Action Plan to Control Air Pollution in Nagpur City

1. Preamble

Nagpur is the winter capital, a sprawling metropolis, and the third largest city of the Indian state of Maharashtra after Mumbai and Pune. Nagpur is the 13th largest Indian city in terms of population. It has been proposed as one of the Smart Cities in Maharashtra.

Nagpur has tropical savannah climate (Aw in Köppen climate classification) with dry conditions prevailing for most of the year. It receives about 163 mm of rainfall in June. The amount of rainfall is increased in July to 294 mm. Gradual decrease of rainfall has been observed from July to August (278 mm) and September (160 mm). The highest recorded daily rainfall was 304 mm on 14 July 1994. Summers are extremely hot, lasting from March to June, with May being the hottest month. Winter lasts from November to January, during which temperatures drop below 10 °C (50 °F).The highest recorded temperature in the city was 48 °C on 19 May 2015, while the lowest was 3.9 °C on 16 January 2016.

Month and Annual Air pollution data is as below

Data for Monthly average reading recorded at Nagpur

Station Name	year	Month	Average of SO_2	Average of NOx	Average of RSPM
			50	***40***	***60***
IOE North Ambazari road	2017	Apr	10	32	91
		May	9	28	89
		Jun	10	30	88
		Jul	7	23	81
		Aug	9	24	82
		Sep	9	28	86
		Oct	11	35	110
		Nov	12	39	111
		Dec	13	41	108
	2018	Jan	13	41	114
		Feb	14	43	90
		Mar	11	39	86
MIDC Office, Hingna Road	2017	Apr	10	30	87
		May	10	30	87
		Jun	9	26	76
		Jul	8	24	71
		Aug	8	24	96

		Sep	9	28	94
		Oct	11	36	121
		Nov	14	43	120
		Dec	14	42	116
	2018	Jan	14	43	120
		Feb	13	41	102
		Mar	12	39	85
Govt Polytechnic Col, Sadar	2017	Apr	11	52	83
		May	8	25	90
		Jun	8	24	90
		Jul	8	24	74
		Aug	8	22	84
		Sep	9	25	85
		Oct	11	35	115
		Nov	11	37	105
		Dec	13	41	114
	2018	Jan	13	41	103
		Mar	11	37	70
Civil lines Nagpur	2017	Apr	8	26	55
		May	8	25	60
		Jun	8	24	52
		Jul	8	22	52
		Aug	8	22	52
		Sep	12	26	53
		Oct	10	32	78
		Nov	11	37	90
		Dec	12	39	72
	2018	Jan	11	38	65
		Feb	12	40	58
		Mar	11	36	54

Data for Annual average trend of SO_2, NOx, and RSPM at Nagpur

Station Name	**year**	**Average of SO_2**	**Average of NO_X**	**Average of RSPM**
		50	***40***	***60***
IOE North Ambazari road	04-05	8	21	52
	05-06	9	30	44
	06-07	10	27	66
	07-08	8	22	125
	08-09	8	30	114
	09-10	10	36	109

	10-11	10	33	96
	11-12	10	34	84
	12-13	11	39	96
	13-14	10	29	90
	14-15	10	32	106
	15-16	10	31	101
	16-17	10	31	92
	17-18	11	33	95
MIDC Office, Hingna Road	04-05	9	21	51
	05-06	10	34	40
	06-07	9	25	90
	07-08	9	24	160
	08-09	9	30	118
	09-10	10	38	128
	10-11	10	34	113
	11-12	10	35	105
	12-13	11	41	125
	13-14	10	31	119
	15-16	10	32	110
	16-17	10	33	101
	17-18	11	34	98
Govt Polytechnic Col, Sadar	04-05	9	21	45
	05-06	9	32	52
	06-07	9	26	70
	07-08	8	21	107
	08-09	8	27	101
	09-10	9	31	93
	10-11	9	30	87
	11-12	9	30	80
	12-13	10	35	82
	13-14	9	28	92
	14-15	10	31	103
	15-16	10	33	91
	16-17	10	30	93
	17-18	10	34	91
Civil lines Nagpur	04-05	17	25	53
	05-06	15	22	66
	06-07	14	28	76
	07-08	14	30	70
	08-09	18	31	84
	09-10	13	35	85

	10-11	9	28	66
	11-12	9	26	55
	12-13	9	30	54
	13-14	9	24	61
	14-15	10	28	62
	15-16	9	29	54
	16-17	9	27	62
	17-18	10	30	61

2. Action Plan for Nagpur

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	
Sr. No		**Source Group**	**Control Option**	**Expected reduction and impacts**	**Technical Feasibility**	**Requirement financial resources**	**Implementation period (Short/mid/long-term)**	**Time target for implementation**	**Responsible agency (ies)**	**Any other information**
1	i	**Vehicle emission**	Launch extensive drives against polluting vehicles for ensuring strict compliance	It is reported that the existing polluting old & under maintained vehicles viz., Two wheeler, Autos, cars, buses, trax, trucks etc approx form 10-15 percent of total vehicles. Pollution from these vehicles will get reduced by proper maitenance, etc. BSIV technology reduces the emission rates by over 20%, of the previous BSIII technology reduces the emission rates by over 20%, over the previous BSIII technology. The present annual vehicle emissions for PM2.5 is about 77 tons which may increase to 82 tons in 2022 (BAU). With mitigation measures like introduction of CNG/e-cars/hybrid vehicles/ green vehicles (about 10-15%) it would reduce to about 79 tons without Nagpur Metro. It would further decrease with operation of Metro.	Feasible	Approx. 10 crores (approx. cost for monitoring systems)	Short term	12-18 months	RTO, Smart city NMC	RTO to have portable monitors for PM and Gaseous air pollutants, random checking of polluting vehicles and take strict action against them to make maintenance compulsary. At present the vehicle manufacturers have to comply with the BSIV standards applicable to all since April, 2017

	ii		Launch public awarness campaigns for vehicle emission control through proper vehicle maintanence, minimising use of personal vehicles, lane discipline etc.stopping of engines while idling in intersectons	Drive less Drive wise Choose fuel efficient vehicles Don't idle Schedule transport vehicles movement Use clean and efficient transport systems	Feasible	Approx. 50 lakhs for the year 2018-19 at 20-25 locations (for digital display boards)	Short term	12-18 months	Traffic Engineer, NMC/Smart city Advertise Deptt. NMC MSRTC	NMC buses, display boards at various traffic intersections to be used for the advertisement
	iii		Prevent parking of vehicles at Non designated areas. Identification of areas where space for more parking is required and developing parking facility	Display boards	Feasible	Approx. 20 crores for parking area development	Short term	12-18 months	Traffic Engineer, NMC /DCP Traffic	In addition to existing NMC parking facility it is proposed to develop parking lots in Dhantoli and along Ramdaspeth to Kachipura square. Similar parking facility to be developed in other congested areas.

	iv	**Vehicle emission**	Initiate steps for retrofitting of particulate filters in Diesel vehicles	will reduce the overall Air Pollution Load	Should be technically checked for efficiency	Rs. 0.5-0.7 lakhs per unit https://dir.indiamart.com/impcat/diesel-particulate-filters.html	Long term	12-18 months	GoI, GoM, NEERI / IIT/VNIT	Policy making decision Up to some extent light motor vehicle & auto rickshaw are presently running on petrol & LPG dual combination. To reduce the impact of air pollution by public transport vehicles the use of CNG, battery operated system, E-Rickshaw are the options which will be implemented in future step by step.
	v		Prepare action plan to check fuel adulteration and random monitoring of fuel quality data	will reduce the overall Air Pollution Load in City	Feasible	Survey and random checking work-Rs. 5-10 lakhs,, Ref: http://urban.rajasthan.gov.in/content/dam/raj/udh/organizations/ruidp/Downloads/BSR/RUIDP%20ISO	Long term	12-18 months	Residence Deputy Collector (RDC), anti-adulteration cell, RTO	Checking fuel adulteration with coordination of anti adulteration cell which is a continuous process.

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	vi	**Vehicle emission**	Prepare action plan for widening of road and improvement of Infrastructure for decongestion of Roads. Development of bicycle tracks along roads to promote use of cycles. Separate bicycle tracks will ensure safe cycling along busy roads and will result in increase use of bicycles.	The existing development of concrete roads about 50 roads will reduce the congestion on existing roads thereby reducing the vehicular emissions. Effective implementation of parking policy should be done.	Feasible	Survey/ maintanence work-Rs. 5-10 lakhs, pothol maintanence-Rs. 10000 approx. based on the size	Short term	12-18 months	Executive Engineer NMC, Chief Engineer PWD, Project Director National Highway Auhtority Nagpur (NHAI)	Total 26.26 km length concrete roads are being developed in Phase I, 155.42 km length will be developed in Phase 2 (work order already placed) and 41.22 km length will be developed in Phase 3 (at placing work order stage) in Nagpur.

	vii		Identification of traffic congestion hot spots and prepare Plan for the construction of expressways/bypass/flyovers to avoid congestion	The congestion Index of Nagpur city is increasing due to enormous constrction of roads and metro.After this constrution, the widening of existing roads, Metro and other activities as per the parking and mobility plan, the vehicular emissions will be reduced	Should be checked for availability of space for constructio n in the city	project consultancy work-Rs. 5-10 lakhs, pothol maintanenc e-Rs. 10000 approx. based on the size	Mid term	12-24 months		
			Steps for Promoting electric, Battery operated vehicles.	At present 100 e-cars and 65 e-rickshaws are running in Nagpur and reducing 0.05 kg/d of PM load in air	Feasible	About 95 crores for introductio n of about 700 CNG/E-taxis/buses etc. by 2022	Mid term	12-24 months	RTO, Nagpur	Already initiated electric fleet of 200 electric vehicles, including taxis, buses, e-rickshaw and autos in Nagpur since last 1 year. To promote electric fleet, GoM waived VAT, road tax, and registration for all electric vehicles in the state.

	ix		Insall weigh in Motion bridges at the borders of the cities/Towns and states to prevent overloading of vehicles.	Same as Above	The percentage reduction in air pollutants should be quantified based on actual monitoring of emissions	Rs 10 Lakhs per unit for 100 tonne load capacity Ref : India Mart	Long term	12-18 months	NMC, RTO, Nagpur	Plan to install weighing check post for heavy goods carrying vehicles has to carried out consultation with Regional Transport office.
	x	**Vehicle emission**	Synchronize Traffic movements/Introduce Intelligent Traffic systems for Lane Driving	would streamline the traffic movement and reduce emissions	Feasible	Rs. 100 lakhs per traffic intersection Ref. https://parade.com/19072/marilynvossavant/what-would-traffic-light-synchronization-cost/	Mid term	12-24 months	DCP traffic EE (Smart city)	Intelligent CCTV surveillance and automated Traffic Management systems already installed at traffic intersections

	xi		Installation of Remote Sensor based PUC systems,	Will reduce the pollution from highly npolluting vehicles. The machines installed on roads will perform real time insitu emission scan and will identify high emitters. The machine will also scan number plate and send notice for enforcement of rules. This technique is extensively used in China, Hongkong, Pune Kolkata	Feasible..To be checked with specific study	Rs. 2.5 Crores/ machine Ref: Swachhindia.ndtv.com	Long term	60 months	Transport Commisioner GoM MPCB, DCP Traffic, NEERI RTO	POLICY MAKING DECISON (The installation of Remote Sensor RFID based PUC systems is proposed under consultation of Transport Commissioner agency will take the expertise of CSIR-NEERI for its installation, Geo Tagging of Locations for its ,implementation and monitoring
	SCS-1		Sulphur reduction in diesel	Same as Above			Long term	60 months	GoI, GoM	POLICY MAKING DECISON
	SCS-2		Introduction of new technology vehicles	Same as Above	Feasible..To be checked with specific study		Long term	60 months	RTO, Transport Deptt. NMC	In a major step in spreading the use of green energy, India's first electric vehicle (EV) charging station was started by Indian Oil company. It is propsed that to substantially increase

										electric vehicles soon
	SC S-3	**Vehicle emission**	Provide good public transport system	Increase in public transport fleet will result in less use of personal vehicles thereby reduce the pollution load	Feasible	Approx. 5 crores (for introduction of 20 new buses for public transport)	Long term	60 months	Maha Metro Rail Corporation Ltd. Nagpur, Transport Deptt. NMC RTO, MSRTC	Present 202 standard buses, 150 midi buses and 25 Ethanol A.C. green buses are on-road. 25 Ethanol A.C. green buses and 35 midi buses are proposed for increasing the capacity of bus transport system. The Metro rail construction is already ongoing which consists of 41.7 km metro length with 40 stations and 19 Feeder Bus Routes covering 160 Km length

	SCS-4		Standards for new and in-use vehicles		Feasible		Long term	60 months	Ministry of Road Surface Transport & National Highways	POLICY MAKING DECISION
	SCS-5		Alternative fuels	Will significantly reduce the emissions on the city roads	the emission reduction efficacy of proposed alternate fuels to be checked		Long term	60 months		
	SCS-6		implementation of BS-VI norms	Will significantly reduce the emissions on the city roads	Feasible		Long term	60 months		
	SCS-7		Hybrid Vehicles	Will significantly reduce the emissions on the city roads.	Feasible		Long term	60 months		Already 100 electric taxis introduced by OLA and 65 e-rickshaws are on-road.
	SCS-8	**Vehicle emission**	OE-CNG for new public transport buses	Will significantly reduce the emissions on the city roads	Feasible..To be checked with specific study		Long term	60 months	Ministry of Road Surface Transport & National Highways	POLICY MAKING DECISION Partial conversion of Polluting Auto Rickshaws with CNG/Gas engines/kits may be implemented

	SCS-9		Ethanol blending (E10-10% blend)	Will reduce the emissions if found to be better than the conventional fuels	emission reduction efficacy of proposed fuels to be checked	Rs. 1.20 cr. per bus Ref.https://timesofindia.indiatimes.com/city/nagpur/Ethanol-bus-eco-friendly-not-pocket-friendly/articleshow/46602245.cms, http://niti.gov.in/writereaddata/files/document_publication/TaskForceReportOnCleanFuel.pdf	Long term	60 months		POLICY MAKING DECISION 25 Ethanol A.C. green buses are proposed for increasing the capacity of bus transport system. However; comparison of these fuels with conventional fuels with respect to their environmental benefits should be done
	SCS-10		Bio-diesel (B5/B10:5-10% blend)	Will reduce the emissions if found to be better than the conventional fuels	same as above		Long term	60 months		Same as above
	SCS-11		Retro-fitment of Diesel Oxidation Catalyst (DOC) in 4-Wheeler public transport (BS-II and BS-III)	Will significantly reduce the emissions on the city roads	To be checked with specific study		Long term	60 months		POLICY MAKING DECISION Catalytic convertor and particulate trap may be provided to existing polluting vehicles after checking technical feasibility
	SCS-12		Retro-fitment of Diesel Particulate Filter in 4-wheeler public transport(BS-III city buses)	Will significantly reduce the emissions on the city roads	To be checked with specific study		Long term	60 months		

	SCS-13		Banning of 15 year old commerical vehicles	Will significantly reduce the emissions on the city roads	Feasible		Long term	60 months	Ministry of Road Surface Transport & National Highways	POLICY MAKING DECISION Buses and heavy vehicles more than 15 years old are still plying. The transport department to undertake a drive to check the fitness of such vehicles.
	SCS-14	**Vehicle emission**	Inspection/maintenance to all BSII & BSIII commerical vehicles	Will significantly reduce the emissions on the city roads	Feasible		Long term	60 months	RTO + MSRTC	POLICY MAKING DECISION
	SCS-15		Restrict commercial vehicle entering city by having ring roads.	Already existing	practice to be continued		Long term	60 months	DCP traffic Project Director, NHAI	Already ring roads are constructed
2	(i)	**Resuspension**	Prepare plan for creation of green buffers along the Traffic corridors. The total road length in city is 3465 km, of which 213 km is partially paved/unpaved. The present annual PM2.5 emissions is 1.5 tons which will decrease after paving.	The green buffers will act as air pollution sinks and reduuce the pollution load	feasible	Approx. 1500 crores (including paving of 213 km unpaved roads and maintenance of existing roads)	Mid term	12-24 months	Garden deptt. NMC, NEERI, MPCB, Garden Deptt. NIT	Partially done. 16758.53 sq.m. green buffers at road dividers, channelizer, traffic islands and on both sides of the roads were developed. This work may be extended to other highly polluted roads

	(ii)		Maintain Pothole Free Roads for Free flow Traffic	Will reduce pollution load	feasible	As per the requirement	Mid term	12-24 months	EE (Hot Mix Plant) NMC, Nagpur, NIT Nagpur	The NMC's hot mix department collected data of potholes from 10 zones for repairing the craters and bad surface layers in coming days. As per the report, there were 1,377 potholes of which 736 were repaired and only 641 remaining
	(iii)	**Resuspension**	Introduce water fountains at Major Traffic intersection, wherever feasible.	Will reduce pollution load	Feasible	Approx. 40 lakhs (for 20 water fountains)	Mid term	12-24 months	EE (Construction) Traffic Deptt. NMC	The water fountains may be installed at the spaces near traffic lights where space is not avialable at the centre of the road

	(iv)		Greening of open areas, garden, community places, schools and housing societies.	Will reduce pollution load	Feasible	Approx. 2.5 crores for developme nt of green areas in 10 zones. Rs. 4.5 crores for garden developme nt (demanded in Amrut mission)	Mid term	12-24 months	Garden deptt. NMC / Garden Deptt. NIT Educati on Deptt. NMC	Total 95 gardens are developed in city with 126.46 Acres area. Total 22 new gardens are proposed in the city out of which under Amrut mission, development of new 8 gardens with an area of 62.46 acres is going on and 14 gardens to be developed under Chief Minister's special fund. Total 32671 trees were planted in 2017-18 and 25000 trees are proposed to be planted in the year 2018-19
	(v)	**Resuspension**	Blacktopping of metaled Roads including pavement of Road shoulders	Will reduce pollution load	Feasible		Long term	12-24 months	NMC, NIT	Majority of the metaled roads have blacktopping

	SC S-1		Wall to Wall paving (brick)	Will reduce pollution load	Feasible	Rs. 100 per sq. ft Ref. https://www.indiamart.com/proddetail/natural-stone-wall-bricks-16478046533.html	Long term	12-24 months	City Engineer, NMC	Already done for majority of the roads and ongoing for the present roads under construction
	SC S-2	**Road design improvement**	More Concrete Roads are made in city with planning of over 50% main roads to be concretized. Total 51 major roads with length of 67.43km is being covered under the project. HDM4 model for performance of concrete roads/pavements etc over vehicle emissions to be studied	Will reduce pollution load	Feasible	Already covered above	Long term	12-24 months	City Engineer, NMC	

3	(i)	**Solid waste management/Biomass/trash burning, landfill waste burning**	Solid waste management at landfill site, increase capacity of waste to energy project. Presently, 1150 TPD solid waste is generated in city. Assuming 41% of unmanaged waste is burnt so releasing 773 kg/yr PM2.5 emissions.	If waste to energy project's capacity is increased to 1000 TPD, the PM2.5 emissions will reduce to 196 kg/yr in 2022	Feasible	For waste to energy project 800TPD , 11.5 MW, costing 241.1 crores at Bhandewadi, M/S. Essel Infraprojects Ltd & Hitachi Zosen India Pvt. Ltd. Mumbai (JV) is initiated and will take place in 2019.	Mid term	24-36 months		For waste to energy project 800TPD , 11.5 MW, costing 241.1 crores at Bhandewadi, M/S. Essel Infraprojects Ltd & Hitachi Zosen India Pvt. Ltd. Mumbai (JV) is initiated and will take place in 2019.
			Launch extensive drives against open burning of biomas, s crop residue, garbage, leaves etc.	Will reduce the air emissions	Feasible		Mid term	12 months	H.O. (S), NMC Punjabrao Krushi Vidhayphit (PKV)	Presently few cases of open waste burning were already detected and fine imposed; however this should be done on regular basis and area-wise volunteers could be identified for the same.

	(ii)		Regular check and control, of burning of Municipal Solid waste	Will reduce the air emissions	Feasible		Short term	12 Months	H.O. (S) NMC Nagpur	Pix Transmission, manufacturer of industrial belts, has been entirely running on steam totally produced using agro-waste for the last two years.
	(iii)		Proper collection of Horticulture waste and its disposal following composting-cum-gardening approach	Will reduce the air emissions	Feasible		Short term	12 Months	Health Officer (S) / Garden Suptd., NMC, Nagpur	
	(iv)	**Solid waste management/Biomass/trash burning, landfill waste burning**	Ensure ban on burning of agricultural waste and crop residues and its implementation.	Will reduce the air emissions	Feasible		Long term	12-18 Months	Health Officer (S) / Garden Suptd., NMC, Nagpur	
	SCS-1		Strict compliance of ban on open burning	Will reduce the air emissions	Feasible		Short term	6 Months	Health Officer (S) / Garden Suptd., NMC, Nagpur	

	5		Biomethanation and biogas plant need to be installed.	Medium		Rs. 17.0 Lakhs. For 250 kg/day plant Cap and Operating extra Ref: http://niti.gov.in/writereaddata/files/document_publication/TaskForceReportOnCleanFuel.pdf	Mid term	2020-2022	Health Department, KMC, Environmental Department, KMC	Plastic bituminous roads option to be excercised, option of decentralized small scale plant unit may be excercised
4	(i)	**Industry**	Identification of Brick Kin and their regular monitoring including use of designated fuel and closure of unauthorized units. About 130 kilns of which 25 (Fixed concrete chimney wala) and 75 (Metal chimney wala)	Will reduce the air emissions	Feasible	MPCB to undertake	Short term	12 Months	Revenue Deptt. RDC, MPCB	No Brick units within NMC limit however other nearby located units in perphery of 10 to 20 Km from NMC Boundary.

	(ii)		Conversion of natural draft brick kikns to induced draft	Will significantly reduce the emissions	The quantification of reduction in emissions should be done by monitoring emissions prior and after the conversion-feasibility to be checked	Rs. 38.5 Lakhs Approx. per unit..Ref:http://shaktifoundation.in/wp-content/uploads/2018/01/Zig-Zag-Kilns-A-Design-Manual-English-2017-1.pdf	Long term	60 Months		
	(iii)		Action against non-complying industrial units	Will significantly reduce the emissions	Not needed	MPCB to undertake	Short term	12 Months	MPCB	Hingna, Koradi, Khaparkheda, Butibori, Kalmeshwar road Direction as Proposed Direction 01 no. and Show Casue Notice 05 nos.
	SCS-1	**Industry**	Sulphur reduction in fuel	Will significantly reduce the SO2 emissions	To be checked with specific study	Policy decision	Short term	12-18 Months	(Policy matter) MPCB, RDC	1) FGD system2) Policy Decision
	SCS-2		Improved Combustion technology	Will significantly reduce the emissions	To be checked with specific study	Industry to undertake	Short term	12-18 Months	Revenue Deptt. RDC	

	SC S-3		Alternate fuel ...Efficacy of use of solar power in Industries and other control measures needs to be studied	Will significantly reduce the emissions	To be checked with specific study	to be done individually by Ind ----100 kW rooftop solar plant costs Rs 60 Lakhs Ref: http://www.solarmango.com/faq/2	Short term	12-18 Months	Revenue Deptt. RDC	Alternative option for use of biogas/ other renewable solid fuels such as MSW briquettes etc. may be probed for co-firing in LSI, MSI alogwith control measures
	SC S-4		Promoting cleaner industries	Will significantly reduce the emissions	feasible		Short term	12-18 Months	ADTP, NMC	Green- white industries
	SC S-5	**Industry**	Location specific Emission reduction	Will significantly reduce the emissions	feasible		Short term	12-18 Months	H.O. (S) NMC Nagpur Joint Director, Industries, Office of Directorates Industries Nagpur Division, Nagpur	3rd party audit for emission reduction
	SC S-6		Fugitive emission control	Will significantly reduce the emissions	feasible		Short term	12-18 Months		Major Large Scale indutris have internal tar road & sprinkler system for vehicular movement. Transportation is done in closed containers for raw material, byproducts, products are etc.

	SC S-7		Banning of new air polluting type industries and proposed expansions in existing city limit and nearby periphery of 20km radius	Will significantly reduce the emissions	Feasible	MPCB to undertake	Short term	12-18 Months		Already done.
	SC S-8		Installation /upgradation of air pollution control systems	Will significantly reduce the emissions	To be checked with specific study	Approx. Rs. 50-100 lakhs by industry for APC systems & house keeping	Short term	12-18 Months	H.O. (S) NMC Joint Director, Industries, Office of Directorates Industries Nagpur Division, Nagpur	Probing studies for reduction of gaseous emissions
	SC S-9		Use of high grade coal	Will significantly reduce the emissions	Feasibility to be checked	WCL to undertake beneficiation	Short term	12-18 Months	RDC + H.O. (S)NMC Nagpur Joint Director, Industries, Office of Directorates Industri	Periodic audit (3rd party) of quality of coal Coal beneficiation to be done

									es Nagpur Division, Nagpur	
	SCS-10	**Industry**	Regular audit of stack emissions for QA/QC	Will significantly reduce the emissions	Feasible	Rs.10-20 lakhs per industry	Short term	12-18 Months	H.O. (S) NMC Joint Director, Industries, Office of Directorates Industries Nagpur Division, Nagpur	
5	(i)	**Construction and Demolition Activities**	Enforcement of construction & demolition rules, implementation of measures for control of emissions during activity	Will significantly reduce the emissions	Feasible	NMC/PWD/Metro etc to undertake as per CPCB norms	Short term	12-18 Months	ADTP, NMC NIT, MPCB, Nagpur Metro	

	(ii)		Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinking, curtains, barriers and suppression units.	Will significantly reduce the emissions	Feasible	NMC/PWD /Metro etc to undertake as per CPCB norms	Short term	12-18 Months	ADTP, NMC	MPCB HQ issued direction on 12/03/2018 for implementation and compliance of Construction and Demolition Waste Management Rules 2016.
	SC S-1		Better construction practices with PM reduction of 50%	Will significantly reduce the emissions	Feasible	NMC/PWD /Metro etc to undertake as per CPCB norms	Short term	12-18 Months	ADTP, NMC, MPCB	
	SC S-2		Banning of operation of Brick kilns in city area	Will significantly reduce the emissions	Feasible		Short term	12-18 Months	Revenue RDC	Already banned

	SC S-3		Ensure carriage of construction material in closed/covered Vessels	Will significantly reduce the emissions	Depending on state or local By-laws, member of corporation can organize regional co-operations according to their specific needs. Through the corporation , public and private decision makers can be brought together to consider a regional strategy in the direction of MPCB. If regionalizat ion seems promising, the corporation can then plan and implement the program.	Rs. 1 lakhs per vehicles	Short term	12-18 Months	RTO	MPCB HQ issued direction on 12/03/2018 for implementatio n and compliance of Construction and Demolition Waste Management Rules 2016.

6	SC S-1	**Domestic fuel burning**	Shift to LPG from solid fuel & kerosene for domestic applications	Will reduce emissions significantly	Feasible	Ujjawala scheme in operation (Rs. 500 per cyl. Refilling)	Short term	12-18 Months	RDC	
	SC S-2		Better cook-stove designs	Will reduce emissions significantly	Feasible	Rs. 2000 per stove (for residential purpose) MNRE	Short term	12-18 Months		
8	(i)	**DG sets**	Monitoring of DG sets and action against violations	Will reduce emissions significantly	Feasible	Rs. 2 lakhs - survey work	Short term	12-18 Months	DCP Traffic , MPCB	Identified DG sets in LSI and MSI and others to strictly implement consent rules to ensure fuel quality usage and emissions control norms. Random checks/ 3rd party audit to be followed
	SC S-1		Reduction in DG set operation /Un-interrupted power supply	Will reduce emissions significantly	Feasible	15 KVA (NG based)-3.7 lakhs, 100 KVA (NG based)- 14 lakhs Ref. https://dir.indiamart.com/impcat/natural-gas-generators.html	Short term	12-18 Months	Director , MSEDCL (Electrical Inspector)	

9	SCS-1	**Hotel/restaurants/Bakeries /**	Use of LPG in Hotels and "Dhabas"	Will reduce emissions significantly	Feasible	Cyl. (commercial) cost per unit-Rs. 1000 approx.	Short term	12-18 Months	Revenue Deptt. RDC	Use of alternate fuels such as MSW/ Agricultural waste briquettes after the testing of these alternate fuels for reduction in pollution
10		**Crematoria**	Use of electric/ gas crematoria should be promoted	Will reduce emissions significantly		Approx. Rs. 12-40 Lakhs per unit Ref: India Mart				Presently, there are 13 crematoria in city emitting around 52 tons/yr of PM2.5
			Promote use of briquettes instead of wood	If wood is replaced with briquettes then around 35% reduction in PM emissions will take place.						Presently, around 13679 and 546 bodies are burnt with wood and briquettes respectively,
			Development of green areas along crematoria	Will reduce transport of emissions in vicinity significantly		Rs. 1000 per sq. ft Ref. https://www.indiamart.com/proddetail/natural-stone-wall-bricks-16478046533.html	Launch extensive awareness drive against polluting vehicles;	Immediate		

11		**Other (city specific)**	Wastewater treatment plant Bhandewadi	This will reduce emissions of foul gases and other pollutants from the running as well as stagnant sewage	Feasible		Ensure Strict action against visibly polluting vehicles;	Immediate	NMC, NIT	Total 200 MLD wastewater is treated. 130 MLD teated wastewateris being supplied to MAHAGENCO for 3 x 660 MW power generation. Proposed work: to prevent pollution in Nag river, installation of 1500 km long sewer collection system and development of 82 MLD wastewater treatment plant. Total 115 MLD capacity wastewater teatment units at Hudkeshwar and Chkhlikhurd, Nagpur

Note : Column No (D) needs to be Filled in Consultation with NEERI & MPCB

Column no (E) Needs to be filled with concerned Finance Officer

3. Monitoring Mechanism for Implementation

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

4. 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 conducted the meetings with all stakeholders for preparation of comprehensive action plan for city and its implementation.