

**Aurangabad City  
Air Pollution Control  
Action Plan**



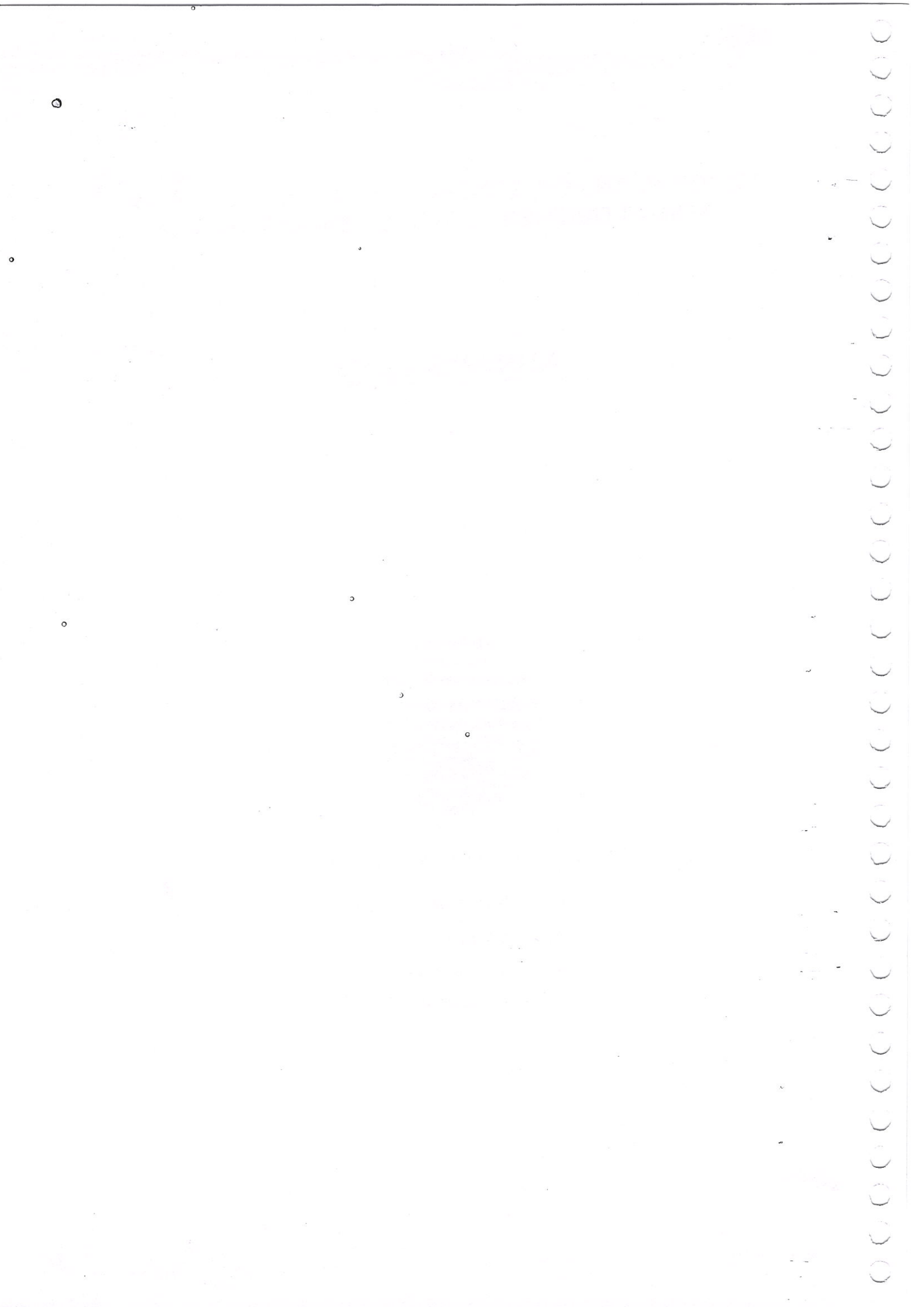
# ACTION PLAN FOR CONTROL OF AIR POLLUTION IN NON-ATTAINMENT CITIES OF MAHARASHTRA

## AURANGABAD



MAHARASHTRA POLLUTION CONTROL BOARD

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# ACTION PLAN FOR CONTROL OF AIR POLLUTION IN NON-ATTAINMENT CITY OF MAHARASHTRA

(Aurangabad)

## 1.0 Introduction

Aurangabad District is located mainly in the Godavari River Basin and partly in the Tapi River Basin. The district is from 19 to 20 degrees north longitude and 74 to 76 degrees east latitude. Aurangabad city is situated on the bank of river Kham a tributary of the Godavari River. The entire city is situated at the latitude of 19°53'50" N and longitude of 75° 22'46" E. It is located 512 meters above Sea Level. The city is surrounded by hills of the Vindhya Ranges and the river Kham passes through it.

The city is a tourism hub, surrounded by many historical monuments, including the Ajanta Caves and Ellora Caves, which are UNESCO World Heritage Sites, as well as Bibi Ka Maqbara and Panchakki. The administrative headquarters of the Aurangabad Division or Marathwada region, Aurangabad is titled "The City of Gates" and the strong presence of these can be felt as one drives through the city. The city was founded in 1610 by Malik Amber.

According to the evaluation of 2011, the city had a population of 1.1 Million. In order to check out the population of Aurangabad in 2020, we need to have a look at the population of the past 5 years. It has been seen that every year (2012-17) the population increases by 0.22 Million. Hence, the population of Aurangabad in 2020 is forecasted to be 4.4 Million.

The Annual average concentration of Aurangabad city is analysed and it is observed that the levels of pollutants are increasing yearly. The table represents the values of RSPM for the year 2013-2014.

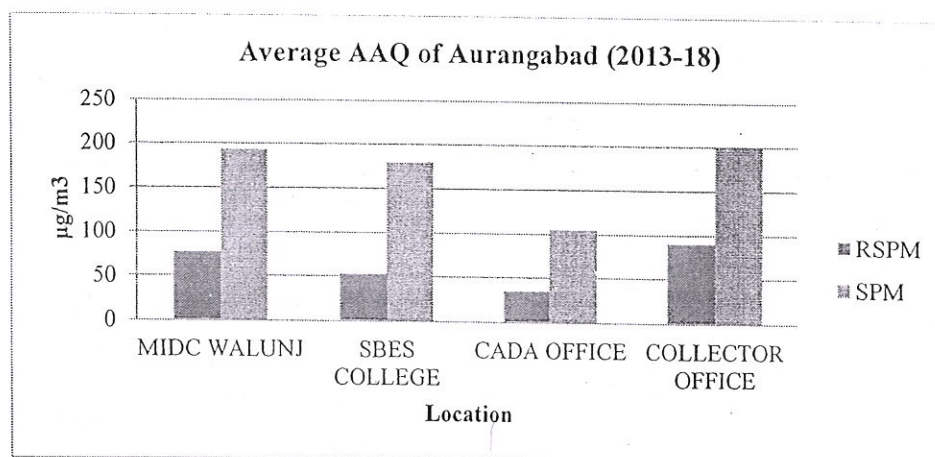


Fig. 1.0: Average AAQ for Aurangabad city

## 2.0 Emission Inventory for Aurangabad city:

Methodology Gross Emission inventory of different sources of air pollution has been prepared for 10- 15kms radial distance from centre of Aurangabad city. The base year 2018 is taken for most of the source data collection. This emission inventory is used to estimate/extrapolate total emissions for the whole of the city for next 5 years. Emission inventory has been prepared in terms Particulate matter (PM10, PM2.5). Source categories and types of sources of air pollution in Aurangabad are presented in Table 2.1.

**Table 2.1: Source categories and type of sources for air pollution**

Source Category	Types of Sources
Area Sources	<ul style="list-style-type: none"> <li>• Domestic cooking</li> <li>• Bakeries</li> <li>• Crematoria</li> <li>• Hotels &amp; Restaurants</li> <li>• Open eat outs</li> <li>• Open burning (refuse/biomass/tyre etc. burning)</li> <li>• Paved &amp; unpaved roads</li> <li>• Construction/Demolition/Alteration activities for buildings, roads, flyovers</li> <li>• Waste Incinerators</li> <li>• DG Sets</li> </ul>
Point Sources	<ul style="list-style-type: none"> <li>• Large scale industries Foundry, distilleries etc</li> <li>• Medium scale industries</li> <li>• Small scale industries (36 industrial estates)</li> </ul>
Line Sources	<ul style="list-style-type: none"> <li>• 2 Wheelers (Scooters, Motor Cycles, Mopeds)</li> <li>• 4 Wheelers (Gasoline, Diesel,)</li> <li>• LCVs (Light Commercial Vehicles)</li> <li>• Trucks (Trucks, min-trucks, multi-axle trucks)</li> <li>• Buses (Diesel)</li> </ul>

For emission inventory, 2017-18 has been considered to be the base year. Reported information and statistics within  $\pm 2$  years have been considered for the purpose of this study except for Census data where 2011 data was used as last available statistics. Data on residential sector obtained from: Census 2011, Statistical handbook of Maharashtra, Indian oil corporation, District Census Reports, survey. Number and other details of registered medium and large restaurants (division based on capital invested) are collected from Municipal Corporation, Distt. Collectorate, MPCB and other small roadside stalls are being surveyed for relevant information like number, type of fuel, monthly fuel usage etc. The electricity supplied (in terms of annual sale) by MSEB. Number of vehicles of different category (cars, buses, trucks, three wheelers) registered in KMC areas are collected from RTO/other published report and Public Vehicles Department. Table 2.2 represents primary data collection plan while Table 2.3 shows the plan for secondary data collection. Regulation of air pollution is the prime concern and accurate knowledge of source contributions is vital to develop an effective air quality

management plan/program. To curb emission load, following are the time bound framework recommendation for different sources.

**Table 2.2: Primary survey plan**

Sector	Data type	Survey type
Registered Restaurants	Type of Fuel, Fuel usage per day	Questionnaire survey of sample population
Roadside atries/Bakeries/DG sets (unregistered)	Type of Fuel, Fuel usage per day	Questionnaire survey of sample population
Vehicular	Vehicular fleet age, miles travelled per day etc.	Petrol pump/parking lot survey
Domestic	Type of Fuel, Fuel usage per day	Questionnaire survey of sample population
Crematories	Type of Fuel, Fuel usage per day, no. of bodies burnt per day etc.	Questionnaire survey of select crematories
SSIs	Type of Fuel, Fuel usage per day	Questionnaire survey of sample population
Construction/Demolition/Roads Paved/Unpaved	Length of Road, Construction type time period etc	Questionnaire survey of sample population

**Table 2.3: Plan for secondary data collection**

Sector	Data type	Concerned Dept.
Population	Slum population	Municipal Corporation
Registered Restaurant	List and address	Municipal Corporation MPCB
Construction (Road, bridge, other civil)	Type of Fuel, Fuel usage per day, Base Area of construction, earth dug per day, number and operating hours of non-road vehicles (earth diggers,	Municipal Corporation

	cranes, mixers)	
Small foundries , distilleries, sugar units etc	Numbers in city, Operating hrs/day and days/y, Type of Fuel, Fuel usage per day	MPCB
Registered Restaurants	List, address and number	Municipal Corporation
Vehicular	No. of registered vehicles in city and their type (small, medium, heavy and sub categories) with emission compliance category (Bharat/Euro etc.)	RTO offices
	No. of vehicles on road per day (Metro reports)	
Industry and industrial activities	Type of industry, Production capacity, Operating hrs/day and days/y, Type of Fuel, Fuel usage per day and where used, control equipment's with efficiency	MPCB
Stone Crushers	Production capacity, Operating hrs/day and days/y, Type of Fuel, Fuel usage per day or year, control equipment's with efficiency	MPCB
DG sets (industrial, commercial, residential)	Operating hrs/day and days/y, Type of Fuel, Fuel usage per day	MPCB/ Municipal Corporation

The Source Activity data sheets for various points, area and line sources for the city is prepared as given in (Table 2.4).

**Table 2.4: Activity Source Types in the Project Cities**

Source Category	Types of Sources
Area Sources (residential and commercial)	<ul style="list-style-type: none"> <li>• Domestic cooking</li> <li>• Hotels &amp; Restaurants, Bakeries</li> <li>• Crematoria</li> <li>• Waste Incinerators</li> <li>• DG Sets</li> <li>• Open burning (refuse/biomass etc. burning)</li> <li>• Construction Activities</li> <li>• Agriculture Tractors</li> </ul>



Point Sources	<ul style="list-style-type: none"> <li>• Large scale industries</li> <li>• Medium scale industries</li> <li>• Small scale industries – foundry, sugar/distillery, stone crusher etc.</li> </ul>
Vehicular Sources	<ul style="list-style-type: none"> <li>• 2 Wheelers (Scooters, Motor Cycles, Mopeds)</li> <li>• 3 Wheelers (Petrol/Diesel)</li> <li>• 4 Wheelers (Gasoline, Diesel,)</li> <li>• LCVs (Light Commercial Vehicles)</li> <li>• Trucks (Trucks, min-trucks, multi-axle trucks)</li> <li>• Buses (Diesel,)</li> <li>• Tractors/Trailers</li> <li>• Railway, Airways</li> </ul>

### 3. Emission factors used for estimating Inventory

The source wise emissions are estimated based on activity data and source wise emission factor for particulate matter (PM10 and PM2.5). These emission factors are obtained from published documents of CPCB, ARAI and AP-42 USEPA as per the link given below:

- [http://cpcb.nic.in/NGT/Annexure\\_3.1\\_27.02.2018.pdf](http://cpcb.nic.in/NGT/Annexure_3.1_27.02.2018.pdf)
- <http://cpcb.nic.in/displaypdf.php?id=RW1pc3Npb25fRmFjdG9yc19WZWWhpY2xlc y5 wZGY=>
- <http://cpcb.nic.in/displaypdf.php?id=RmluYWxOYXRpb25hbFN1bW1henkucGR m...>  
**.page No 258 Annexure VIII**  
<https://www.epa.gov/air-emissions-factors.../ap-42-compilation-air-emissions-factors>

## 4.0 Emission Estimation for Aurangabad city

### 4.1 Area sources

The emissions from individual area sources are relatively small and if collectively seen their emissions are of great concern. Area sources are mainly domestic sources of fuel (coal, wood, kerosene, cow dung, LPG) burning of trash/MSW combustion, fuel used in bakeries, hotels, restaurant, and resuspension of dust. Assessing the estimation of emission inventory, contribution of emission load from area sources PM2.5 is 15.06 tons/day. Out of the total area source emission, the most contribution is from household consumption and bakeries. The same

trend was observed for SO<sub>2</sub> emission load. Based on the survey and assessment, following recommendations emerge to curb area source emissions:

- Bakeries using coal and wood as fuel must be shifted to LPG or electric burners.
- Number of consumers using LPG from supply agencies should be maintained.
- Local Domestic Gas agencies and PMUY team can take initiative to sensitize people from the slum & non slum to make the shift from conventional domestic fuel (LPG, Kerosene, wood and coal) to Piped Natural Gas or other clean fuel sources. (PNG).
- Development of roads – Main roads of Aurangabad city are of Asphalt/cement roads. The internal roads are required some improvement. The roads in MIDC areas also required to be made improvement. Dusty materials at construction site such as sand and cement should be kept covered. Footpaths along roadside needs to be constructed to avoid resuspension of dust.
- Resuspension of dust is minimized through regular sweeping by sweeper trucks running in city at evening. Appropriate barricading of the under construction site to avoid dispersion of the dust and particulate matter in the ambient air. Water spraying on the tires of trucks and vehicles at the entry/exit point of construction site. Constructing a water pit at the entry/exit points of the construction site to avoid dispersion of particulate matter through movement of trucks while entering and exiting the site.

**Table 4.1.1: Proposed percentage of households using each type of fuel with time to achieve intended targets of emission reduction**

Fuel	In 2018 (%)	Target 2019 (%)	Target 2020 (%)	Target 2021 (%)
Coal	20	15	10	10
Wood	20	15	10	10
Biomass	10	10	5	5
Kerosene	30	20	10	5
LPG	20	40	50	70

#### 4.1 Stone Crushers

Quarrying is being done for at least last 50 years at the start point of north side of the Aurangabad. Till March 2018, there are 9 stone quarries in active mode. Following measures can be adopted to control on/off-site emission and resuspension from Quarry site:

- Stringent Fugitive emission management practices and regulation should be implemented
- Most of the quarries have provided sprinkler system for dust suppression however, improvements are required. Use of water sprinklers should be made compulsory at the

quarrying sites. All these units will be proposed to install efficient emission control system. Provision of chemical spray for dust suppression with R & D lab can be done.

- Trucks carrying the crushed stone material for transportation should be covered.
- Quarrying sites and activities should be regulated with strict vigilance as per the norms laid by CPCB and MPCB.
- Constructing a water pit at the entry/exit points of the construction site to avoid dispersion of particulate matter through movement of trucks while entering and exiting the site. Spraying of water on the tires of the truck and vehicles at the entry/exit of construction site.

Tree plantation in and around the quarrying site

#### **4.2 Point Source**

As per data received from MPCB Aurangabad, there are total 117 Air Polluting industries in area/cluster. Major pollutants are PM, SO<sub>2</sub>, and NO<sub>x</sub> from automobiles and pharma units. All the Air polluting industries have provided emission control systems as required i.e. Dust collectors, Scrubbers, and Stack of sufficient height. The number of D.G sets in the region is very high but they are rarely used by the industries and emissions from their stacks are accountable. Total 25 industries are using LPG as their fuel pattern and industries using coal and wood are directed to use PNG. The industries which were using wood are shifted to biomass briquettes as their fuel pattern. Nearly all industries are provided with air pollution control systems, but working of APC systems and its efficiency needs to be evaluated. Based on the survey and assessment, following recommendations are given:

- Alternate use of fuel instead of pet coke as fuel in tyre manufacturing industries and use of FO must be regulated.
- Alternate fuel (replacement of wood to Biomass briquettes, Indian coal to Indonesia or SA coal, ash content of briquettes after burning – 0.22%, One cubic meter (or approximately one ton) of briquettes produces as much heat as five cubic meters of air-dried and split firewood while burning, Briquettes produce 10 times less carbon dioxide than natural gas and 50 less carbon dioxide than coal)
- Regular performance audit for industries for performance of stack.
- Regular AAQ monitoring of industrial areas i.e Waluj MIDC, Chikhalthana MIDC and Shendra MIDC can be done by MPCB or CPCB.
- MIDC & MPCB should survey for the identification of illegal SSI and their levels of operation and their contribution in each of the grids in the city. Need for regulations for such units.

**Table 4.2.1: Estimated emissions from point sources for the year 2018 and its reduction upto year 2022 keeping growth constant**

Year	Industry Emission PM (TPD)	Control Strategy to be adopted
2018	7.39	Improved APC system installation, Strict compliance
2019	6.65	Use of NG/Electricity and other renewable energy source
2020	5.65	Implementation of APC systems, Use of LPG/NG.
2021	4.5	Relocation of polluting industry outside city area Strict compliance, improved APC system, clean fuel.
2022	3.16	Strict compliance, Renewable energy sources.

### 4.3 Line Source

Increase in number of trucks moving along the city roads, more number of public transportation buses moving from major squares of the city, are the reasons for the increased pollution. Waluj MIDC and the Paithan MIDC nearby have increased the number of trucks on large scale. In all 10000 trucks per day enters along the roads of the city. Out of which 1800 trucks passes from city towards Ajanta road, 1500 towards Nagpur road and 8000 towards to Paithan/Beed road. The number of vehicles in the city has also increased. As per RTO, the vehicle population in Aurangabad is around 11,83,919 for the year 2016-17 and the year wise growth in number of registration of vehicle is observed to be in the range of 8%. As per current study the emission from vehicular source is calculated to be around 2035 Tonnes/Yr. 80% of total vehicular emissions is from heavy duty vehicles and 3 wheelers public transportation auto rickshaws. There are in all 157 CCTVs cameras fitted at different locations covering all the city area to manage traffic. This is managed by smart city traffic cell and traffic police division under smart city initiative.

Following steps can be taken to control the vehicular pollution and for implementing smooth traffic management. This can be lock after by RTO, traffic cell division and police commissioner:

- AMC, RTO, MSRDC & MIDC should collaborate to formulate time bound design and construction of flyovers and widening of roads to control the traffic jams and congestion along Railway station road, near deolali square, baba petrol pump square, golawadi square and at pre-determined junctions. All school buses in the city should be regulated to run on CNG or clean diesel of 10 ppm sulphur with particulate trap for exhaust or on biodiesel which is readily available in the city.
- Bus fare reduction can be achieved from various means, but not alone from improving its

own efficiency (as is normally believed).

- The public transport should be cross-supported directly from the personalized vehicles either being purchased newly or older one running on the road.
- An Air Quality Fund could be created which will have sources of funds coming from measures such as higher car user charges, higher parking charges, high registration fees, higher taxes on private mode of transport etc. should be directly transferred to them to achieve the low cost, better comfort, better frequency and faster travel.
- Diesel or any fuel used for public transport should be sold at lower price to keep the bus fare lower. The losses can be recovered from car-users
- Phase out of the old commercial vehicles say more than 15 years old, most of which are diesel driven. Stringent Emission standards for the new vehicle in line with Bharat Stage VI Emission Standards should be adopted.
- Need to frame legislation for the Retro-fitment of new engine/Emission Control Devices (Diesel Particulate Filter (DPF) /Diesel Oxidation Catalyst (DOC) that could help in major reduction of PM. Cost sharing by the agencies will help in immediate provision.
- Better quality fuel by adopting stricter fuel supply & dispensing system along with Chemical marker system to keep check on adulterations in fuel. The current fuel specification are too board and therefore, analysis of conventional parameters does not reflect adulteration. Finer fuel specifications are needed for implementation. Success of marker system shall be highly dependent upon the collaboration of Oil Companies and Anti Adulteration Cell. Fiscal Measures for development of alternative fuel technology.
- Conversion of existing public transport buses/tempos/mini buses to CNG fuel operation. Concession/rebates by NMMC for erecting CNG fuel.
- Prepare a traffic dispersal model for efficient mobility & connectivity and should be undertaken by regulatory bodies like NMMC, RTO, MIDC and Departments of Police
- Promotion of electric public transport or public buses running on ethanol. Battery Operated transport vehicles providing point to point service can also be initiated.
- Finally, awareness programme should be undertaken with no vehicle day and assessment for air pollution to share the benefits among the general population.

Name of the Office / Region	2012-13	2013-14	Growth %	2014-15	Growth %	2015-16	Growth %	2016-17	Growth %
Surangabad	811412	910439	12.20	1020021	12.04	1102444	8.08	1183919	7.39

**Table 4.3.3: Projected vehicle count based on growth rate**

Sr. No.	Category	2017	Projected Count		
			2018	2020	2022
1	<b>Total --Two Wheelers</b>	932739	1007358	1168535	1355501
2	Cars	63826	68932	79961	92755
3	Jeeps	29322	31668	36735	42612
4	Stn. Wagons	452	488	566	657
5	Taxis meter fitted	59	64	74	86
6	Luxury /Tourist Cabs/	2743	2962	3436	3986
7	Auto-rickshaws	27806	30030	34835	40409
8	Stage carriages	5959	6436	7465	8660
9	Contract carriages	1544	1668	1934	2244
10	School Buses	1114	1203	1396	1619
11	Private Service Vehicles	1997	2157	2502	2902
12	Ambulances	504	544	631	732
13	Trucks & Lorries	14086	15213	17647	20470
14	Tanker	4727	5105	5922	6870
15	Tractors	24852	26840	31135	36116
16	Trailors	14901	16093	18668	21655
17	Others	492	531	616	715
18	<b>Total</b>	<b>1183919</b>	<b>1278633</b>	<b>1483214</b>	<b>1720528</b>

#### 4.4 Additional information for vehicular source

Simultaneously, the newly amended Motor Vehicle Act and Rules has given the opportunity to implement emissions recall programme so that the vehicle manufacturers can be held responsible for any manufacturing defect that increase on-road emissions. It is the responsibility of the owner as well as of manufacturer to release low emission load into atmosphere. In view of this the following recommendations can be made:

1. Limit the numbers of PUC centers, upgrade them (electronic PUC generator) and bring them under strong supervision and quality control. The manual PUC of Maharashtra is nowhere applicable at the other state border, If a heavy vehicle enters in other state it has to issue a new PUC. This is at least applicable at Maharashtra-Madhya Pradesh border.
2. Ensure 100 per cent compliance by linking annual vehicle insurance with PUC certificates.
  - A. Annual vehicle insurance cannot be obtained without all the requisite PUC certificates. Currently, PUC certificates need to be obtained every six months in the

Aurangabad. This periodicity of PUC certification can be made uniform across all cities of Maharashtra.

**B. Mandate pre-payment of PUC fees before the tests are conducted**

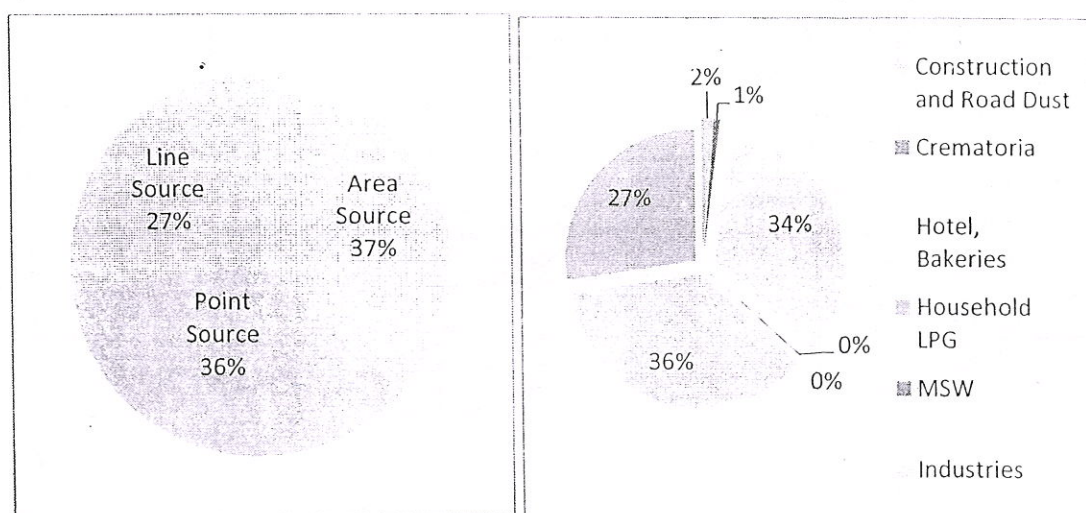
**C. Strengthen inspection of the PUC centers for quality control and strengthen the licensing programme to ensure proper calibration, authentic tests; annual maintenance contact for the maintenance of all testing equipment and accessories; training of operators, calibration of equipment etc are carried out.**

**D. Phase in big centralized emissions testing centers capable of conducting automatic and upgraded tests for commercial vehicles on a priority basis. Delhi already has Burari vehicle inspection and fitness centre in Delhi for commercial vehicles. The commercial vehicles visit it for annual vehicle fitness and roadworthiness tests. This needs to be upgraded for high level of automatic emissions testing so that operators and vehicle drivers do not come in contact to influence the test results and credible and upgraded tests are conducted.**

**E. A squad can be deputed for on time inspection of PUC or emission load generated from the vehicles. Traffic cell division or RTOs can form a squad. Heavy fine and cancellation of license can be charged as a fine.**

#### 4.5 Major Contributors to Emission Load

A quantitative representation of the concentration of the emission load from different sources is shown in the pie diagram. The major contributor for high emission load is from area source followed by industrial emissions. The bakeries run on wood as fuel for production of breads, toasts etc. Industries uses pet coke, wood and coal as fuel in boilers. Major line sources are trucks and busses which run in diesel and the NH passes through the centre of the city.



**Fig 4.5: % of Particulate matter from different sources**

The solid waste generated in the city was dumped earlier at Naregaon site 10 kms away from city, but the new site has not been identified by AMC. The generation of solid waste and its management is planned by AMC and AMC is in process to setup waste to compost plant ward wise. The waste generated in future and its management is shown in the following table:

**Table 4.5: Quantity of MSW generation and management**

Year	Solid Waste Created	Managed	Unmanaged	Unmanaged
			But Burnt	As is
2018	109500	36500	43800	29200
2019	127750	67890	30660	29200
2020	146000	105120	16060	24820
2021	164250	136510	16060	11680
2022	182500	166075	14600	5475

**5.0 Ambient Air Quality 2017-18**

Station Name	year	Month	Average of SO <sub>2</sub>	Average of NO <sub>x</sub>	Average of RSPM	
Aurangabad CAAQMS	2017		50	40	60	
		Apr	3	35	120	
		May	6	33	96	
		Jun	5	33	38	
		Jul	4	44	37	
		Aug	5	34	37	
		Sep	4	32	43	
		Oct	4	32	55	
		Nov	5	44	83	
		Dec	6	36	99	
		2018	Jan	6	42	79
			Feb	5	38	79
	Mar		5	24	82	

Station Name	Year	Average of SO <sub>2</sub>	Average of NO <sub>x</sub>	Average of RSPM
Aurangabad CAAQMS		50	40	60
	16-17	5	33	86
	17-18	5	36	71



6.0 Section I Submitted by Municipal Corporation

Table 1: Air Pollution Mitigation Action Plan

Control option	Expected reduction and impacts	Technical feasibility	Requirement of financial resources	Implementation period (short/mid/long-term)	Time target for implementation	Responsible agency(ies)	Any other information
<b>Monitoring Mechanism</b>						Aurangabad Municipal Corporation has an Environment Cell which comprises of 9 members and 1 consultant (details attached) each month the cell will meet and examine the implementation. Commissioner- Head MPCB RO- Meeting Convener	
Launch extensive drives against polluting vehicles for ensuring strict compliance	Moderate	Feasible	Not needed	Short (Regular on monthly basis at Toll plaza & Extensive during winter months)	Start 2018	AMC Transport, RTO, Traffic Police, CMIA, Media	With involvement of Colleges & local NGOs
Launch public awareness campaigns for air pollution control, vehicle maintenance, minimising use of personal vehicles, lane discipline etc.	Moderate	Feasible	Not needed	Short (Regular & Extensive campaigns during winter months particularly Pre & Post Diwali)	Start 2018	Traffic police, CMIA, Media, Colleges	With involvement of Colleges & local NGOs. Buses and Display boards at traffic intersections to be used for advertisement

Prevent parking of Vehicles at Non designated areas	Low (only in old city's congested areas)	Feasible	Not needed (balanced with fine from impounded vehicles)	Short (Regular monthly checks with fine)	Start 2018	AMC Transport, Traffic Police	
<p>Prepare action plan for widening of road and improvement of Infrastructure for decongestion of Roads.</p>	<p>High</p>	<p>Feasible</p>	<p>Yes, 5 crores</p>	<p>Mid (in progress)  PWD proposed New Ring Road 60 width passing through Chikalthana and fringe area, 60m wide road Mitmita and Bhavsingpura to join Pune and Nashik road</p>	<p>2017-2019</p>	<p>AMC, MRDC, PWD, Traffic</p>	<p>Wankatesh Nagar tar roads to be resurfaced at Rs 32.62 Lakhs, proposals for roads in Asefiya colony, Builders housing society, Kiradpura, Chikalthana and Raj Nagar. Concrete road in Rohidaspura to be constructed at Rs 25-35 Lakhs. 41 km of roads relaid, 3 flyovers constructed</p>

				Yes, 2 crores	4 dust cleaners needed for major roads				
Prepare Plan for the construction of expressways/bypass to avoid congestion	Moderate	Feasible	Yes	Beed Bypass exists for heavy vehicles, Mumbai-Nagpur Expressway planned		AMC, MRDC, PWD, Traffic			
Steps for Promoting Battery operated vehicles	Moderate	Feasible	Yes, 1 crores	Short	2017-2018	AMC, Transport, Traffic	Charging point & Training Centre inaugurated by Mayor in Oct, 2017. 50 rickshaws ordered.		
Synchronize Traffic movements/Introduce Intelligent Traffic systems for Lane Driving	Moderate	Feasible	Yes, 2 crores	Mid - Long term	2018-2020	AMC, Transport, Traffic	Under Smart city initiative of GoI		
Installation of Remote Sensor based PUC systems	Moderate	Not Feasible till next few years	Yes	Mid - Long term	2020 onwards	Traffic, RTO	10 Approved PUCs		
Provide good public transport system	High	Feasible	Yes under Smart City at least 10 crores	Short-Mid	2020	AMC, MSRTC	present 29 buses at least 500 more needed. Tenders for 5 Electric buses floated and 150		

<i>Electric / Hybrid Vehicles</i>	Moderate	Feasible	Not needed, borne by consumers	Mid	2018-2019	Automobile firms	Discussed under E-Rickshaws
<i>OE-CNG for new public transport buses</i>	Moderate	Not Feasible till next few years	Yes for laying of pipelines	Mid	2019-2020	AMC, Oil & Gas companies	
<i>Bio-diesel (B5/B10: 5 – 10% blend)</i>	High	Feasible	Blends available at outlets in city	Short	2018	AMC, MPCB, BIS, CMIA, Fuel firms	88000L available per month
<i>Restrict commercial vehicles entering city by having ring roads</i>	Moderate	Feasible	Yes, 5 crores	Mid-Long	2020	AMC, MSRDC	PWD proposed New Ring Road 60 with passing through Chikalthana and fringe area, under Smart city initiative of GoI
<i>Prepare plan for creation of green buffers along the Traffic corridors</i>	High	Feasible	Yes, 1 crores	Short (in progress)	2018	AMC Horticulture, CMIA	30,000 saplings with plastic guards planted this year

Maintain Pothole Free Roads for Free Flow Traffic	High	Feasible	Yes	Regular		PWD, MSRDC	
Introduce water fountains at Major Traffic intersection, wherever feasible	Moderate	Feasible	Not needed	Short (in progress)	2018	AMC, CMIA	Fountains have been opened at 3-4 locations
Greening of open areas, garden, community places, schools and housing societies	Moderate	Feasible		Regular		AMC Horticulture, CMIA, NGOs	<b>Oxygen rich MDC</b> project 12km roadside planted with trees increased to 70km
Launch extensive drive against open burning of biomass, crop residue, garbage, leaves etc.	High	Feasible	waste processing plants 10 crores	Short	Regular basis start 2018	AMC, NGOs, CMIA, Colleges	10 Garbage processing plants expected to process 30MT waste each - 5-10 crores
Regular check and control, of burning of Municipal Solid waste	High	Feasible	Yes	In Progress	By 2020	AMC	10% waste already being composted
Proper collection of Horticulture waste and its disposal following composting -cum - gardening approach	High	Feasible	Yes	In Progress	By 2020	AMC	

Action against non-complying industrial units	High	Feasible	MPCB's role	Regular	Regular	MPCB	MPCB RO issues directives and notices					
Alternate fuel (Biogas for Boiler)	Moderate	Feasible	Industry has to take action	In progress	2019	MPCB	M/s United Spirits Biodigester					
Promoting cleaner industries	High	Feasible		In progress	2019	MPCB	Chemical & Bulk Drug industries solvent recovery units. 50 Electroplating industries process emission control. 1 industry ESP and 1 Industry Wet Scrubber					
Installation/ upgradation of air pollution control systems	High	Feasible		In progress	2019	MPCB	M/s Harman & M/s United Spirits Continuous Stack Monitoring					
Regular audit of stack emissions for QA/QC	High	Feasible		In progress	2019	MPCB						

Enforcement of construction & demolition rules	Moderate	Feasible			Start 2018	AMC	
Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and suppression units	High	Feasible		Short	2018	AMC	
Better construction practices with PM reduction of 50%	Moderate	Feasible		Mid	2019	AMC	
Ensure carriage of construction material in closed /covered Vessels	Moderate	Feasible		Short	2018	AMC	

**Table 7.1: Action plan for emission reduction in short and long term**

Area Sources	Short Term - 2019	Long Term- 2022	Action required
Domestic	50% of slums to use LPG/ PNG/Biogas	100% of slum to use LPG/ PNG/Biogas	Proper dispensing and easy availability of cylinder to the consumer of slum population should be made. Increase the infrastructure and availability of LPG/PNG/Biogas to whole of Aurangabad region.
Hôtel & Restaurants	50% of coal to replace by LPG	75% of coal to replace by LPG	Hotels & Restaurants should be regulated for their operation and maintenance of chimneys. Designated areas should be designed for the coal and wood based operations within the premises. Options of fuel shift should be implanted in phase wise.
Open Eat outs	The open eat outs cannot be identified in numbers.		A rule can be implemented to use of cleaner fuel for all open eat outs, the emission load will be reduced to PM- 0.12 kg/day and NOx – 0.039 kg/day.
Bakeries	50% LPG & 25% Electric	25% LPG & 75% Electric	Full ban on use of wood and coal as fuel in bakeries. Clean fuels like LPG/NG or biomass briquettes or electricity can be attempted for bakery operations. Initial incentives and rebate should be provided for the conversion from traditional fuel. This will require change in current baking practices for which a separate study involving techno-economic feasibility is recommended.
	If 50% Wood in each bakery if replaced by biomass briquettes. This type of fuel gives 36% less emissions for PM2.5 and 86% less SO2 generation. If consumption of wood in a bakery is considered to be 500 kg/day, then emission load of pollutants are PM - 8.65 kg/d, CO - 63.15 kg/d, NOx -0.65 kg/d, HC-57.25 kg/d and if we manage to replace the wood quantity by other fuel i.e only 100 kg/days of wood is being used, there will be 80% reduction in load.		
Crematoria	50% Electric & 50 % biomass briquettes	75% Electric & 25 % biomass briquettes	There are sentiments involved in the activities that are carried out in crematorium. Still all crematoria should be provided with efficient pyres and chimneys with bag filters for release of emissions through stacks at appropriate height. 50% Wood in each crematorium if replaced by biomass briquettes. This type of fuel used in crematoria gives 36% less emissions for PM2.5 and 86% less SO2 generation. Concept like Green Crematoria should be explored.



Area Sources	Short Term- 2019	Long Term- 2022	Action required
Open & Landfill Burning	100% control of Landfill burning events and heavy fine on open burning of MSW	Feasibility study for establishment of Waste to compost/energy plant facility	It has been observed that the unaccounted or mismanaged waste from SWM system, often are reported into road side open burning cases. The waste generated from the residential sector highest quantity (502 MT/day) of waste was generated and was collected to Naregaon dumping yard. Now the site for dumping yard is not yet decided by AMC and the MSW is still lying along the roadside and at community wards. Waste to compost plants are proposed by AMC, but only the tender is floated by AMC till date.
<b>If we restrict the activities of open and landfill burning we can reduce PM2.5 by 3 ton/year &amp; CO- 12 ton/year</b>			
Bypass for the city	Temporary arrangements can be made for traffic diverting to beed by pass road and sanctioning of	Feasibility study after construction of Samruddhi Mahamarg	Construction of bypass/ring roads for the city. (Nagpur Mumbai highway passes from the centre of the city. This will be achieved from construction of Samruddhi Mahamarg. Nearly 10000 heavy vehicles enter in the city everyday out of which 1800 goes to Ajanta road, 1500 to Nagpur road and 8000 to Paithan/Beed road). If bypass is constructed, vehicular pollution will be reduced to 50%. Presently 27% air pollution load is from vehicular source.
Bldg. & Road Construction	50% control on dust emission	75% control on dust emission	Building construction/demolition codes need to be used with specific reference to PM control UTTIPEC design manual has been recently created by Delhi Development authority for uniform roadside, drains, footpath and related design. The same should be adopted for all future design for roads and pathways. Road construction/repair uses wood for melting tar, this technology needs to be abolished as over a large period of time, emissions are high.
Paved & Unpaved	Paving : 75% control on dust	Paving : 100% control on dust	90.5% of roads are considered to be paved. Wall to wall pavement for all the major roads is necessary for restricting resuspension of dust. There are only 2 mechanical sweepers procured by AMC, more mechanical sweepers must be deployed for the region so as 60KMS/day road can be swiped. As initiated by union transport minister, cement roads are mostly constructed in all over the city.

Point Sources	Short Term - 2019	Long Term - 2022	Action Plan
<p>Quantity of fuel used in LSI, MSI and SSI Coal (270 TPD), Petcoke (300TPD), Diesel (114 TPD), Briquettes (261 TPD) and are the major contributors towards PM and NOx emission loads</p>	<p>Shift to cleaner fuels in both the category of industries-- 50% of Coal, Petcoke, Briquettes, Wood to LDO, Coal (having less ash content) &amp; Others to NG</p>	<p>Shift to cleaner fuels - 100% All types of fuel to Natural gas</p>	<p>There are 117 Air Polluting industries in area/cluster (including all 4 MIDC areas/clusters). Instead of using Indian coal which has a low sulfur content in comparison with other coals, % of ash is reported to be quite high (34%) and contributes to coarse PM emissions, SA coal or indoesian coal can be used which is readily available in India.. Use of alternate fuel such as LPG, PNG, propane gas can be a option for industries. For this production process needs to be studied for the industries to switch on alternate fuel. Industries should be regulated to install air monitoring devices within their premises and same data should be regularly submitted to MPCB/CPCB. Industries should adopt stringent stack emission norms beyond those prescribed by CPCB Industries with periodic audits like QA/QC of units from both the parties. Energy Conservation Scheme should be encouraged in the industries that are not economically capable towards shifting to eco friendly fuel use or advanced clean technology. The dependency on DG set on power cut should be replaced by conventional source of energy.  AMC Aurangabad and MPCB Aurangabad along with NGOs has initiated development of Green Buffer zone along industrial region of all MIDC areas in Aurangabad. Industries can plant trees along the boundary line of area.</p>

Line Sources	Short Term- 2019	Mid Term- 2022	Long Term- 2024	Action required
<b>Reduction Emission per Unit of Fuel</b>				
Fuel Adulteration	Strict Banning of Fuel Adulteration- 50%	Strict Banning of Fuel Adulteration- 80%	Strict Banning of Fuel Adulteration- 100%	# Specially 3 wheelers public auto rickshaws are using oil mixed fuel. Action against these vehicles must be taken. A local level body should be developed for the periodic vigilance and fair distribution in the region. #At petrol pumps, facility should be provided for identification of fuel adulteration by way of marker. # Heavy fines and cancellation of license are some major steps to curb fuel adulteration.
CNG/ LPG	Agencies which are giving vehicles on rent/ Ola/UBER/ can run on CNGs for a short distance within city 50%	Agencies which are giving vehicles on rent/ Ola/UBER/ can run on CNGs for a short distance within city. 75%	Agencies which are giving vehicles on rent/ Ola/UBER/ can run on CNGs for a short distance within city. 100%	No public transportation buses for Aurangabad city. The AMC has ordered buses which are yet to arrive. Private aggregator vehicles from institution, schools and services should be regulated to convert to CNG/LPG. Incentive for new owners to buy CNG/LPG/battery operated electric vehicles. Development of convertible device to convert old vehicles into CNG running kit.
<b>Reduction Emission per Unit of Vehicle/Congestion</b>				
Banning of 10 year old Commercial Vehicle	50% banning	75% banning	100% banning	Provision of incentives in form of scrap value, tax rebate, and transferrable discount rewards for new vehicles and registrations. All the existing and newly vehicles should go through inspection and certification after every 5 years. According to reports, the government has set up a central depository called 'VAHAN' to store data relating to all vehicles.

Synchronization of traffic signals Sensor Based -Real time tracking	Major & minor roads, excluding feeder roads (or about 35% of the all arterial roads)	Major & minor roads, excluding feeder roads (or about 65% of the all arterial roads)	Major & minor roads, excluding feeder roads (or about 80% of the all arterial roads)	There are significant emissions at signals and congestion zones, especially because of hot and cold start due to unsynchronized and delayed traffic signals. Pre-feasibility study should be undertaken for some hotspots. Awareness for public to switch off these vehicles at traffic intersection when the red signal is blinked.
New Vehicle Standards Sulphur Reduction	Currently BS-IV standards are in operation	Implement BS- VI from 2020 -50% (adopt progressive increment)	Implement I from 2020 -75% (adopt progressive increment)	Sulphur specification for petrol and diesel will be reduced 50 times from a level of 50 ppm for BS-IV fuel to 10 ppm in BS-VI. There presently exists no better fuel than this anywhere in the world. Oil refineries will need to invest Rs 30,000 crore in upgrading petrol and diesel quality to meet cleaner fuel specifications by 2020. A strategic plan should be devised for its successful implantation across all levels. Vehicle manufacture should be taken in confidence for the respective modification of engines.

**Reducing Fuel Consumption Per Unit Distance**

Share of Electric vehicles in Total City Fleet	Two wheeler: 15%, 3 wheeler and Taxi: 15% Public transport buses -20%	Two wheeler: 30%, 3 wheeler and Taxi: 30% Public transport buses -40%	Two wheeler: 60%, 3 wheeler and Taxi: 60% Public transport buses -80%	The government is focusing on creating charging infrastructure and policy framework so that by 2030. Subsidies are also available for two-wheelers, three-wheelers, light-commercial vehicles, buses, and for retrofit kits. The Central Government of India and some state governments, provide tax incentives that treat hybrid and electric vehicles preferentially over conventional technologies. The administration should devise some incentives and rebate at local level. The Ministry of Heavy Industries recently gave its approval to the introduction of EV-based public transportation systems in 11 cities across the country.
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**Reducing Fuel Consumption Per Unit Distance**

Share of Hybrid vehicles in Total City Fleet	(Gasoline powered four-wheelers only) – 10%	(Gasoline powered four-wheelers only) – 20%	Gasoline powered four-wheelers only – 30%	<p>*The FAME scheme offers a subsidy on the retail price of passenger cars. These subsidies range as follows: for mild hybrids, from INR 11,000 (USD 165) to INR 24,000 (USD 360); for strong hybrids, from INR 59,000 (USD 885) to INR 71,000 (USD 1,065);</p> <p>*Subsidies are also available for two-wheelers, three-wheelers, light-commercial vehicles, buses, and for retrofit kits.</p> <p>*The Central Government of India and some state governments, provide tax incentives that treat hybrid and electric vehicles preferentially over conventional technologies. The administration should devise some incentives and rebate at local level.</p> <p>*For example, the Central Government of India levies an excise duty of up to 30% on conventional car technologies while hybrid vehicles are subjected to flat duties of 12.5%.</p> <p>*In the national FY 2016-17 budgets, the Central Government of India also subjected conventional motor vehicles to an infrastructure cess ranging from 1% to 4% of the vehicle price and exempted hybrid vehicles from this cess.</p> <p>*While the FAME scheme provides incentives for all market segments, presently only passenger car models appear to be taking advantage of the scheme.</p> <p>*Hybrid buses hold potential to gain significantly under FAME, as the allocations available cover a significant portion of the technology costs.</p>
Line Sources	Short Term- 2019	Mid Term- 2022	Long Term- 2024	Action required
Reduce Vehicle Distance Travelled				

No parking in non designated areas	Road site parking to be reduced by 50%	Road site parking to be reduced by 75%	Road site parking to be reduced by 100%	AMC and traffic cell has identified parking zones. On an average 20 Rs is charged for vehicular parking from each vehicle. Vehicles parked in non designated areas can be charged fine to avoid congestion of traffic.
Encourage Public Transport	Public transport buses	50 % increase in public transportation	Increase Public Transport - 75%	* AMC has floated tender for procurement of buses. They will arrive in Aurangabad after Diwali this year. The inauguration of Public transportation buses is planned next year.
<b>Battery operated 3 wheelers for public transportation</b>				
3 wheelers for public transportation within city limits	50 % reduction in petrol & diesel autorickshaws	75% reduction in petrol & diesel autorickshaws	100% reduction in petrol & diesel autorickshaws	* Major contributors for causing line source air pollution. Electric or battery operated 3 W must be made compulsory. * Ban on 3 W petrol and diesel vehicles for public transportation within city limits. * Presently 30 thousand autorickshaws are registered in Aurangabad. The emission can be reduced to 50% if in future ban on petrol and diesel autorickshaws is implementation of autorickshaws on CNG and battery operated.
Retrofitment of Diesel Oxidation Catalyst (DOC) and Diesel Particulate Filter	Retrofitting devices- 50% conversion for HDDV in city registered vehicles	Retrofitting devices- 75% conversion for HDDV in city registered vehicles	Retrofitting devices- 1000% (Excluding the heavy duty city outside vehicles)	* A pilot study is required to test the need and efficacy of emission control device and retrofitting it in the older vehicles * As retro fitment of emission control devices also needs a certain levels of fitness of the vehicle, it would be desirable to follow the norm after developing the same through the inspection and certification procedures

### **8.0 Monitoring Mechanism for Implementation**

The aforesaid action plan shall be implemented by Maharashtra State Pollution Control Board with various concern departments/stakeholders.

### **9.0 Implementation status**

The Chief Secretary, Govt. of Maharashtra to convene the meetings with different concerned departments and direct for compliance of directions for implementation of air quality of Amravati. The Principal Secretary, Environment and Forest, Govt. of Maharashtra to also convene the meeting for follow up of the aforesaid directions. The Maharashtra Pollution control Board continuously taken meetings with all stakeholders for preparation of comprehensive action plan for city and its implementation.





**Action Plan for Control of Air Pollution in Aurangabad, Maharashtra**

Sr. No.	Source group	Sr. No.	(B) Technical Control option	(C) Expected reduction and impacts	(D) Technical Feasibility	(E) Requirement of financial resources (Approximate Cost)	(F) Implementation period (short/mid/long-term)	(G) Time target for implementation	(H) Responsible agency (ies)	Any Other Information
1	Vehicle emissions	i	Launch extensive drives against polluting vehicles for ensuring strict compliance	Moderate, Less polluted vehicles will run on road.	Feasible	Survey work-Rs. 5-10 lakhs. Ref: <a href="http://urban.rajasthan.gov.in/content/dam/raj/urban/organizations/aiup/dh/organizations/aiup/downloads/BSR/UIDP%20ISOR-%202017.pdf">http://urban.rajasthan.gov.in/content/dam/raj/urban/organizations/aiup/dh/organizations/aiup/downloads/BSR/UIDP%20ISOR-%202017.pdf</a>	Short (Regular on monthly basis at Toll plaza & Extensive during winter months)	Immediate effect	AMC Transport, RTO, Traffic Police, CMIA, Media	Penalty against the owner for making pollution
		ii	Increase in public transportation (No public transport buses yet in Aurangabad city. If Biodiesel used as a fuel, reduction will be more)	High, Less pollution by small public transport vehicles.	Feasible	Rs 40-50 Lakhs per unit of fleet	Mid term. (Purchasing buses and planning of fleet)	3-4 months	AMC, Smart City Cell, Traffic division	At a gap of 10 minutes, the buses fleet should be available at any stop.
		iii	Prevent parking of Vehicles at Non designated areas	Low (Only in old city's congested areas)	Feasible	Not needed (balanced with fine from impounded vehicles)	Short (Regular monthly checks with fine)	1-2 months	AMC Transport, Traffic Police	Penalty can be charged to vehicles parked in non parking areas.
		iv	Widening of roads and wall to wall pavement	High, Less road dust will again fly into atmosphere	Feasible (Survey must be done)	Yes, 5 crores (AMC Data - construction of 63 km road sanctioned)	Midterm (All roads should be paved with interment and wall to wall paved)	6-24 Months	AMC, PWD	Wankatesh Nagar tar roads to be resurfaced at Rs 32.62 Lakhs, proposals for roads in Asefiya colony, Builders housing society, Kiradpura, Chikathana and Raj Nagar. Concrete road in Rohidaspora to be constructed at Rs 25-35 Lakhs. 41 km of roads related, 3 flyovers constructed
		v	Construction of bypassing roads for the city. (Nagpur Mumbai highway passes from the centre of the city. Nearly 10000 heavy vehicles enters in the city everyday out of which 1800 goes to Ajanta road, 1500 to Nagpur road and 8000 to Pathan/Bheed road)	High, As heavy vehicles will pass from outer of city, air pollution will reduce to 50%.	If funds are sanctioned by transport ministry, Feasible	Approx. Rs. 10 Cr per km 4 lane with service roads	Long term (Heavy vehicular emission will be reduced)	48-60 months	MSRDC, PWD	If bypass or ringroad is proposed from outer of the city, connecting the other cities road, vehicular pollution will be reduced to 50%. Presently 27% pollution is from vehicular source.
		vi	Steps for Promoting Battery operated vehicles	High, Low emissions from vehicular source.	Feasible	Rs. 10-15 lakhs per vehicle Ref: <a href="https://dir.indiamart.com/">https://dir.indiamart.com/</a>	Short term.	6-12 months	AMC, Transport, Traffic, RTO	Compulsion of 3W public transportation autorickshaws on battery operated.
		vii	Synchronize Traffic movements/introduce Intelligent Traffic systems for Lane Driving	Moderate	Feasible	Rs. 100 lakhs per traffic intersection Ref: <a href="https://parade.com/19072/marilynvossavant/wbat-would-traffic-light-synchronization-cost/">https://parade.com/19072/marilynvossavant/wbat-would-traffic-light-synchronization-cost/</a>	Mid Term-Long term	24 months	AMC, Transport, Traffic	Under Smart city initiative of GoI; One way can be an option for intelligent traffic systems.
		viii	Installation of electronic PUC generator	High, Proper and regular maintenance of vehicles	Feasible	1-2 crores	Mid Term- Long term	2020 onwards	Traffic, RTO	Adulteration of fuel and beneficial for charging penalty on high emission vehicles.
		ix	Provide good public transport system	High	Feasible	Yes under Smart City at least 10 crores	Mid Term	2020	AMC, MSRTC	present 27% pollution is from vehicular source. Tenders for 5 Electric buses floated and 25 ordinary buses to be



	Electric / Hybrid Vehicles	Moderate	Feasible	Approx. Rs. 5-7 Lk. per unit for 4 wheeler	Mid-Term	2018-2019	Automobile firms	Discussed und. Risk.
x	Electric / Hybrid Vehicles	Moderate	Feasible	Approx. Rs. 5-7 Lk. per unit for 4 wheeler	Mid-Term	2018-2019	Automobile firms	Discussed und. Risk.
xi	OE-CNG for new public transport buses	Moderate	Feasible	Approx. Rs. 20 Lakhs per unit	Mid-Term	12 months	AMC, Oil & Gas companies	As 88000/- L biodiesel is available per month, public transport buses can be run on this, to reduce pollution
xii	Bio-diesel (B5/B10: 5 - 10% blend)	High	Feasible	Blends to be made available at outlets in city	Short Term	2018	AMC, MPCB, BIS, CMIA, Fuel firms	PWD proposed New Ring Road 60 width passing through Chikalthana and fringe area, under Smart city initiative of GoI
xiii	Restrict commercial vehicles entering city by having ring roads	Moderate	Feasible (If Bypass or ringroad is sanctioned)	Approx. Rs. 10 Cr per km 4 lane with service roads	Mid-Term- Long term	2020 onwards	AMC, MSRDC	
i	Green Buffers along the road dividers and along vertical columns of flyovers	High;	Feasible	PPP basis, Rs. 1 cr. For 10 km (approx) Ref. <a href="https://economictimes.indiatimes.com/news/politics-and-nation/1000cr-fund-to-plant-trees-along-highways-in-the-work/articleshow/51592606.cms">https://economictimes.indiatimes.com/news/politics-and-nation/1000cr-fund-to-plant-trees-along-highways-in-the-work/articleshow/51592606.cms</a>	Short Term	6-12 months	AMC Horticulture, CMIA	30,000 saplings with plastic guards planted this year
ii	Water fountains & green belt development at Major Traffic intersection	Moderate	Feasible	1-2 crores	Short Term	6-12 months	AMC, CMIA	Fountains have been opened at 3-4 Squares. (Major Squares can be sold or rented to private companies for development purpose, as done for Mumbai circle n Nashik which is now named as Mylan circle)
iii	Greening of open areas, garden, community places, schools and housing societies	Moderate	Feasible	Rs. 1000 per sq. ft Ref. <a href="http://www.sanjaynursery.com/vertical-garden">www.sanjaynursery.com/vertical-garden</a>	Short Term	6-12 months	AMC Horticulture, CMIA, NGOs	NGOs are helping for this activities
i	Action against industries doing high air pollution	High	Feasible	MPCB may initiate	Short Term	3-6 months	MPCB	MPCB RO issues directives and notices
ii	Alternate fuel (replacement of wood to Biomass briquettes, Indian coal to Indonesia or SA coal, ash content of briquettes after burning - 0.22%. One cubic meter (or approximately one ton) of briquettes produces as much heat as five cubic meters of air-dried and split firewood while burning. Briquettes produce 10 times less carbon dioxide than natural gas and 50 less carbon dioxide than coal)	High (50% reduction)	Feasible	Not Required Industries must purchase	Short Term	12 months	MPCB	SA coal or Indonesian coal has a low ash content reducing air pollution. Industries can purchase it. Biomass briquettes are available in Aurangabad. Presently 37% air pollution is from Industries.
iii	Installation of CAAQMS	Moderate	Feasible	MPCB may initiate or union of industries can purchase Rs 1.5 Crores capital	Short Term	12-24 months	MPCB	Industries along with MPCB should implement the CAAQMS station in industrial areas.

2 Resuspension of Dust

3 Industrial Activities



iv	Installation/ upgradeation of air pollution control systems	High (50% reduction)	Feasible	Approx. Rs. 30-100 lakhs by industry for APC systems & house keeping.	Short Term	36 months	MPCB	M/s Harman & M/s United Spirits Continuous Stack Monitoring
v	Regular audit of stack emissions for QA/QC	High	Feasible	Rs. 10-20 lakhs per industry	Short Term	6-12 months	MPCB	MPCB and private or government labs
i	Hotels, Bakeries, open eatouts to use LPGs	High; 34% bakeries runs on coal and wood, which will get reduced to 0.	Feasible	Cyl. (Commercial) cost per unit-Rs. 1000 approx.	Short Term	6 months	ESSAI, AMC	34% emissions from area sources are from bakeries which are using wood and coal as fuel. This can be completely reduced if bakeries are switched to LPGs
ii	Electric Cremation/use of Biomass Briquettes	High; less impact on surrounding environment	Feasible	Approx. Rs. 12-40 Lakhs per unit Ref: India Mart	Short Term	6-18 months	AMC	Biomass Briquettes are used in Crematoria. 50% switching to electric in 2020 and 80% switching in 2035
iii	No open burning in community areas	High	Feasible	Not Required	Short Term	3-6 months	AMC	Penalty against people burning the MSW. Policies against burning of MSW.
iv	Segregation of waste at source itself	High; Will solve the important issue of MSW dumping of Aurangabad.	Feasible	Not Required	Short Term	3-6 months	AMC and residential societies	Implementation and penalty for societies not segregating waste which are generating MSW of 100 kgs and more. Awareness among people for segregating waste at source.
v	Higher benefit of PMUY scheme	Moderate; As LPG will be used by maximum households, the use of other fuel will be reduced.	Feasible	Cyl. (residential) cost per unit-Rs. 500 approx.	Short Term	6-12 months	MPNG and AMC	LPGs to BPL people
vi	Construction and demolition activities	Proper covering with fibre sheets to prevent dust remixing into atmosphere	Feasible	CPCB rules to be followed	Short Term	3-6 months	AMC, RERA and PWD	No dust should be redispersed from construction and demolition site
vii	Crematoria: If wood replaced by electricity burners in Crematoria there will be less emissions of Particulate matter. Total 22 Cremetoria. Control equipments installed for air pollution control.	Control equipments for air pollution control	Feasible	Rs 10-20 Lakhs Approx.	Mid Term	12-18 months	AMC, MPCB (Aurangabad)	50% Wood in each cremetoria to be replaced by biomass briquettes. This type of fuel used in cremetoria gives 36% less emissions for PM2.5 and 86% less SO2 generation.

4 Area Sources

