

GOVERNMENT OF WEST BENGAL

Comprehensive Air Quality Action Plan for Kolkata

*Prepared in connection to the order passed by Hon'ble National Green Tribunal on
08.10.2018 in respect of order dated OA 681 of 2018 (in matter of News Item
Published in "The Times of India" authorized by Shri Vishwa Mohan Titled "NCAP
with Multiple Timelines to Clear Air in 102 Cities to be released around)
August 15th 2019*

by

Air Quality Monitoring Committee (AQMC)

(Constituted vide notification No. EN/3678(1-10)/3C-38/2018 Dated 05/12/2018)

12/31/2018

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Notification on Constitution of the Air Quality Monitoring Committee (AQMC)

Department of Environment
Government of West Bengal
Notification

No. 3678/EN/(1-10)/3C-38/2018

Date: 05/12/2018

Whereas air quality of Kolkata has not attained National Ambient Air Quality Standards (NAAQS)

And whereas the Hon'ble Principal Bench in its order dated the 8th October, 2018 has directed the State Government to constitute an Air Quality Monitoring Committee (AQMC) for preparation of an appropriate action plan for attaining NAAQS

Now therefore, a ten member AQMC is constituted for preparation of Air Quality Action plan for Kolkata for attaining NAAQS with following members:

- Additional Chief Secretary, Environment **Chairman**
- Secretary or his nominee, Transport
- Secretary or his nominee, Urban Development & Municipal Affairs (UD&MA)
- Secretary or his nominee, Industry, Commerce & Enterprise
- Secretary or his nominee, Micro Small and Medium Enterprises (MSME)
- Secretary or his nominee, Agriculture
- Commissioner or his nominee, Kolkata Police
- Commissioner or his nominee, Kolkata Municipal Corporation (KMC)
- Member Secretary, West Bengal Pollution Control Board (WBPCB)
- Chief Environment Officer, Environment **Convener**

The nominee of any department should be a senior level officer at least in the rank of Joint Secretary/ Joint Commissioner/ Director

The Committee shall start functioning with immediate effect and shall submit the action plan to Central Pollution Control Board by 31.12.2018.

Sd/-
Chief Secretary
Government of West Bengal

Convenor

1. Constitution of an Air Quality Monitoring Committee (AQMC)

Hon'ble National Green Tribunal was pleased to pass an order on 08.10.2018 in respect of order dated OA 681 of 2018 (*in matter of News Item Published in "The Times of India" authorized by SHri Vishwa Mohan Titled "NCAP with Multiple Timelines to Clear Air in 102 Cities to be released around August 15"*) for :

- 1) constitution of Air Quality Monitoring Committee (AQMC) by every state
- 2) preparation of air quality action plan by AQMC for the "Non Attainment City" in the state with an objective to meet the national ambient air quality standards (NAQQS) within six months of finalization of the said action plan.

Accordingly, a committee has been constituted with members from department of Environment, Transport, Industries, Commerce and Enterprises, Medium Small and Micro Enterprises, Urban Development & Municipal Affairs, Agriculture, Kolkata Municipal Corporation, Kolkata Police and Member Secretary State PCB under direct supervision of Additional Chief Secretary, Environment and further supervision and intra-sectoral co-ordination by Chief Secretary.

2. Meeting of the Committee

The meeting of the Air Quality Monitoring Committee (AQMC) was conducted on 27th December, 2018 and the Comprehensive Action Plan has been prepared on basis of the feedback received from various departments.

3. Air Quality of Kolkata

3.1 Status of Air Quality Monitoring

The WBPCB has already made all semi-automatic air monitoring stations functional with effect from 01.01.2016, which were in operation till 2011. These monitoring stations operate in such a way that the air quality of Kolkata is being monitored every day. WBPCB is also operating two Continuous Ambient Air Quality Stations.

The semi-automatic stations provide data every 8 hourly for PM₁₀, daily for PM_{2.5} and 4 hourly for SO₂ and NO₂. Each semi-automatic station operates on two days a week for 24 hours on each day of monitoring and on 104 days a year as per the guidelines of the Ministry of Environment, Forest and Climate Change, Government of India through the NAAQS, 2009. Each automatic station, however, operates round the clock and the data from the automatic stations can be obtained for user-selected intervals. The data from the automatic monitoring stations (operated on all days of the year) and the semi-automatic ones (operated twice a week) are made available in the web site of the WBPCB (<http://emis.wbpcb.gov.in/airquality/citizenreport.do>). All Air Quality Index data for Kolkata is already integrated with National AQI portal. Locations of stations are provided in Table 1.

Table 1: Kolkata—locations of the Ambient Air Quality Monitoring Stations and the parameters monitored in Kolkata

Station name and location	Parameters monitored
Automatic Monitoring stations	
Rabindra Bharati University	PM _{2.5} , PM ₁₀ , SO ₂ , NO ₂ , CO, C ₆ H ₆ , O ₃
Victoria Memorial	PM _{2.5} , PM ₁₀ , SO ₂ , NO ₂ , CO, C ₆ H ₆ , O ₃
Semi Automatic monitoring stations	
Dunlop Bridge	PM ₁₀ , SO ₂ , NO ₂
Behala	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO, C ₆ H ₆ , O ₃ , NH ₃ , As, B(a)P, Pb, Ni
Salt Lake	PM ₁₀ , SO ₂ , NO ₂
Baishnabghata	PM ₁₀ , SO ₂ , NO ₂
Ultadanga	PM ₁₀ , SO ₂ , NO ₂
Moulali	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂
Shyambazar	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO, C ₆ H ₆ , O ₃ , NH ₃ , As, B(a)P, Pb, Ni
Minto Park	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂
Paribesh Bhawan	PM ₁₀ , SO ₂ , NO ₂
Picnic Garden	PM ₁₀ , SO ₂ , NO ₂
Tollygunge	PM ₁₀ , SO ₂ , NO ₂
Hyde Road	PM ₁₀ , SO ₂ , NO ₂
Beliaghata	PM ₁₀ , SO ₂ , NO ₂
Topsia	PM ₁₀ , SO ₂ , NO ₂
Mominpore	PM ₁₀ , SO ₂ , NO ₂
Gariahat	PM ₁₀ , SO ₂ , NO ₂
Rajarhat	PM ₁₀ , SO ₂ , NO ₂

Source: Air Pollution Control Action Plan for Kolkata and Howrah prepared by WBPCB (for Winter 2017)

The air quality data from CESC Chakmir automatic monitoring station is also made available through WBPCB website.

Station name and location	Parameters monitored
Automatic Monitoring stations	
CESC Chakmir (new station)	PM _{2.5} , PM ₁₀ , NO ₂ , SO ₂ , O ₃ , CO

3.2 Status of air quality

Kolkata is the centre of the major urban metropolis of West Bengal. Vehicular emissions, emission from construction sector, road dust re-suspension, industrial emission, trans-boundary pollution etc continue to pollute the city air. The situation aggravates in winter months when typical weather conditions like temperature inversions entraps pollutants in lower levels of atmosphere. Recent analysis of air quality data shows that as per the National Air Quality Index (NAQI) followed in India, the ambient air quality index of Kolkata remains in “poor or very poor or severe” category for about 18-20 days in winter. The two air quality parameter PM_{10} , NO_2 , which have been listed as Non-attainment pollutant in NGT order dated 8.10.2018 and which exceed National Ambient Air Quality Standards (NAAQS) for Kolkata are shown in Figure 1. The long-term annual average of criteria air quality parameter also does not indicate any significant downward trend (Figure 1).

Figure 1 shows that the annual average concentrations of pollutants like PM_{10} , and NO_2 are above the respective prescribed standards. The level of SO_2 , Pb, NH_3 , C_6H_6 , B(a)P, As and Ni were found to be well within the respective standard values. These pollutants were not observed to cross the standard even at shorter (daily, 8-hourly, etc.) time intervals during these three years.

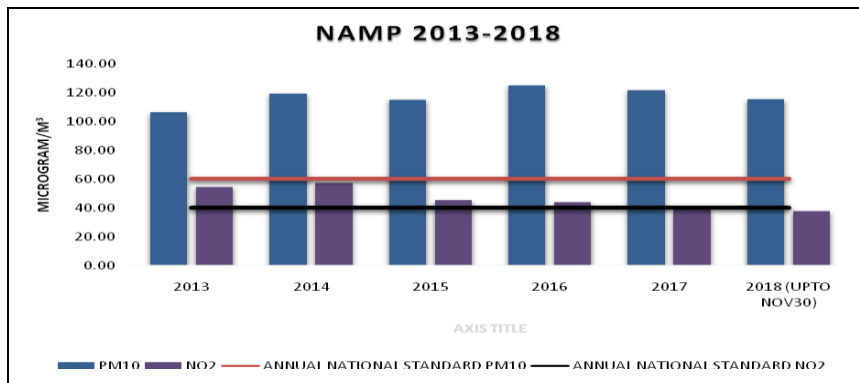


Figure 1 Year wise trend of average concentration of criteria air pollutants in Kolkata (data from semi-automatic stations *)

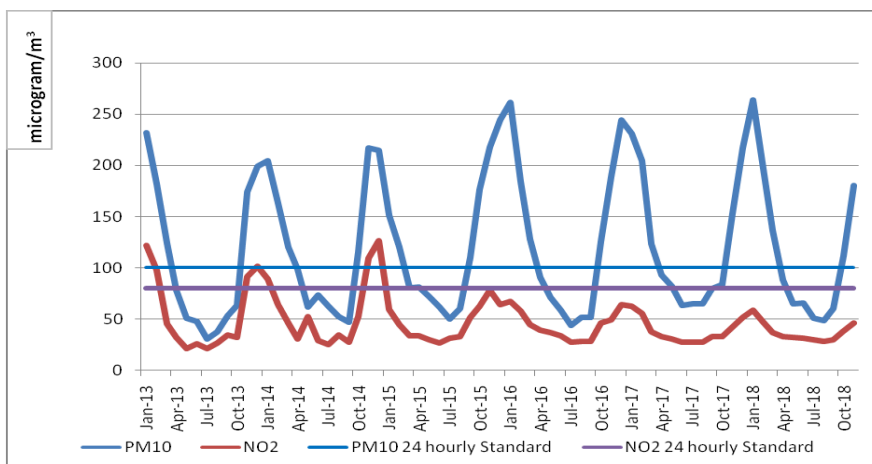


Figure 2 NAAQS for PM_{10} and NO_2 is not attained from Mid October to Mid March

4. Major Source of Air Pollution in Kolkata

Any air pollution control strategy will need baseline information on the sources and their relative contribution to ambient air pollution concentration as well as population exposure. WBPCB, along with NEERI, are currently carrying out a source apportionment study which is expected to bring greater precision in understanding of the recent pollution profile of Kolkata. After the completion of the study the plans can be further refined as action in several sectors is already underway. The available information on the assessment of pollution sources and their relative contribution have been taken into consideration for current action planning process.

In early 2000, it was found that the contribution from transport, industries and domestic sectors are 50%, 48% and 2%. About 56 per cent of the industrial emissions were contributed by the large- and medium-scale industries whereas about 44 per cent were contributed by the small-scale units operating within the city limit. These small units were using age-old technologies and were operating small coal fired energy inefficient heating installations like boilers or furnaces. Besides, coal-fired ceramic kilns-which were operating in the fringe areas of the city were also contributing to the city air.

The WBPCB decided that these industries should change to clean fuel (oil or gas) to reduce the particulate emission load from their operations. The regulatory frameworks for these changes were i) Regulating fuel quality (use of oil or gas in place of coal as mandatory); ii) Stricter emission standard 150 mg/Nm³ for PM (the national standard was 1,200 mg/Nm³) was enacted by the WBPCB for boilers (=2t/hr steam generation capacity) and down-draft kilns. *Fuel conversion and mandatory use of cleaner fuel in those small-scale units reduced the emission from small scale industries by 98%.* The major contributor in medium and large-scale category was from CESC New Cossipur. Closing down of CESC New Cossipur (due to its vintage and derated capacity) has reduced the contribution from large and medium industries by 94%. The WBPCB also introduced stricter industrial siting policy and there was hardly and scope of addition of new industrial emission sources in following years. The benefit of 95% reduction of industrial emission is primarily offset by emergence of large-scale construction activities like construction of fly overs, large buildings and metro railways from middle of the last decade.

Vehicles are a dominant source of pollution in Kolkata and can remain a daunting challenge with growing motorization. Along with motorization, use of diesel has also increased in the city due to growth in the number of high mileage commercial vehicles and dieselization of the personal vehicle segment. This is not only contributing to the particulate and NO_x load in the city but also to the toxic risk as, according to the WHO, diesel emissions are classified as Class I carcinogens.

The contribution of vehicles to air pollution is expected to be significantly high. In 2005, ADB source apportionment study had reported that vehicles were responsible for 50 per cent of PM_{2.5} in KMA. Subsequently, a report released by Central Pollution Control Board in March 2015 computed the emissions from road transport in six mega cities in India. The emission inventory of road transport referred by CPCB in six mega city report states that that the road transport sector contributes almost 4.6 MT of particulate matter and 44.3 MT of NO_x per day in Kolkata. The emission data mentioned

above is being used till improved estimates are made available. About 45 per cent of NO_x and 32 per cent of particulate emissions are from use of diesel in city buses and vehicles.

Data on traffic count in eleven intersections in southern section, twenty two in central and 17 in northern sections of Kolkata, as available from the final report of the expert committee that was constituted by the National Green Tribunal for Kolkata, shows massive build-up of congestion during November 2014 (see *Table 1: Vehicles type distribution on road in different sections of Kolkata*).

Table 1: Vehicles type distribution on road in different sections of Kolkata

Kolkata	Southern area		Central area		Northern area	
	Traffic volume	(In per cent)	Traffic volume	(In per cent)	Traffic volume	(In per cent)
Private cars and taxis	265,987	45	788,058	58	267,347	39
Motor cycles and scooters	44,191	7	101,791	8	45,186	7
Buses	106,081	18	249,521	19	150,253	22
Mini- and midi-buses	22,194	4	48,657	4	28,230	4
Tram and trailers	14,391	2	25,240	2	12,264	2
Auto rickshaws	86,521	15	57,447	4	101,739	15
Heavy and light trucks	27,579	5	32,698	2	45,834	7
Van and others	28,841	5	45,108	3	40,125	6
Total	595,785	100	1,374,777	100	697,069	100

Note: 8 a.m. to 8 p.m. as on November 2014 (in passenger car units)

Source: Final Report of the Expert Committee constituted by the National Green Tribunal, Eastern India Bench, Kolkata

It is established that the strength of Kolkata is public transport, where approximately 88 per cent people are dependent on bus, tram, rail, metro, IPT, ferry etc. against only 12 per cent that are dependent on private vehicles like car and two-wheelers. In Kolkata 60 per cent of the trips have trip length of three–four km and it has a very vast network of streets and lanes that facilitate walking and movement of non-motorized modes. The compact structure of the city makes it more walkable and cycle-friendly. This is the inherent advantage that Kolkata needs to build on.

The unique advantage of Kolkata is its inherent link between zero emissions electric mobility with public transport systems that include network of metro rail and tramways. Both the systems have leveraged to move sizeable sections of daily trips to zero emissions modes. Tramways will need modernization, further strengthening, and network development to build on the unique advantage.

Roadside eateries, emission from diffused sources, trans-boundary emissions is also contributing to the deterioration of air quality in winter.

Several policy measures have already been implemented. Actions has also been initiated in connection to order of Hon'ble Eastern Bench of NGT in OA-33/ 2014/EZ, which are mostly provided in section 5 and considering the observations of Hon'ble Principal Bench of NGT in OA-681/2018, a comprehensive action programmes are provided in Tabular form in section 8 .

5. Actions already initiated with respect to Hon'ble Eastern Bench of NGT (National Green Tribunal) in case no in OA-33/ 2014/EZ

A. Traffic Management

(i) Phasing out/scrapping of commercial vehicles that are more than 15 years old.

Action Taken:

Transport Department has already issued an order restricting the plying of 15 years old commercial vehicles like Buses/Mini Buses/Meter Taxies and other commercial/transport vehicles for Kolkata Metropolitan Area (hereinafter referred as KMA) vide its order No.2827-WT/3M-86/2009 dated 13.08.2012.

Copy of the order No. 2827-WT/3M-86/2009 dated 13.08.2012 is annexed herewith and marked as Annexure 1.

The following actions have been taken by Transport Department for phasing out of commercial vehicles more than 15 years of age:

(a) The number of vehicles phased out as per the order of Hon'ble NGT is as follows:

Year	Number of vehicles phased out
Upto August, 2012	53,019
Sept, 2012-2013	6,088
2013-2014	5,979
2014-2015	7,866
2015-2016	11,321
2016-2017	12,145
2017-2018	14,568
2018(Till October)	2,904
TOTAL	1,13,890

This phasing out of vehicles is automatically done through e-Vahan Software managed by National Informatics Centre (NIC) by identifying and locking them in the data base itself to block any future transaction on account of these vehicles such as payment of taxes, renewal of permits, conduct of Certificate of Fitness etc. and this is an on-going process.

(b) No renewal of Stage Carriage/Goods Carriage/Contract Carriage permits is allowed for 15 years or more old commercial/transport vehicles falling within Kolkata

Metropolitan Area. State Transport Authority (STA), West Bengal and all Regional Transport Authorities (RTAs) and all Registration Authorities falling within KMA are implementing this aforesaid order.

- (c) No Certificate of Fitness or Re-registration is granted to any commercial/transport vehicle plying within the KMA which are more than 15 years old.
- (d) Bharat Stage-IV norms for Kolkata City have been implemented vide notification No. 2767-WT/T/3M-21/2012 dated 07.08.2012 read with order No.1643-WT/3M-38/2013 dated 26.04.2013 of Transport Department. These norms are applicable for all types of vehicle plying in Kolkata City except for the 4-wheeler transport vehicles plying on Inter State Permits or National Permits or All India Tourist Permits.

Following steps have been taken for the implementation of Bharat Stage-IV norms:

- (a) Only Bharat Stage-IV emission norm compliant vehicles are registered in the Kolkata Municipal Corporation (KMC) area and areas under Salt Lake and Lake Town Police Stations.
- (b) New permits are granted to only Bharat Stage-IV norms compliant vehicles for KMC areas and the areas under Salt Lake and Lake Town Police Stations.
- (c) Operation of goods carriage permits and contract carriage permits are allowed only to Bharat Stage-IV compliant vehicles for Kolkata Municipal Corporation Area and Salt Lake & Lake Town Police Stations areas.
- (d) The replacement of goods vehicles/buses and other transport vehicles is allowed by BS-IV compliant vehicles only.
- (e) Further, the Transport Department issued a notification vide No. 5958-WT/3M-10/2018 dated 31.12.2018 to phase out 15 year old commercial or transport vehicles and restricting entry of more than 15 year old commercial or transport vehicles. The details of the same are as follows:

Commercial or transport vehicles which are 15 year old from the date of initial registration, registered anywhere in the country, are hereby not allowed to enter the areas covered under the Police Commissionerates of Kolkata, Howrah, Bidhannagar and Barrackpore which include the twin cities of Kolkata and Howrah. This shall apply to all commercial or transport vehicles including trucks, trailers, buses, taxis etc.

The 15 year old commercial or transport vehicles registered within Kolkata Metropolitan Area, if found plying in violation of this Department's order No.2827-WT/3M-86/2009 dated 13.08.2012, shall be seized forthwith by the law enforcing authorities. The concerned Regional Transport Officer or Additional Regional Transport Officer, as the case may be, shall realise all unpaid taxes/other dues, initiate prosecution u/s 192 of the Motor Vehicles Act, 1988 and take necessary action for cancellation of registration and scrapping of these vehicles.

The 15 year old commercial or transport vehicles of this State which are registered outside Kolkata Metropolitan Area and operates under stage carriage/contract carriage/private service permits having routes passing through or with one terminal within cities of Kolkata and Howrah shall have to be replaced by eligible vehicles

within a period of six (6) months from the date of issue of this Notification subject to the conditions of operations laid in notification No. 3244-WT/8S-96/2014 dated 14.07.2017 issued by this Department.

Thus, the State Government has already taken effective steps for phasing out of 15 years old vehicles from operations in Kolkata and Howrah cities and to implement Bharat Stage-IV emission norms as per order of the Ministry of Road, Transport & Highways (MoRTH), Government of India.

(ii) Traffic re-engineering to remove congestion from densely populated/most frequented road stretches.

Action Taken:

(a) Integrated Automated Network system of Traffic Light Signals:

Kolkata Traffic Police has already undertaken various innovative measures for ensuring smooth circulation of traffic in the city of Kolkata:-

- i. Automation & up-gradation of traffic light signal through SIEMENS controller via GPRS network system are in operation. At present, most of the intersections are covered;
- ii. Introduction of SCADA (Supervisory control and data acquisition) software have been made in order to avoid congestion at any corridor, the traffic cycle time can be centrally modified from time to time as and when prevailing ground level situation demands. The real-time control logic or controller calculations are performed by networked modules which connect to the field sensors and actuators. In particular, coordinated traffic lights that create green waves along major arterials are an increasingly used strategy to reduce travel times.
- iii. In this regard, to run green corridor smoothly and monitored centrally Kolkata Police have installed SIEMENS controller with GPRS network system in individual signal for betterment of signalling system. The fully automatic signalling system has already covered almost total Kolkata Police jurisdiction to maintain a green wave harmony.
- iv. Kolkata Traffic Police Control Room uses this system to control all the light signals in the city. It aims to provide drivers with a faster, safer trip on roads by optimizing the use of available capacity, efficiently managing incidents and any special events;
- v. This SCADA software maintains a signal harmony throughout the intersections and corridors with the help of PLC (network based) device.

(b) Smart Variable Message Signs (VMS):

Smart Variable Message Signs (VMS) are digital road signs. They are used by Kolkata police as effective medium to inform car drivers about specific temporary events and ground level real-time traffic condition. The signs are

often linked to a manned control centre via a local network. Smart VMS is an integral part of Intelligent Transportation Systems.

The Smart VMS helps the commuters to know the expected travel time, disseminate traffic safety messages, provides information to drivers regarding change required in travelling speed, change lanes, divert to a different route or simply be aware of a change in current or future traffic conditions, drivers can take informed decision in selecting appropriate routes & avoid congestion, provides updates about weather conditions, prevailing real time ground level traffic scenario, road repairing works etc. Kolkata police has already installed 35 VMS in the city and further, 2 VMS are in the process of installation.

(c) Steps for Ensuring Proper Traffic Management:

- i. Bus Bays are made from at a stretch from E M Bypass / Dhapa Road crossing to E.M.Bypass/ Narkeldanga Main Road crossing;
- ii. Road marking is prominently made to regulate traffic;
- iii. Spring posts are fixed on BM Road and Chaulpatty Road, N M Road, SukantaSarani etc. as road dividers;
- iv. Prismatic guard rails are used for Speed breaker at night;
- v. Adequate number of normal guard rails are used for free flow of traffic management as well pedestrian management;
- vi. Adequate number of Mandatory traffic signs are fixed for traffic awareness and enforcement;
- vii. Many awareness programmes like Road Safety Week, Karmoyog and SDSL are organised regularly;
- viii. Adequate number of informatory traffic sign board, beat board are fixed whenever required for benefit of public;
- ix. New Traffic signals installed at E M By pass and Tapuriaghata Crossing.

(iii) Traffic signals may be replaced with circular round about for removal of congestion from densely populated/most frequented road stretches.

Action Taken:

(a) Synchronization of Traffic Signals (Green Channel).

The Traffic Signal synchronization concept ensures less waiting time for vehicles in stop line which in turn reduces gas emission from vehicle. In particular, coordinated traffic lights that create green waves along major arterials are an increasingly used strategy to reduce travelling time. It is noticed that the introduction of a green wave could potentially lower the emissions of the considered air pollutants by 10 % to 40 % in the most favourable conditions, depending on traffic flow and signal timing settings. For ensuring smooth functioning of green corridor and better surveillance centrally, Kolkata Police has installed SIEMENS controller with GPRS network system in individual signal for betterment of signaling system & maintain a green wave harmony.

(b) Google Traffic Pilot Project.

Kolkata Traffic Police has introduced the Google Traffic Pilot Project to integrate real time traffic situation with Google traffic virtual condition so that the traffic signal changes strategically according to Google Traffic situation instead of pre-programmed configuration. This helps to discharge/release the vehicles based on prevailing traffic scenario & road dynamics, reducing the halting time of vehicles & consequently minimizes air pollution arising out of disruption.

(c) Further Technological Interventions

The following measures are undertaken by Kolkata Traffic Police to improve the flow of traffic in Kolkata:-

1. The MLCP (Multi Layered Car Parking) project underneath Gariahat Flyover has already been approved which shall alleviate the pollution caused by parking related issues.
2. Introduction of camera based citation prosecutions & instant communication of information to the violators through SMS alerts is another innovative move by Kolkata Traffic Police.
3. To cater to the needs of the fast paced dynamic environment the existing signaling system has been completely revamped & substituted with automated synchronized signaling across the city.
4. Road Users are made conversant about the real time ground level scenario & updates on travel time through state of the smart VMS which not only is informative in nature but sensitizes the pedestrians about their rights & responsibilities.
5. The enforcement efforts of Kolkata Traffic Police officers are further bolstered with the introduction of E-challan system of prosecuting violators.
6. Implementation of Green Corridor system to provide unimpeded passage to KARMA ambulance during emergency
7. Use of body cameras by sergeants ensures more transparency during public interactions.
8. Better traffic surveillance system could be ensured through centralized & revamped Traffic Control Room & use of sophisticated cameras for effective enforcement.
9. Speed signages are installed for inculcating better road etiquette & responsible driving.
10. Officers & men are deployed at vital intersections to ensure that smooth flow of traffic is maintained without disruption. & the ones emitting pollution are prosecuted.
11. Kolkata Traffic Police on its part is striving towards better traffic management so as to obliterate any congestion which certainly lead towards harassment of the masses and increased fuel consumption and pollution by the vehicles. In addition, mass education awareness programmes such as 'Safe Drive, Save Life' campaign, Jaago Kolkata etc. are organised to inculcate more road discipline.
12. Kolkata Traffic Police is consistently focused on improving on the 4 'E' for better traffic management i.e., Education, Enforcement, Engineering & Emergency Response, by harnessing the use of modern technology to ensure a faster & safer experience for the commuters on roads. To this end

& with a view to minimizing the effects of air pollution in the city of Kolkata, our officers frequently against infringement of pollution norms in accordance with law. Moreover, it shall also be imperative to mention that concerted efforts are undertaken to combat this menace through the use of modern equipment in a systematic & scientific manner.

(iv) Underpasses may be constructed in major crossings where large scale crossover of pedestrian takes place.

Action Taken:

- (a) KMDA has already constructed MAA flyover in the year 2015, East bound ramp of MAA flyover in 2016, and West bound ramp of MAA flyover is under construction and will be completed shortly. The flyover has been constructed to lessen the traffic congestion, reducing considerably the waiting time of the vehicles and lessening the air pollution at intersection points.
- (b) Kamalgazi flyover has been constructed in the year 2016. This flyover has been constructed to lessen the traffic congestion, reducing considerably the waiting time of the vehicles and lessening the air pollution at intersection points.
- (c) KMDA has also constructed Garden Reach Flyover from Brooklyn More off Circular Garden Reach Road to Remount Road near Majherhat Bridge for reducing the Traffic Congestion on the Circular Garden Reach Road, resulting reduction in the Air Pollution due to less waiting time of the vehicles. The said Flyover was thrown open to vehicular traffic in March, 2018.
- (d) Public Works Department, West Bengal, has already constructed flyovers on VIP Road and Diamond Harbor Road at Taratola to reduce the traffic congestions.
- (e) Kolkata Metropolitan Development Authority has already constructed four underpasses at i) Science City, ii) Beliaghata Connector, iii) Kadapara Connector on EM Bypass. **The Beliaghata & Kadapara Underpasses were inaugurated in September, 2018.** By constructing these underpasses the waiting time of the vehicles at road intersection of these locations has reduced significantly resulting less emission of burnt Fossil Fuel from the moving vehicles thus reducing the Air Pollution.
- (f) Besides, the feasibility study cum DPR preparation proposed underpass at Chingrighata-Salt Lake Broadway crossing has also been taken up by KMDA to reduce the traffic congestion and for safe crossover of the pedestrian.
- (g) KMDA has also initiated tender for feasibility cum DPR preparation for proposed underpass at Ruby intersection of EM Bypass to reduce the congestion which in turn will lessen the waiting time of the vehicles thereby reducing the air pollution from the emission of the vehicles.
- (h) PWD, has already constructed four pedestrian underpass on VIP Road at important crossing points of Bangur, Kestopur, JoraMandir and Raghunathpur. Underpasses which are under construction are at the following four locations namely, Golaghata, Sribhumi, Kaikhali and Teghoria.
- (i) Also, one pedestrian underpass has been constructed on Raja S.C. Mallick road near 8B Bus terminus of Jadavpur.

- (v) **Strict enforcement of possession of valid PUC Certificate in all the vehicles plying within Kolkata and Howrah city and imposition of penalty for noncompliance of the same.**

Action Taken:

- (a) Transport Department operates a 'Remote Sensing Device (RSD)' fitted vehicle which can assess the pollution emission level of moving vehicles remotely. This vehicle is regularly deployed in different parts of Kolkata to check the emission level of passing vehicles on road and subsequently, notices are issued by the office of Director, Transport Directorate to the defaulting vehicles. A fine of Rs.1000/- is imposed for the first offence and Rs.2000/- for each of subsequent offences. Number of vehicles which have been checked for pollution and issued notices from 2015-2016 onwards is as follows:-

Year	Vehicles checked	Notice issued	Fines realised (in Rs.)
2015-16	7,64,251	49,155	77,72,780
2016-17	7,63,257	50,155	52,29,500
2017-18	7,31,243	51,989	54,20,725
2018(Apr. to Oct.)	4,42,512	28,892	30,12,475
Total	27,01,533	1,80,191	2,14,35,480

- (b) Police authorities in Kolkata and Howrah cities regularly check the PUC Certificates of the vehicles and do prosecution in case of violations. A total of 1,35,88 number of vehicles have been prosecuted from 2015 till date. The year-wise details of vehicles prosecuted is given as under:

Sl. No.	Year	Number of prosecutions
1.	2015	36,532
2.	2016	51,407
3.	2017	30,252
4.	2018(till 30.11.2018)	17,797
	Total	1,35,988

- (c) Anti-Pollution Cell, Kolkata Traffic Police also checks pollution through thirty (30) nos. AVL SMOKE EMISSION DETECTING DEVICE.
- (d) They have sensitized ground level officers to remain alert & maintaining zero tolerances measures to sustain the enforcement of prosecution against contravention of pollution norms beyond the permissible limit on a consistent basis. Large number of prosecutions have been enforced against violation of PUC

norms & notice for renewal of PUC (Pollution under Control Certificate) shall corroborate the unrelenting action taken by Kolkata Traffic Police.

- (e) It shall be pertinent to mention that to combat air pollution in the city, there is a separate Anti-Pollution Cell under Traffic Department, Kolkata which is entrusted with the responsibility of ensuring that zero tolerances measures are maintained & enforcement made against contravention of pollution norms in accordance with law. It comprises of handpicked officers & men & raids are frequently organized at some of the violation prone stretches of the city equipped with modern & scientific Smoke Emission Detection Device.
- (f) Prosecution Figures of Air Pollution enforced by Anti-Pollution Cell, Kolkata Traffic Police (01.01.2015-30.11.2018) with the help of thirty (30) nos. AVL SMOKE EMISSION DETECTING DEVICE as well as manual procedure-

PERIOD	NOTICE	Prosecutions u/s 116(6) of CMVR, 1989 or section 190(2) of MV Act, 1988 against failure to comply with the Notice.	Prosecutions u/s 115(7) of CMVR, 1989 or section 179(1) of MV Act, 1988 for non-possession of PUC Certificate.
2015	2,439	1,563	22,985
2016	2,205	1,767	31,890
2017	11,587	9,505	12,277
2018	9,532	7,296	5,664
TOTAL	25,763	20,131	72,816

- (g) Restrictions on Entry of non Bharat Stage –IV transport vehicles registered outside the jurisdiction of Kolkata and Howrah.
- (i) As per the direction of Hon’ble NGT on 11th August 2016 regarding restriction of plying of non BS-IV vehicle without a valid PUC certificate or its stay within the city limits for a period of not more than seven days, Transport Department has issued a notification No. 3244-WT/8S-96/2014 dated 14.07.2017 directing the police authorities to act in strict compliance thereof.
- (ii) The Transport Department is also considering the feasibility of installation of Automatic Number Plate Reader (ANPR) cameras at all important entry points of Kolkata and Howrah in consultation with Kolkata and Howrah Police authorities. These cameras will be interconnected to centralized server and they will collect the registration details of the vehicles entering the cities automatically. This central server shall also be linked to e-Vahan data base. This interconnected system will provide the details of the vehicles entering the city limits, record the duration of stay and also help in enforcement of order of Hon’ble NGT by identifying the over staying vehicles.
- (vi) Operationalisation of E-Rickshaws and E-Carts as the mode of transport for last mile connectivity.**

Action Taken:

- (a) Government of West Bengal, has decided to introduce electric buses in Kolkata to reduce vehicular emission levels. For supply of 80 electric buses order has been given to M/s Tata Motors. 2 electric buses have already arrived in Kolkata. Rest electric buses are expected to be delivered by April, 2019. .
- (b) All the 3-wheelers Auto operating in Kolkata City are 4-Stroke LPG Autos (which fall within category of green vehicles) as per the order of the Hon'ble High Court, Kolkata.
- (c) E-Rickshaws are plying in Howrah City and Salt Lake areas and are registered by Transport Department. These Autos/E-Rickshaws are providing last mile connectivity and reducing the auto emissions at the fringe of Kolkata.

(vii) Strict enforcement of No Parking Rules and compounding of offences committed.

Action Taken:

Kolkata Traffic Police maintains zero tolerance measures to ensure that the main thoroughfare remains free from unauthorized encroachment & parking. The officers & men regularly patrol the vulnerable areas to ensure that flow of vehicular & pedestrian traffic remains unimpeded & unhindered. There are as many as twenty-six (26) Wrecker Vans which are deployed in different parts of the city of Kolkata and are used for towing vehicles causing obstruction to the free flow of traffic.

PERIOD	CITATION	COMPOUND	WRECKER VAN	CLAMP
01.01.2015-30.11.2018	1726689	2337280	213398	218337

(viii) Construction of multi-layered or underground car parking space.

(ix) KMC and HMC should insist on either underground or multitier parking arrangement within the premises while sanctioning building plans for Malls etc.

Action Taken:

- (a) Kolkata Municipal Corporation (KMC) has constructed underground & multi-layered car parking at New Market and Rawdon St. respectively.

KMC encourages Multi level Car parking including mechanical car parking to avoid parking on street for smooth vehicular movement. Around 5000 Multi level car parking has been sanctioned and 91,600 Sq.M. of covered Car parking space has been generated in different Boroughs of KMC.

Post 2016, Building plans were sanctioned at housing projects at Shalimar, Foreshore Road having the entire parking facility at ground level, and it is further stated that all high rise construction coming in Howrah, HMC insists for having multi-tier car parking spaces in all such buildings.

(x) Construction of pavements for all city streets to increase space for smooth traffic movement.

Action Taken:

- (a) KMC during the last couple of years developed approximately 720 K.M. pavement to control the dust pollution.

- (b) HMC constructed pavement for all city streets to increase space for smooth traffic movement. HMC also have taken construction of new pavement and have repaired the existing ones. Total 8.5 KM of pavements have been constructed post 2016 as per order of Hon'ble N.G.T, out of total existing pavement of 11.5 KM

After 2016, pavement have been constructed at Foreshore Road, Drainage Canal Road and some portions of East-West Road. Pavements were also constructed at locations of Salkia, Howrah Maidan area, Shibpur/Nabanna area etc.

(xi) Provision of cycling and walk ways throughout the two cities.

Action Taken:

- (a) Kolkata Metropolitan Development Authority (KMDA) constructed Dakshineswar Skywalk which was inaugurated on 05.11.2018. This will lessen the Air Pollution during movement of Traffic below the Skywalk. As a result of construction of the Skywalk, the Pilgrims are moving at the elevated level of the Skywalk, thereby reducing the waiting time of vehicles which has also significantly reduced the Air Pollution due to less emission of burnt Fossil Fuel from the moving vehicles.

- (b) KMDA has also floated tender for foot overbridge near Captain's Bherry, Chingrighata, Patuli which will reduce air pollution. The said projects will be completed by September, 2019.

C. Streamlining efficiency of Auto Emission Testing Centres

(i) Number and operational aspects of the AETCs need to be relooked by the State Transport Department enhancement / betterment.

Action Taken:

There are 103 operational AETCs in Kolkata and Howrah cities. The centres are renewed yearly after obtaining clearance from West Bengal Pollution Control Board(WBPCB).In addition, there are 11(Eleven) Auto Emission Testing Centres of West Bengal Transport Corporation (WBTC) and they will also be allowed to conduct pollution check of private vehicles as well. This will also increase the number of AETCs in the city.

Certificate of Fitness for commercial/transport vehicles remains valid for one year. All vehicles have to come to Regional Transport Office (RTO)/ Assistant Regional Transport Office (ARTO) offices to get their Certificate of Fitness every year.Holding of a valid Pollution under Control (PUC) Certificate is mandatory for grant of 'Certificate of Fitness'. All the RTOs/ARTOs are mandatorily implementing the same.

- (ii) **AETCs should be connected to a centralized server for better monitoring and enforcement.**

Action Taken:

A notification No. 527(E) dated 06.06.2018 has been issued by the MoRTH, Government of India, amending the Central Motor Vehicles Rules, 1989 which states that “*The emission results obtained during testing as per clause (i) or clause (ii) above, shall be electronically uploaded through online process to the State Register of Motor Vehicles or the Central Register of Motor Vehicles, as the case may be, as laid down in Document No. MoRTH/CMVR/TAP-115/116 as amended from time to time.....*”.

As per the details given therein this system has to be implemented by 1st April, 2019. Government of West Bengal has completed preparatory steps for integration and linking of AETCs with e-Vahan data base. Further work in this regard is being done for integration of AETC approved machines and e-Vahan data base with the help of National Informatics Centre.

In respect of West Bengal including Kolkata and Howrah cities, it is proposed that integration of AETC is expected to be implemented by 01.04.2019. Once this system is implemented, vehicles of non-compliant emission standards or not holding valid Pollution under Control Certificate can be monitored automatically through the e-vahan database itself.

- (iii) Following the order of the Hon’ble Tribunal dated 19 January 2016, the WBPCB has already conducted surprise raids in February 2016. Surprise inspection of the AETCs to check the calibration of the emission testing equipment and proper functioning of the AETCs, should be continued. Strict penalties to be imposed on AETCs for violation under the relevant Acts and Rules by the authority.

Action Taken:

WBPCB regularly performs inspections of these AETC centres and for the period from January 2017 to November, 2018 WBPCB has inspected 226 AETCs.

Details of the same as follows:-

District	No. of AETC inspected
Kolkata	88
Howrah	37
North 24 Parganas	18
South 24 Parganas	22
Hooghly	43
Nadia	18
Total	226

D. Other recommendations.

(i) Open burning of coal and wood in Kolkata and Howrah should be stopped

Action Taken:

- (a) KMC has taken necessary steps in this regard. Necessary orders in this regards have been issued.
- (b) HMC imposed a ban against open burning of coal. It is not generally seen in the HMC area, though all the Councillors have been requested to keep strict vigilance over the said issue.

(iii) Strict implementation of direction issued by Department of Environment, Govt. of West Bengal vide no. EN/3170/T-IV-7/001/2009 dated 10 December 2009 by the concerned Municipal Authorities (KMC and HMC) and all concerned Government Departments for controlling air pollution.

Action Taken:

- (a) KMC stated that all materials transported for road construction / building construction / any other construction are transported in covered condition.
- (b) No construction materials are left uncovered at roadside.
- (c) Wrap construction area / building in geotextile fabric, installing dust barrier or other actions as appropriate for the location is being undertaken.
- (d) Sprinkling of water prior to the levelling or any other earth movement activities to keep the soil moist throughout the process is being done. Water is applied to maintain soils in a visible damp and crusted condition for temporary stabilization.
- (e) Disposal of debris from the construction site is done at the earliest in consultation with the local authority following proper environmental management practice.
- (f) Prepared amendment of Building Rules for inclusion of statutory undertaking from the owners of the building.
- (g) KMC issued notices to owner of construction site in different Boroughs to maintain environmental norms.
- (h) Follow up actions were taken, stop work notice are issued to different construction site.
- (i) KMC encourage sanction of Green Building and still date seventeen (17) number of Green Building has been sanctioned in recent past.

(iv) Complete banning of open burning of solid waste including dry leaves in the city areas.

Action Taken:

- (a) KMC has banned open burning of tyre and other solid waste including dry leaves in Kolkata City by issuing Circulars / Orders to all Deputy Directors and Assistant Directors of SWM Department, KMC for implementation of the banning of open burning of tyre, dry leaves alongside the roads and streets and slum areas and to keep strict vigil to implement the same.
- (b) In respect of open burning of solid wastes including dry leaves, HMC imposed a complete ban within the city of Howrah and also awareness program are being taken by HMC. The Conservancy Department under the HMC collects all solid waste including dry leaves and all are disposed at Belgachia Trenching Ground. Moreover, awareness are generated by

the staffs of Health Department and Conservancy Department amongst the citizen of Howrah.

(v) Plantation of new leafy saplings in the available space in different parts of the twin cities to mitigate the level of air pollution

Action Taken:

- (a) KMC stated that plantation of around 15000 new leafy saplings have been planted within the jurisdiction of Kolkata in last two years to mitigate the air pollution. In addition to control dust, about 53000 sq.m. (Approx.) roadside gardens have been developed by providing tree plantation / landscaping / vegetation cover. In order to control the pollution and improve the air quality 21 k.m. hedges have been planted at median strip along the city roads.
- (b) KMDA has also planted saplings on the flanks of the East Metropolitan Bypass from HUDCO more of Ultadanga to Garia-dhalai Bridge for beautification as well as containment of the air pollution.
- (c) HMC stated that in respect of plantation of new leafy saplings within the available space of Howrah City to mitigate the level of air pollution saplings are being planted at Foreshore Road (1.75 kilometers) – tree and hedges- 22,000. Drainage Canal Road (3.20 kilometers) – tree and hedges – 18,000, G.T. Road (13 kilometers) – 300 saplings and in 250 parks about 50,000 tree and hedges saplings are being planted.

(v) Sprinkling of water daily at important traffic junctions of the twin cities of Kolkata and Howrah during the peak winter months (October to February) by Kolkata Municipal Corporation and Howrah Municipal Corporation to mitigate suspension of particulate matters to the air

Action Taken:

- (a) KMC does sprinkling of water on small trees and shrubs planted at road dividers, road side gardens, sprinkling & washing are done at the following locations: From Ultadanga railway station to Muchibazar, Shyambazar to Esplanade, from Mullick Bazar to Chowringhee along Park Street, New Alipore Road Prince Anwar Shah Road, along Raja S. C. Mullick Road from Dhakuria Bridge to Sukanta Setu, washing of roads surrounding CMO building of KMC. Sprinkling of water are also done at RCTC Helipad, Behala Flying Club Helipad & their surroundings.
- (b) HMC does sprinkling of water daily with sprinkling machine and it is deployed once a day to cover important location like Kazi Para, Benepole Junction and Natun Rasta, Chatterjee Para and Shahanpur crossing.

(vi) Air pollution problem of Kolkata and Howrah twin city has become complex due to multiplicity and complexity of air polluting sources (e.g. industries, automobiles, generator sets, domestic fuel burning, road side dusts, construction activities, etc.). The proposed **Source Apportionment Study, which would be primarily based on measurements and tracking down the sources through receptor modelling, would help in identifying the sources and extent of their contribution in deteriorating the air quality of twin city Kolkata and Howrah. Once results of Source Apportionment Study are available, a cost effective integrated approach for managing air quality would be evolved including (a) identification of emission sources; (b) assessment of extent of contribution**

of these sources on ambient environment; (c) prioritizing the sources that need to be tackled; (d) evaluate various options for controlling the sources with regard to feasibility and economic viability; and (e) formulation and implementation of most appropriate action plans for managing air quality of Kolkata & Howrah twin city.”

Action Taken:

NEERI (National Environmental Engineering Research Institute), Nagpur which is the pioneer Institute in this field has been engaged for conducting the Source Apportionment Study in Kolkata and Howrah. NEERI has submitted an interim report which is annexed herewith. The final report from NEERI would be made available to WBPCB by 31st March, 2019.

6. Relationship between the actions initiated in case no in OA-33/ 2014/EZ and OA-681/2018 in order dated 08.10.2018

The order dated 08.10.2018 points out in para 17 that the actions taken/to be taken in both cases are expected to supplement each other for achieving the overall objective at macro level. Accordingly, this CAP consists of the action programmes already initiated in connection with case number OA 33/2014/EZ for improvement of air quality.

7. Establishing the linkage between the air quality improvement targets and the proposed / actions

As mentioned in section 4 above, setting the quantifiable targets for improvement of air quality is expected to be made possible after completion of source apportionment study by NEERI. In absence of the same, the removal efficiencies of proposed action programmes used in the Report by Sharma and Dikhsit (2016)¹ has been used as referral values, while formulating this CAP and the cumulative impacts of the actions proposed in this draft CAP is expected to improve the air quality significantly in winter months, which eventually shall improve the air quality in terms of NAAQS. However, controlling the two governing factors: *transboundary pollution and metereological changes* are beyond the scope of any intervention, by the state government.

¹ Reference:

Comprehensive Study on Air Pollution and Green House Gases (GHGs) in Delhi by, Prof Mukesh Sharma; PhD and Prof Onkar Dikshit; Professors, Department of Civil Engineering , Indian Institute of Technology Kanpur, Kanpur- 208016 (Final Report: Air Pollution component) , Submitted to Department of Environment Government of National Capital Territory of Delhi and Delhi Pollution Control Committee, Delhi, 2016

8. Proposed action programmes under Comprehensive Action Plan in Connection to observations of Hon'ble Principal Bench of NGT in OA-681/2018 in order dated 08.10.2018
(With Financial Outlay)

8.1 Air quality monitoring

Sl. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Short-term priority action				
8.1.1	<p>The WBPCB has already made all semi-automatic air monitoring stations functional with effect from 01.01.2016, which were in operation till 2011. These monitoring stations operate in such a way that the air quality of Kolkata is being monitored every day.</p> <p>Additional five CAAQMS are being set up to cover entire Kolkata city. The locations are –1) Administrative Training Institute, Salt Lake, 2) Rabindra Sarovar, Kolkata, 3) Birla Industrial and Technology Museum, Kolkata, 4) Science City, Kolkata and 5) Indian Association for the Cultivation of Sciences, Kolkata</p>	West Bengal Department of Environment (WB DoE), West Bengal Pollution Control Board (WBPCB)	01.04.2019	Cost of five CAAQMs are estimated to be Rs. 6,79,66,463/-
Medium to long-term action				
8.1.2	<p>Research studies including air pollution inventory, source apportionment, health impact studies, exposure impacts and other relevant studies: Source inventory and source apportionment studies commissioned to NEERI.</p> <p>NEERI (National Environmental Engineering Research Institute), Nagpur</p>	WBPCB, WB DoE	The final report from NEERI would be made available to WBPCB by 31 st March, 2019	Cost is estimated to be Two crore thirty three lakh only

<p>which is the pioneer Institute in this field has been engaged for conducting the Source Apportionment Study in Kolkata and Howrah. NEERI has submitted an interim report.</p> <p>Government may also initiate research works or scientific studies by academic or research institutions. Expertise will be sought from various institutions to develop protocols for assessment of the research proposals.</p>			
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8.2 Action to reduce vehicular emissions

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
EMISSION AND FUEL QUALITY FOR NEW VEHICLES				
Medium-term action				
8.2.1	<p>Introduction of battery-operated vehicles in targeted segments of two-wheelers, para-transit (three-wheelers and taxis), buses, light commercial vehicles and delivery fleet.</p> <p>Linking up electric mobility with public transport strategy. Implement electric bus transport strategy (with procurement and deployment strategy) Along with infrastructure for charging and battery disposal.</p>	WB Transport Department Power Distribution Companies,	<p>April 2019</p> <p>80 buses shall be introduced over a period of time. Expected time period is April 2019 depending upon the availability of the buses from the vendor, who has been entrusted with the job.</p> <p>Short note on status of action taken in this regard is has been provided in section 5 A (vi)</p>	<p>State has already issued order for procurement of 80 electric buses with 15 slow charging and 5 fast chargers for 9 m E buses as well as 12 m E buses.</p> <p>The total cost of buses and charging stations are 69.37 crore (27.75.crore by WB govt and 41.62 Crore by Central Government through FAME scheme.)</p>

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
	<p>Identification and notification of commercial areas with high footfalls and good public transport connectivity that can be pedestrianized, supported by zero emission battery-operated vehicles: Priority may be accorded to battery-operated para-transit as feeders and for last mile connectivity in such areas. Ensure organized deployment to reduce congestion.</p> <p>Provide a fiscal strategy to promote electric mobility.</p>			
8.2.2	Restriction on plying and phasing out of 15 years old commercial driven vehicles		<p>Action has been initiated. This is a continuous process and actions already taken are provided in section 5 A (i) A order has been issued on 31.12.2018 for prohibiting commercial or transport vehicles to enter the area covered under Police Commisionerate of Howrah, Bidhan nagar and Barrackpore – Annexure 2</p>	No separate budget is allocated because the same is carried out as routine work.
8.2.3	Expanding LPG dispensing for vehicles: Expanding the infrastructure for delivery and use of LPG/CNG/battery operated three wheelers.	West Bengal State Government, MOP NG	July 2019	

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
ON-ROAD VEHICLES				
8.2.4	Auditing and reform of Pollution under control (PUC) certification centres Link PUC centres to a centralized server, ensuring real-time transmission of data and minimal human intervention	WB Transport Department	April 2019 Status of action initiated has been provided in 5 C (ii)	Rs 15 crore for installation of camera etc
8.2.5	Enforcement of law against visibly polluting vehicles: Impose penalty, launch extensive awareness drive against polluting vehicles.	WB Transport Department	Immediate (Action has been initiated and are being implemented by Kolkata Police Refer to section 5 A v ©-(e)	No separate budget is allocated because the same is carried out as routine work.
8.2.6	Monitoring on vehicle fitness	WB Transport Department	In implementation stage (Note on actions taken are provided in section 5 A (i)(b)-(c) and 5 C (i)	No separate budget is allocated as the same is carried out as routine work.
TRANSIT TRUCK TRAFFIC				
8.2.7	Check overloading: Expedited installation of weigh-in-motion bridges and machines (WIM) at entry points to Kolkata, Howrah and the KMA area. As per the CMVR, a penalty of 10 times the applicable rate for overloaded vehicles is applicable.	WB Transport Department Kolkata and West Bengal Traffic Police, Kolkata Municipal Corporation (KMC) and	Target deadline: May 2019 (But the progress is facing impediments due to litigation.)	Will be done in PPP mode.

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
		other municipal/urban local governments within KMA area and NHAI (as applicable)		
Medium- to long-term action				
8.2.8	Inland Waterways Authority of India has started bulk transport of coal through waterways	Inland Waterways Authority of India, Railways, KoPT	Initiated 7,70,000 MT of coal has been transported through NW-1 in FY: 17-18 6,88,000 MT of coal has been transported through NW-1 in FY: 19-18	

8.3 Strategies to reduce vehicle numbers on roads

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
PUBLIC TRANSPORT STRATEGIES				
Short-term priority action				
8.3.1	Depot spaces should be rationalized to ensure more efficient utilization. Multi-modal, multi-use bus depots to be developed to provide high-class bus services and terminal experience to	West Bengal Transport Department	September 2020	100 crore for retrofitting of diesel buses to CNG buses And 50 crore charging stations

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
	passengers. Should include well-equipped maintenance workshops. Charging stations shall be set up.			
8.3.2	Enforcement of bus lanes and keeping them free from obstruction and encroachment.	Kolkata Police	January 2019 Actions initiated. List of road stretches are provided in Annexure 3	
8.3.3	Ensuring integration of existing metro system with bus services. Rites is carrying out a study. Optimize fleet utilization of tramways and increase service frequency	West Bengal Transport Corporation, Metro Railway Authority	June 2019	Can be finalized after RITEs study

Medium- to long-term action			Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
8.3.4	Improvement in bus numbers and services. Increase size and service delivery of bus fleet, along with fuel efficiency and pollution reduction	West Bengal Transport Corporation, WB Transport Department	June 2019	Transport Department shall provide cost as per the existing plan of action.

8.3.5	Need route rationalization: Improvement of availability by rationalizing routes and fleet enhancement with requisite modification.	WB Trans port Depar tment	June 2019	Will be done from existing budget
8.3.6	Reforming of bus operations—modernize fleet and the crew scheduling process, install and operate GPS units on buses, and create a traffic control cell for monitoring bus movement.	WB Trans port Depar tment	June 2019	
8.3.7	IT system in buses, bus-stops and control centre and passenger information systems for reliability of bus services and service monitoring.	WB Trans port Depar tment , Kolka ta Traffi c Police	June 2019 Action has been initiated and are being implemented by Kolkata Police. Refer to section 5 A iii	50 crore

8.4 Parking policy to reduce congestion and pollution

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
8.4.1	Removal of free parking zone,	WB DoT, Kolkata Municipal Corporation (KMC)	Action has been already initiated and the list of stretches, where free car parking has been removed in provided in Annexure 4	No separate cost is allocated as it is being done as part of routine work

		and other municipal or urban local governments within KMA area, KMDA, Kolkata and KMA traffic police, WB Department of Urban Development		
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8.5 Traffic management

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial outlay
8.5.1	Introduce early alarm system during traffic congestion for the benefit of commuters on major routes, to facilitate route diversion.	Kolkata Police ,	Action has been initiated and are being implemented by Kolkata Police Refer to section 5 A iii	Kolkata Police has spent/is spending Rs 525239125.00 (Fifty two crore fifty two lakh thrity nine thousand and one twenty five only) for better traffic management resulting in to less emission from automobiles.
8.5.2	Synchronize traffic movements or introduce intelligent traffic systems for lane-driving.		Action has been initiated and are being implemented by Kolkata Police Refer to section 5 A iii	
8.5.3	Electronic monitoring of traffic violations.		Action has been initiated and are being implemented by Kolkata Police Refer to section 5 A iii	

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial outlay
8.5.4	Examine existing framework for removing broken down buses or trucks from roads and create a system for speedy removal and ensuring minimal disruption to traffic from such buses or trucks.	Kolkata Municipal Corporation (KMC), WB	A system is in place with. 26 Wrecker Vans are deployed in the city.	
8.5.5	Conducting audit of traffic intersections and install functional traffic signals at all major intersections in the KMC area.	DoT, WB PWD and other municipal/urban local governments within KMA area, Kolkata and KMA traffic police, WB Department of Urban Development	Action initiated	
8.5.6	Conducting a review of traffic signaling systems at all intersections in particular areas traffic hotspots and bring requisite changes to reflect the traffic movement pattern at the intersections.	other municipal/urban local governments within KMA area, Kolkata and KMA traffic police, WB Department of Urban Development	June 2019	
8.5.7	Enforcement of lane driving through heavy fining	Kolkata traffic police	Actions initiated. List of road stretches are provided in Annexure 5	

8.6 Power plants and industries

S. No.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Mid-term priority action				
8.6.1	Implementation of new thermal power plant standards in CESC Southern –a power plant within KMC by an early date.	WBPCB, Department of Power	March 2022 (As per CPCB letter B-33014/07/2017-18/IPC-II/TPP dated 11.12.2017)	

INDUSTRIES				
Short-term priority action				
8.6.2	Enforcement and implementation of SO _x and NO _x standards notified by MoEF&CC for 35 categories of industries as applicable.	WBPC B	March 2019	No separate budget is allocated as the same is carried out as routine work
8.6.3	Strict enforcement of air pollution control measures in all industries includes those located in unauthorized areas.		March 2019	No separate budget is allocated as the same is carried out as routine work
INCINERATORS				
Medium- to long-term action				
8.6.3	Implementation of emission norms for incinerators.	WBPC B and WB DoE	September 2019	No separate budget is allocated as the same is carried out as routine work

8.7 Generator sets

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Short-term priority action				
8.7.1	Ensuring only those DG sets that meet the standards are allowed to operate.	KMC, Kolkata Police, WBPCB ,	Immediate	No separate budget is allocated as the same is carried out as routine work
8.7.2	Only approved fuel should be allowed.		Immediate	No separate budget is allocated as the same is carried out as routine work

8.8 Open burning (including solid waste and agricultural residues)

S. No.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Short-term priority action				
8.8.1	Enforcing a complete ban on garbage burning in the entire KMA region. Evolve a monitoring mechanism for this. Take stringent action against open burning of biomass, leaves and tyres etc. to control such activities.	Kolkata Municipal Corporation KMC, and other municipal or urban local governments within KMA area	Immediate	No separate budget is allocated as the same is carried out as routine work
8.8.2	Ensuring proper collection of horticulture waste (biomass) and composting-cum-gardening approach; municipal zonal offices should be responsible for controlling burning of leaves and garbage on roads or parks. All horticulture agencies should have compost pits in parks.	Municipal bodies and other park owning bodies like KMC,	January 2019	No separate budget is allocated as the same is carried out as routine work
8.8.3.	Finding out the possibilities of burning of agricultural waste in areas which are contributing to air pollution in Kolkata and prevention plan, thereof,	Agriculture Department, Kolkata and West Bengal Police, District administration	July 2019	5 crore for incentivizing for not burning agri-waste and also for awareness generation

S. No.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
EPISODIC EVENTS				
8.8.4	Fire crackers — regulate to control their usage	WB DoE, WBPCB, Kolkata and West Bengal Police Depart ment		

8.9 Cooking fuels and open eateries

S. No.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Medium- to long-term action				
8.9.1	In slums and low-income neighbourhoods, as well as roadside eateries, dhabas or restaurants etc. promotion of and give access to LPG and electricity. Link commercial license to clean fuels.	KMC, Kolkata Police, WBPCB	June 2019	5 crore
8.9.2	Prohibiting use of coal in hotels and restaurants, eliminate use of kerosene for cooking and incentivize a move to LPG	Kolkata Municipal Corporation (KMC). WBPCB	Immediate	Not permitted for hotels with trade license
8.9.3	A targeted programme can be developed for wider distribution of LPG.	MoPNG & Oil Companies	June 2019	

8.10 Control measures for road dust

S. No.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Medium- to long-term action				
8.10.1	<p>The following may be carried out:</p> <ul style="list-style-type: none"> • Implementation of street design guidelines for roads, streets and pavements with • adequate vegetative buffers and paving of roads. Take steps for blacktopping and the pavement of road shoulders to avoid road dust. • Phase-in mechanical and vacuum-based street sweeping wherever feasible; introduce wet or mechanized vacuum sweeping of roads in targeted roads. • Implementation of truck loading guidelines; use appropriate enclosures for haul trucks; and gravel paving for all haul routes. • Sprinkling of recycled water (without compromising other uses). • Maintaining pot hole-free roads for free flow of traffic to reduce emissions and dust. • Increasing green cover and plantation. Undertake greening of open areas, gardens, community places, schools and housing societies. • The WBPCB shall be 	<p>Kolkata Municipal Corporation (KMC) and other municipal/urban local governments within KMA area, Kolkata and KMA traffic police, WB Department of Urban Development, WB</p>	<p>June 2019</p>	<p>Rs 3.8 crore from WBPCB for water sprinklers</p> <p>Estimated cost of 6 (six) mechanical street sweepers are 3.6 crores on basis of GEM. The actual cost shall be known after procurement, for which processing has been started.</p> <p>6.8 Crores for procurement of 4 Pot hole repairing machine @ 1.7 crore</p> <p>2x10 crore for setting up two Batch mix plants @ Rs 10 crore at Sirakol & Bhangor with availability of land at Sirakhhol from PWD, WB.</p> <p>15 crores for procurement of 15 Thermo Containers @ 1 crore</p>

S. No.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
	providing fund for 10 (Ten) water sprinklings vehicles to KMC and 5 (Five) to HMC	PWD, Road-owning agencies, Police Dept and Forest Dept, WBPCB		
8.10.2	Enforcement of air pollution control in concrete batching (use of water spray and wind breakers, bag filter at silos and enclosures, hoods, curtains etc.)		Immediate	No separate budget is allocated as the same is carried out as routine work

8.11 Control measures for construction dust

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
Short-term priority action				
8.11.1	Measures are to be taken by Private Entrepreneurs. No separate budget is allocated the enforcement of measures shall be done as per routine activities	Kolkata Municipal Corporation (KMC) and other municipal or urban local governments within the KMA area, WB PWD, and road owning agencies, Kolkata Police	June 2019	Measures are to be taken by Private Entrepreneurs. No separate budget is allocated the enforcement of measures shall be done as per routine activities
	Restriction on storage of construction materials along the road	KMC, Kolkata Police, KMDA	June 2019	Measures are to be taken by Private Entrepreneurs. No separate budget is allocated the enforcement of measures shall be done as per routine activities
Medium-term action				
8.11.2	For material handling, construction and demolition, it should be obligatory on part of the developers to provide evidence of debris on-site recycling and disposal at designated sites. Promote recycling of construction and demolition waste. Implementation of	Kolkata Municipal Corporation (KMC) and other municipal or urban local governments within the KMA area, WB PWD, and road	June 2019	Measures are to be taken by Private Entrepreneurs. No separate budget is allocated the enforcement of measures shall be done as per routine activities

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
	construction material and debris in covered system			enforcement of measures shall be done as per routine activities

8.13 Awareness Generation

S. no.	Action points	Agency responsible	Timeline for action (to be finalized after discussion with the implementing agencies)	Financial Outlay
8.13.1	Issue of advisory for prevention and control of air pollution	WBPCB	June 2019	Measures are to be taken by Private Entrepreneurs. No separate budget is allocated the enforcement of measures shall be done as per routine activities
8.13.2	Involvement of school and other academic institutions in awareness programme	WBPCB and DoE	June 2019	Measures are to be taken by Private Entrepreneurs. No separate budget is allocated the enforcement of measures shall be done as per routine activities
8.13.3	Plantation		KMC has started plantation (Refer to Section 5D (v) (a))	The provision for tree plantation and tree guard is increased to Rs One eighty (180) Lakh for 2018-19. Earlier, the annual expenditure for tree plantation and tree guard used to be Rs fifty (50) lakhs.

General observations made by three member committee for further improvements in the plans and the responses thereof

Sl. No	General Observations made by three member committee for further improvements in the plans and the responses	Responses
1.	<p>Emission Inventory , Source Apportionment and Carrying Capacity Assessment:</p> <p>Vehicular Pollution, Industrial Emissions, Population Density, Construction Activities The AQMCs should duly address the above issues so that the cities remain air quality compliant in future and some activities, if required, are restricted in future planning. It is expected the knowledge from EI, SA and carrying capacity assessment will upgrade the action plans</p>	<p>Issue is expected to be addressed from NEERI Study. Action Plan with further details shall be sent to CPCB as and when NEERI Report is available.</p> <p>This has been already mentioned in section 7 of the CAP submitted to the CPCB.</p>
2.	<p>Interim Emission Reduction Targets The plans should include auditable and verifiable interim emission reduction targets. This will ensure continuous and timely implementation of actions</p>	<p>Issue is expected to be addressed from NEERI Study. Action Plan with further details shall be sent to CPCB as and when NEERI Report is available.</p> <p>This has been already mentioned in section 7 of the CAP submitted to the CPCB.</p>
3.	<p>Challenges in Implementation: Role of Central Agencies Some actions proposed in the plans (e.g. supply of CNG or PNG) will require coordination and commitment from Central agencies. It is desirable that such actions are discussed with concerned agencies for effective implementation.</p>	<p>Responses of central agencies are critical parameter and are to be dealt separately.</p>
4.	<p>Consideration to Graded Response Action Plan (GRAP) The GRAP is an important contingency plan in NCR. The SPCBs may give due consideration to the GRAP and develop a suitable plan relevant to the emissions in the city and likelihood of their impact on air quality.</p>	<p>GRAP has been prepared. After approval, the same would be included.</p>
5.	<p>District Level Monitoring Committee Besides AQMC, a monitoring committee headed by the Murricipal Commissioner or District Magistrate comprising senior officers from concerned departments may be considered to review the progress and ensure smooth implementation of the plan.</p>	<p>Weekly monitoring committee has been constituted under the chairmanship of KMC Commissioner vide notification dated 22.12.2017.</p>