		Health impact	Health impact studies to be conducted	April 30, 2005

## 5. Sholapur

This is a smaller city – 1 million population – situated on the Pune-Hyderabad national Highway. The key sources of air pollution relate to vehicles – with the number of two-wheelers sharply increasing in the city and industrial pollution.

The city has a total vehicle population of 2,76,768, of which 2,16,167 are two wheelers. Therefore, the key challenge in this city is to find approaches to control pollution from these vehicles. On the other hand, the city has 102 city buses of which only 60 are on the road.

It must be noted that as yet there are virtually no effective methods of combating pollution from these vehicles;

- a. Two-wheelers cannot be converted to gaseous fuels like CNG or even LPG;
- b. Two-wheeler emission standards even if strict at the point of manufacturing are known to deteriorate and lead to pollution in the in-use fleet; Given economic conditions, it is not possible to demand a phase-out of old two-wheelers;
- c. The emission-warranty offered by manufacturers has never been put into effect because of a lack of enforcement mechanism;
- d. The check and enforcement of these large numbers of vehicles on the road is also difficult within the PUC systems and demands a huge infrastructure and capacity to check the in-use fleet.

It is in this respect that EPCA believes that Sholapur is a city that will provide answers to many other newly motorizing cities, which are also going the private auto-dependent route, leading to congestion and pollution. The answers found for Sholapur, can be emulated by many other cities in the country so that we avoid the health burden of pollution.

The strategy will therefore be:

- a. To find ways of reducing pollution from the in-use emission fleet by introducing effective emission warranty and PUC checks;
- b. To find ways of moving towards zero-emission two wheelers like battery two-wheelers;
- c. To find ways of upgrading the public transportation system so that the growth in the numbers of private vehicles can be checked and controlled.

The following are the key deadlines set for Sholapur:

1. To examine the feasibility of supplying Euro III fuel to Sholapur, given its low benzene content and given the fact that Sholapur has large numbers of two-wheelers, which emit higher emissions of this carcinogen.
2. To issue notification for ban on supply of loose 2T oil at petrol pumps by April 30, 2005;
3. To set up a pilot centre for upgraded PUC for two-wheelers using the equipment and test methodology designed by ARAI by April 30, 2005;
4. To upgrade the current petrol pump PUC centers by April 30, 2005;
5. To encourage the use of zero-emission two-wheelers, like battery two-wheelers in the city, by providing incentives;

6. To submit a comprehensive action plan for upgraded public transport system by April 30,2005;
7. To submit a timebound action programme for completion of the Pune-Bijapur bypass and the Pune-Hyderabad bypass by April 30, 2005.

### Sholapur Action Plan

SI No	Issues	Proposed action	Status	Deadline
1	Emission norms and automotive fuel quality	1% benzene containing fuel	Not included in list for Euro III fuel	Oil companies to submit feasibility plan to EPCA
		Ban on supply of loose 2T oils at petrol pumps	To issue notification and ensure that no loose oil is sold in city	April 30, 2005
2	Alternative fuels	Introduction of zero-emission battery scooters	To explore opportunities to introduce battery scooters in city	April 30, 2005
3	Public transport system and transportation plan	The Solapur Municipal Corporation has a fleet of 102 city buses of which only 60 are on the road	City government to submit a plan for substantial upgradation of public transport	April 30, 2005
		Bypass: Pune-Bijapur Pune-Hyderabad	To submit action plan for completion of bypass	April 30, 2005
4	Vehicle inspection programme		To set up a pilot centre for centralised check of two-wheelers based on ARAI equipment and methodology	April 30, 2005
		I & M for all categories of vehicles		April 30, 2005
5	Fuel adulteration	Checking of fuel adulteration	To submit report on the current status and action taken to improve enforcement	April 30, 2005
6	Control of emissions from Industrial sources	Organisation of inventory of the polluting industries	Completed and continuously updated	
7	Control of emissions from commercial sources	Compliance to standards in DG sets	Routine continuous efforts. Board is issuing NOC stipulating conditions as per guidance of MoEF/CPCB	

### 6. Ahmedabad

This city fights for the position of the country's most polluted city with Kanpur. Like all other cities, its air pollution is because of the rampant growth of vehicles combined with all the problems of adulteration, poor technology and poor enforcement. In addition, the city has a range of industries, which use polluting fuel and contribute to the city's air pollution.

But the city does have access to CNG, which can drive its transition to clean air. The state has given rights for city gas distribution to private companies. There is also interest in autos to convert to CNG. But the progress in building the infrastructure to supply gas has been below expectations;

The problem is two-fold:

1. The price of CNG – currently, the city gas distributor buys gas from LNG-Petronet, which unlike the gas distributed in Delhi, is under the administered price mechanism, and therefore, is more expensive. As against the Delhi basic gas price of Rs 5.41/kg, the LNG gas in Ahmedabad is roughly Rs 8/kg. Without any price regulation, the private company, which is investing in the gas distribution infrastructure, plans to sell the gas at Rs 22- Rs 25/kg, which will be insufficient incentive to switch from polluting diesel to clean CNG. In Delhi, the gas price, even with the high investment made to provide gas through 100 odd CNG stations is Rs 16.80. This price also includes the sales tax, which in the case of Delhi, has been waived off by the state government to encourage transition.
2. Lack of demand for CNG, because of a poor public transportation system. The city has only 400 buses on the roads.

### Public transport

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EPCA noted with considerable surprise that in the city, the public transport system caters to only 10 per cent of the commuter needs. Furthermore, the number of public buses on the road have consistently declined over the years. Whereas in the 1981 there were 30 buses per lakh population, by the end of 2003, this ratio was down to 11 buses per lakh population. Therefore, in 1981, roughly 28.7 crore people used public transportation but by 2003, even as population has increased only 11.3 use the public transportation system. This when the population increased and the demand from mobility increased.

It is not surprising therefore, that the city has seen a huge increase in private motorisation – primarily two-wheeler driven – which has led to increase in pollution and congestion in the city. Two wheelers have increased from 3 lakh in the mid-1980s to 14 lakh in 2003.

AMTS has phased out 342 old buses in the last 4 years, without replacement and as a result there are roughly 400 buses on the road today. It is estimated that the city needs 3000 buses at the minimum to cater to demand.

### Key deadlines

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1. Creation of CNG infrastructure for the auto-gas supply in the city: **10 CNG stations by March 31, 2005 and 10 more stations by July 31 2005.**
2. Transition of vehicles to CNG fuel: 355 (large) and 100 (medium) CNG buses of AMTC to be on road by March 31, 2005; 100 CNG buses of GSRTC to be on road by March 31, 2005. In addition, 5000 CNG autorickshaws to be on road by March 2005.
3. **Augmentation of public transport in the city:** Government to submit to EPCA, a time bound action plan to augment public transport from the current 10 per cent of commuter needs to 40 per cent by March 2005.
4. **Vehicle inspection programme for city fleet:** The Ministry of Road Transport and Highways has issued a Gazette Notification (GSR 111) in February 2004, on the requirements to upgrade the current pollution under control (PUC) programme of the various state governments. This notification lists the changes that have to be carried by October 1, 2004. In this notification, the government of India has clearly specified the new standards for emission to be checked in the in-use fleet. The new standards require governments to upgrade the current roadside vehicle checking programme to include new equipment and new regulatory systems.

EPCA inspected the current system in Ahmedabad, which is based on mobile vans and found it weak and ineffective. It was agreed to do the following:

The government would ensure that there would be 10 PUC stations, with 4-gas analyzer (for Euro II) vehicles, smoke tests for diesel vehicles and lambda tests by March 31, 2004. These centers will be monitored to ensure that the systems are working and that vehicles in the city are complying with the in-use emission norms.

5. **Industrial air pollution:** GPCB to submit a plan for highly polluting industries switch over to natural gas or other fuels with the objective to reduce air pollution by March 31, 2005.

#### Ahmedabad action plan

SI No	Issues	Proposed action	Status	Deadline
1	Emissions norms and automotive fuel quality			
		Status of Euro II norms	Not done earlier. But implemented now	
		1 per cent benzene in petrol		April 2005
		Installation of pre-mix oil dispensers for two-stroke two- and three-wheelers	Out of total 148 outlets except in 20 pre mixing with 2 T oil is done in all. <b>Special drive by pollution control board revealed 31 stations where oil dispensers not installed.</b>	April 30, 2005
		Measures to ban sale of loose 2T oil	Pollution control board reported widescale loose oil distribution. To be implemented strictly.	April 30, 2005
2	Alternative fuels	Infrastructure	10 CNG stations 10 CNG stations	March 31, 2005 July 31, 2005
		Transition to CNG	5000 autos	March 31, 2005
			355 (large)+100 (medium) buses	March 31, 2005
			100 by GSRTC	March 31, 2005
3	Public transport system and transportation plan			
			To plan for augmenting from current 10 per cent of commuter needs to 40 per cent. To submit plan.	To submit comprehensive plan for public transport by March 31,2005
		Parking policy		
		Bypass traffic	Decision for banning heavy vehicles within AMC already taken by the Office of Police Commissioner. Entry of heavy vehicles to the city already banned w.e.f. 01/07/2004. This has reflected in improvement of the situations. Diesel driven	

			Rickshaws banned	
		Bypass road	A 200 feet wide AUDA ring road is under completion in phases (Dec 2004) heavy vehicles would be diverted.	
4	In-use vehicles	Phasing out of old vehicles		
5	Vehicle inspection programme	PUC system	PUC centres to upgrade to meet new norms: 10 PUC stations, with 4-gas analyzer (for Euro II) vehicles and lambda, smoke tests for diesel vehicles	March 31, 2005
6	Fuel adulteration	Setting up facility for independent fuel testing in city	FSL is an independent testing lab. A team consisting of Forensic Science Lab, RTO, Civil supply & Traffic Police is formed for fuel testing in vehicles esp. 3 wheelers. The Task Force has inspected 47 outlets from 1 <sup>st</sup> June- 04 to 13 <sup>th</sup> August- 04.	Food and Civil Supplies to file report on action taken and proposals for strengthening mechanisms for enforcement.
		Status and plan to implement naphtha, kerosene and solvents control order and make it effective	Quarterly checking of petrol pumps is done. RTO and Civil Supply Dept. with the help of FSL team is sent for regular checking of adulteration in petrol/diesel driven vehicles in order to effectively implement this aspect. GOG has also constituted a Task Force to ensure strict vigilance and surveillance in order to check adulteration of fuel	
			The Police Department has started the drive to check Kerosene adulteration. 3924 rickshaws detained in 2003. In the current year upto now 5218 rickshaws were detained for Kerosene adulteration. Cases registered by Traffic Dept: 2003 – 3924 2004 (till 14 <sup>th</sup> Sept.) –5218 Cases filed under Essential Commodities Act are 27. FCCA dept has started registration of free sale kerosene vendors. 74 agencies registered while 210 applications rejected. Restriction of sale of loose kerosene in the vicinity of petrol /diesel pumps. For other violations in 2003, action was taken in 11747 cases, and in 2004 10248 cases	
7	Industrial pollution		Plan for highly polluting industries to switch to natural	March 31, 2005

			gas and other environmentally acceptable fuels	
8	Air quality and the issues in air quality monitoring			
		Expanding the monitoring network	Revamping the AAQ monitoring	March 31, 2005
		Source apportionment studies	Source apportionment at the exposure sites would be carried out for specific recommendations on air quality improvement	
		Health impact	Health impact studies to be conducted	

## 7. Kanpur

Air pollutants are measured from 3 monitoring sites in Kanpur, one each at residential, commercial and Industrial location. In 2002 all locations exceeded the national standard by 3 to 3.5 times. This trend continues in 2003 even though Euro II vehicles and fuel became mandatory in the city in April 2003.

According to the state pollution control board, vehicular traffic contributes to 80 per cent of the pollution load, while domestic sources add another 14 per cent and industrial 6 per cent. However, the study by NEERI in 2002, estimated that autoexhaust and diesel generator sets contributed 30-40 per cent of the total respirable particulate matter, while resuspended dust contributed between 20-30 per cent and other sources, including garbage burning made up the rest.

The progress on the agreed action plan has been very slow progress. In its meeting held at the end of January 2005, to review implementation EPCA noted a lackadaisical attitude of the state government towards reporting progress. Despite sufficient notice in advance for the meeting there was no responsible official present in the meeting who could give undertaking on the deadlines for various tasks committed by the state government to the Hon'ble Supreme Court. As no action taken report is available for the city the progress could not be evaluated satisfactorily.

In view of this it has now been decided that the state government will come back with a detailed progress report for both Kanpur and Lucknow by February 15, 2005 detailing out the following strategies that were flagged off as priority measures in the review meeting.

Key deadlines are as follows:

- 1. CNG infrastructure:** Natural gas pipeline has already been built upto Faizal Ganj in the city. GAIL has committed to set up one mother station in Faizal Ganj by August 15. Two more stations will be built in Nanachawk and Vijaynagar. Site for mother station has been acquired. Other stations are likely to be built in the vacant sites in petrol pumps.
- 2. Public transport:** The CNG programme was discussed in conjunction with the public transport plan for the Kanpur as well -- especially how the public transport augmentation plan will be linked to the CNG programme when it is available in August. Currently, the state government has proposed to bring in 250 CNG buses in Kanpur. The state government needs to indicate more clearly how the bus fleet will be increased over time linked to the CNG programme. It has been decided therefore that the state government will submit their plan by February 15, 2005 detailing out the strategy for increasing the public transport fleet in the city

- 3. Parking policy:** The state government has not given any thought to this strategy for Kanpur. They have been asked to come back on this issue by end of February.
- 4. Implementation of new PUC norms:** EPCA takes strong note of the fact that adequate steps have not been taken to implement the new PUC norms. EPCA has directed to implement the new norms by March end and report to progress on its progress.

#### Kanpur action plan

SI No	Issues	Action Plan	Status	Deadline
1.	Fuel quality	Installation of premixed 2T oil dispensers and plan for more retail outlets with such facility	Implemented	
2.	Alternative fuels	All types & categories of vehicles are targeted	Little progress on demand estimation based on number of vehicles.	June 2004 commencement of supply (subject to availability of land and statutory permission for execution of project)
3.	Public transport system and transportation plan		1.State government to submit an action plan on public transport based on natural gas, with deadlines to EPCA by February 15. 2. State government to submit a parking policy for the city by February 15.	
4.	In-use vehicles			
a.		Restriction on entry of non-destined commercial vehicles and interstate/intercity buses	State government to review and inform EPCA	No restriction
b.		Old tempos shall be banned on certain routes	Government has submitted to EPCA that by June 15 it plans to ban the plying of diesel tempos and autos on certain crowded routes in the city.	
c.		Only scrubber-fitted tempos shall be allowed in the city	This is not being monitored. Government to submit progress to EPCA on this matter.	
5.	Vehicle Inspection programme		New PUC norms have not been implemented. This is to be implemented by March 2005.	
a.		Regular audit of the functioning of PUC stations. Currently 27 centres in the city	To begin checking the working of the PUC stations and to evolve system to put information on the website.	

			To inform EPCA of status.	
b.		To do on-road monitoring to check gross polluting vehicles and to fine on the spot.	To launch a campaign with the pollution control board and police to check on-road vehicles. To get new instruments to check on the spot and to inform public about the campaign. To launch immediately and to inform EPCA of status.  Information on progress inadequate.	
6.	Adulteration of automotive fuels	Regular monitoring of adulteration is conducted	Oil companies were asked give written undertaking to the state government about the quality of fuel being supplied by them. Based on this, EPCA to undertake inspection of fuel quality with the independent testing laboratory in Noida. This has not been done	No further plans submitted
7.	Control of emissions from industrial sources		State government informed that they have identified 60 polluting units. Of these 5 are defaulters. The information supplied by state government on the nature of industrial pollution is inadequate. State government to prepare action plan on the nature of establishments and its proposed action plan to control pollution.	
8.	Other sources			
a.	Generator sets	Phase-wise registration of DG sets above 50KVA and 20KVA to 50KVA	Electricity failure is a chronic problem and is leading to pollution. To submit progress report on steps being taken to enforce emission standards.	
b.	Generator sets	Enforcement of emission standards for generator sets		
c.	Thermal power plant		State government to submit a plan to EPCA on the control of air pollution and fly ash disposal.	
d.	Garbage dumps in the open and burning of waste		Kanpur city has recently earmarked a landfill site  State government to prepare action plan and submit to EPCA in one month.	



## 8. Lucknow

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As of April 2002, there were a total of 3,87,697 vehicles in the city (300 sq km area). Two-wheelers constituted 83 per cent of the registered vehicles.

Lucknow has 3 monitoring sites (Mahanagar: residential, Hazaratganj (commercial) and Talkatora (industrial)). The monthly average levels of RSPM ranged from 147 to 269 microgrammes per cubic metres, as against the annual national standard of 60 microgramme per cubic metre.

In 2003, after discussions with EPCA, the city authorities submitted a revised action plan for environmental improvement of Lucknow. This plan was submitted by EPCA to the Hon'ble Supreme Court in its final report on *Particulate Pollution Reduction Strategy in Seven Critically Polluted Cities*. In its report, EPCA had pointed to various areas that needed further review as well as the need for tighter schedules from the state government.

EPCA would like to express strong displeasure at the very slow progress in the implementation process. It would also like to take strong note of the lackadaisical attitude of the state government towards reporting progress to EPCA. Despite sufficient notice in advance for the meeting in late January, convened to discuss the implementation of the plan, there was no responsible official present in the meeting who could give undertaking on the deadlines for various tasks committed by the state government to the Hon'ble Supreme Court.

In view of this it has now been decided that the state government will come back with a detailed progress report by February 15, 2005 detailing out the following strategies that were flagged off as priority measures in the review meeting.

Key deadlines:

**1. CNG infrastructure:** There has been significant delay in setting up CNG stations since the earlier stated deadline of June 2004. It has now been agreed on the basis of the commitment from GAIL that the first Mother station will be built by August 15, 2005 at Amausi. The natural gas pipeline has already come up to this point. Two more stations -- one daughter booster station in Gomti Nagar and one online station in Charbagh will be set up by December 2005. Commissioning process for mother station has begun. The joint venture company to be formed by GAIL and IOC has not been finalised yet. GAIL gave assurance that this will be expedited by February and that the formality of forming the company will not interfere with the progress of the infrastructure development for the programme.

**2. Planning for the CNG vehicle fleet:** EPCA has been informed that the transport commissioner has taken the decision that all renewal of permit of tempo and taxi and auto rickshaw that have completed five years will be done only for CNG/LPG vehicles. Also all new permits for these vehicles will be given only to CNG/LPG vehicles. It has also been decided that up to 500 permits for CNG/LPG tempo/auto rickshaw and taxis will be issued.

However, there is still no clarity with regard to the organization of both LPG and CNG programmes. The city already has 1 LPG station and vehicles have begun to move to LPG. As of date there are 255 LPG autos and 20 LPG vikrams. This market will begin to grow before CNG comes to the city. While three CNG stations have been planned to come up by December 2005, it is not clear whether more LPG station will be set up in the city.

This will impede the clean fuel programme. It is therefore important that the state government immediately develops a plan detailing out the strategy to balance the LPG and

CNG programme. The state government will submit the plan to EPCA by February 15, 2005. The plan will have to consider the key implementation issues in terms of number of vehicles to be converted, fiscal incentive for CNG vehicles, pricing of CNG vis a vis diesel and so forth.

**3. Public transport:** The CNG programme was discussed in conjunction with the public transport plan for the city -- especially how the public transport augmentation plan will be linked to the CNG programme when it is available in August. Currently, the state government has proposed to bring in 250 CNG buses. The state government needs to indicate more clearly how the bus fleet will be increased over time linked to the CNG programme.

The state government will submit the report by February 15, 2005 detailing out the strategy for increasing the public transport fleet in the city

**4. Parking policy:** The state government has not evaluated the problem of parking or designed a strategy yet. They have been asked to come back on this issue by end of February.

**5. Implementation of new PUC norms:** EPCA takes strong note of the fact that adequate steps have not been taken to implement the new PUC norms. EPCA has directed the state government to implement the new norms by March end and report progress to EPCA.

#### Lucknow action plan

Sl No	Issues	Action proposed	Deadline	Comments
1.	Emission norms and fuel quality	Euro II emission norms for new vehicles	To be implemented on 1.3.2004	Done. All new vehicles as of 1.1.2004 are Euro II compliant.
2.	Emission norms and fuel quality	Installation of pre-mix oil dispensers for 2 stroke 2 and 3 wheelers	2T premix dispensers being installed at the remaining outlets	Done
3.	Alternative fuels	1,500 tempo taxi, 300 buses/minibuses and 250 auto rickshaw to be on CNG  900 tempo taxi, 200 buses/minibuses and 400 auto rickshaw to be on CNG  426 auto rickshaws and 200 Bus/Minibus	December 31, 2005  December 31, 2006  December 31, 2007 (Subject to approval of state govt.)	Progress is tardy. As discussed above:  The state government to submit a report on the implementation of the CNG vehicle programme and public transport plan based on CNG, with deadlines by February 15, 2005.
4.	Alternative fuels	To set up infrastructure for CNG dispensing	The CNG project being executed by GAIL is scheduled for	GAIL to set up mother station by August 15, 2005. Two most stations by December 2005.

			commissioning of first station by June 1, 2004, subject to availability of land and statutory permission. GAIL has also planned one mother station at Amausi of capacity 1200 SCMH and one daughter station of capacity 150 SCMH	
5.	Public transport system and transportation plan		Augmentation of fleet shall be based on demand	<p><b>1.State government to submit an action plan on public transport based on natural gas, with deadlines to EPCA by February 15, 2005</b></p> <p>2. State government to submit a report on parking policy for the city by February.</p>
6.	In-use vehicles	Phasing out of 15 year old commercial vehicles and all diesel three wheelers	<p>Buses: 15 year phased out.</p> <p>Auto (petrol): More than 5 year phased out.</p> <p>Cat converter compulsory in 0-5 years.</p> <p>Auto (diesel): More than 5 year phased out.</p> <p>Scrubber fitted in 0-5 years.</p>	To implement new PUC norms by March end and report progress to EPCA.
7.	In-use vehicles	To lower the age of vehicles	State government has decided to lower down the age limit of city buses from 9 to 5 years	Implemented
8.	Vehicle Inspection programme	Institutional systems for rigorous auditing and inspection of centres	Monthly auditing is proposed for every pollution checking center from January 1, 2004. 49 centres in the city.	<p>Inadequate action taken.</p> <p>State government to set up system for 3-monthly audit of testing centres and put record of the functioning on site to create public interest.</p> <p>State government to report progress by March.</p>
9.	Vehicle Inspection programme	On-road inspection of vehicles planned and periodicity and coverage	Quarterly on road inspection camps are to be organized by Transport Dept with the help of UPPCB with	<p>Inadequate action taken.</p> <p>To start immediately and inform EPCA on progress.</p>

			effect from January 1, 2004	
10.	Adulteration of automotive fuel	Public broadcast of defaulting petrol pump	Under consideration	Not done. To start and inform EPCA on progress.
11.	Control of emissions from Industrial sources	All the moderate air polluting small scale units numbering 40 shall be provided with adequate air pollution control system	December 2004	State government has identified 43 polluting industry. Out of these 5 have been issued show cause notice, and 1 has been closed.
12.	Other sources			
		Hospital incinerators	It shall be ensured that installation of water scrubber on each of six incinerators is completed by December 31, 2004	Inadequate action. State government to review action plan for biomedical waste in light of evidence of controlling pollution from individual incinerators.
		Solid waste		It was noted that Lucknow has not earmarked land for disposal of solid waste.