ENVIRONMENT POLLUTION (PREVENTION & CONTROL) AUTHORITY
for the National Capital Region

Dr Bhure Lal
Chairman

EPCA-R/2017/L-04
February 01, 2017

To:

The Registrar General
Hon'ble Supreme Court of India
New Delhi

Sub: Submission of Report on Air pollution in the matter of Writ Petition (C) No 13029 of 1985; M.C. Mehta v/s UOI & others

Dear Sir,

This is with reference to the Hon'ble Supreme Court Order dated January 17,2017 in W. P. (C) No 13029 of 1985 M. C. Mehta v/s UoI & Others.

I am hereby enclosing the report of the Environment Pollution (Prevention & Control) Authority for the National Capital Region (EPCA), on Air pollution.

Kindly arrange to place the report before the Hon'ble Court.

Thanking you,

(Bhure Lal)
Chairman, EPCA

Central Pollution Control Board
Parivesh Bhawan, East Arjun Nagar, Near Karkardooma Courts, Shahdara, Delhi 110 032
Tel/Fax: 22301955 (CPCB), Tel: 24623060 (R)-Dr. Bhure Lal, Chairman

EPCA Report

In the matter of W.P. (C) No.13029 of 1985; M.C. Mehta v/s UOI & others

Report to Hon'ble Supreme Court on air pollution sources and actions to be taken, directions till date and status of compliance

Environment Pollution (Prevention and Control) Authority for Delhi NCR

February 1, 2017

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Environment Pollution (Prevention and Control) Authority for Delhi NCR
February 01, 2017

Report to Hon'ble Supreme Court on air pollution sources and actions to be taken, directions till date and status of compliance

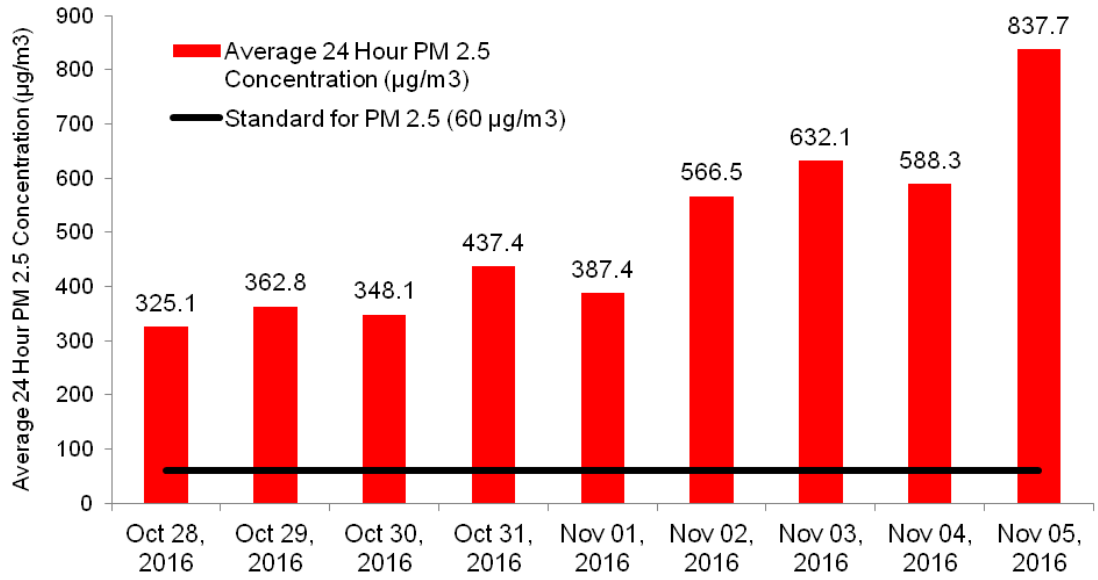
1. About EPCA

EPCA is a Central Government constituted committee for the National Capital Region vide Gazette Notification SO 93 (E) dated 29.1.1998 in compliance with the Hon'ble Supreme Court order dated January 7, 1998 in W.P. 13029/1985. The Ministry of Environment, Forests and Climate Change, Government of India, vide Gazette Notification S.O. 2311(E) dated July 04, 2016, re-constituted the EPCA in compliance of the Hon'ble Supreme Court order dated April 30, 2016.

2. EPCA report on November 7, 2016 informing Hon'ble Supreme Court of the smog episode and need for urgent action and strict enforcement of orders

- The level of PM2.5 has increased by 1.4 times on November 5, 2016 as compared to Diwali. **It is 14 times the standard on November 5, 2016 – a situation, which is both alarming and dangerous for human health**. This is a level of pollution, which is higher than what was recorded during the London smog incident and certainly higher than what has been seen in Delhi ever.
- **The key cause of this extremely high pollution that is seen in Delhi and its vicinity is a combination of factors – already high pollution in Delhi because of numbers of vehicles; unchecked construction and road dust and garbage burning; compounded by Diwali crackers and the burning of paddy residue by farmers in Punjab and Haryana and near still weather conditions without wind and the onset of winter.**
- **This severe smog episode is a result of these factors and must be treated as a public health emergency**.
- It is also clear that these conditions demand emergency measures – short term and immediate, which will drastically reduce pollution during the peak smog episodes.
- EPCA is submitting this urgent report to inform the Hon'ble Supreme Court of the status of actions being taken in pursuant of the directions of the Hon'ble Supreme Court as well the urgent actions that need to be taken to address this public health emergency.

Graph 1: 24-hour average at 3 air quality monitoring stations in Delhi (Punjabi Bagh, AnandVihar and R K Puram)



Source: Real time air quality monitoring of Delhi Pollution Control Committee

Enforcement of directions for effective action to control pollution

The Hon'ble Supreme Court has passed important directions to control air pollution in Delhi. It is critical that there is strict enforcement of these orders. EPCA is constrained to point out as in many cases, actions are lax and do not recognize the urgency of toxic air pollution, particularly in winter months.

Priority actions for control of pollution in winter are as follows:

1. **Strict enforcement of ECC on Delhi-bound trucks** so that there is control on numbers, including enforcement to check and divert all non-Delhi bound truck traffic and age limit (as stipulated by Hon'ble Supreme Court). Ensuring the early introduction of RFID will improve compliance and enforcement of this measure.
2. **Strict enforcement by GNCTD and municipal bodies of Hon'ble Supreme Court directives on control of dust pollution** from construction activities and road through vacuum cleaning; water spraying and horticulture.
3. **Strict enforcement by GNCTD/municipal agencies on ban on** garbage burning. Long-term action on control of emissions from garbage burning needs to be assessed and taken.
4. **Urgent action to control pollution from thermal power plant in Delhi and its vicinity** by shutting down plants during winter months and moving towards natural gas based power plants in the long run. Urgent action to reduce pollution from fly ash dumps in thermal power plants.

5. **Strict action by Punjab/Haryana to control biomass burning** through enforcement and by providing farmers alternatives to use paddy straw for energy and for tilling into ground for manure.
6. **Strict enforcement by all pollution control boards on control of air pollution from industries**, brick kilns and other sources of air pollution.
7. **Enforcement of all actions and directives to move vehicles towards cleaner technologies; fuels and emission standards**. This includes move towards BS IV (nationwide) by April 2017; BS VI (nationwide) by April 2020; increased introduction of CNG in NCR as already directed by Hon'ble Supreme Court and control on dieselization of vehicles.
8. **Comprehensive steps to augment public transport in Delhi and connectivity with NCR**, including bus, rail, metro and walk and cycle for last mile connectivity and increased parking charges. This is the most important action that needs to be taken urgently as it is the only way that Delhi/NCR will be able to address air pollution and restrain the growth of private vehicles. The Hon'ble Supreme Court has already directed GNCTD to augment bus fleet and metro to increase its passenger capacity. But much more needs to be done to build public transport network with last mile connectivity and governments in NCR along with Union Ministry of Urban Development must provide the comprehensive and multi-modal plan, which can then be monitored for implementation.

Emergency action required for current smog episode

The Delhi government has announced emergency actions, **but now it has to ensure enforcement of these steps**. If pollution is not reduced within the next 48 hours then Delhi government must take further steps to drastically reduce pollution, including odd-even (without exemptions) and further restrictions on commercial vehicle entry. It has to ensure that drastic and effective actions are taken to reduce pollution during the winter months. The Punjab and Haryana government must take all steps necessary to incentivize and penalize farmers so that burning of crop residues is checked.

The Delhi government must issue daily health advisory, which clearly state the health risks of pollution based on the level of smog that is present in the city. Health advisory need to inform people to keep children and those suffering from heart and respiratory ailments and chronic obstructive pulmonary disease (COPD) indoors and avoid outdoor exercises. Schools should be shut based on the health risk. We must recognize that children are most vulnerable as they have a poor defence mechanism and their ability to metabolize and detoxify environmental agents is different from adults.

EPCA would request the Hon'ble Supreme Court to closely monitor this critical situation so as to ensure that enforcement is stringent and that based on the level of risk it can direct remedial action. We believe this is an extremely dangerous

situation and one that needs drastic action – short term and long term – as current levels of pollution are extremely toxic and extremely hazardous for human health.

3. Hon'ble Supreme Court and Delhi government's directions and actions after November smog incident

Responding to the severe and prolonged smog episodes in 2016 and the public outcry following it, the Delhi government announced a slew of temporary emergency measures. It ordered schools to shut down, closed the coal-based power plant in Badarpur, and halted construction activities for 10 days. It has informed the Hon'ble Supreme Court that it will begin vacuum cleaning of roads every week and has banned leaf burning and imposed fines on responsible officials. Needless to say, effectiveness of all this emergency action will depend entirely on stringent enforcement and zero tolerance.

The Lt Governor of Delhi has also created a high-powered body to monitor the emergency situation and the measures being implemented. To these, he has further added stringent action on old diesel vehicles and trucks entering Delhi. All this will guide and improve enforcement.

The Hon'ble Supreme Court has also directed (vide order dated December 2, 2016) that the government should notify a graded response action plan, which responds to the different levels of pollution emergency. This plan, as finalized by the Central Pollution Control Board and EPCA, has now been notified by the MoEF&CC on January 12, 2017. EPCA has convened the meeting with state governments of NCR and directed action for conditions as specified in the graded response plan (see Annexure 1).

In addition, the Hon'ble Supreme Court has directed CPCB to set up a central control room, which is linked remotely to all air pollution monitoring stations. It has also given directions to CPCB to adhere to its time-schedule for setting up additional air pollution monitoring stations in NCR. EPCA has reviewed this with CPCB in its last meeting (see Annexure 1).

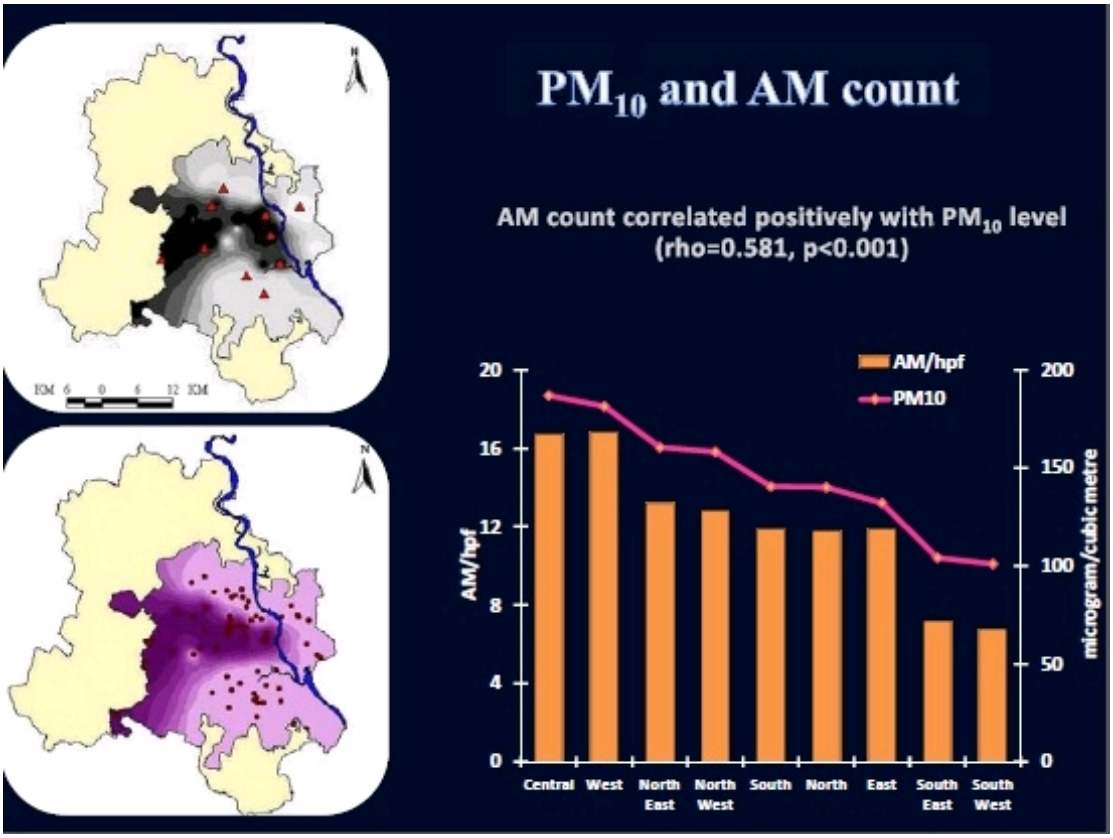
4. Health impact of air pollution

Delhi is paying a very high price for its polluted air. Several global and national studies have already proven severe health risks from air pollution; a number of studies are also available in Delhi to provide local evidence. In 2008, the Central Pollution Control Board (CPCB) and the Chittaranjan National Cancer Institute, Kolkata, did a study[1] on children in Delhi. The study, which covered 11,628 school-going children from 36 schools in Delhi, found that every third child in the city has reduced lung function. Delhi's children

[1] 2008, Study on Ambient Air Quality, Respiratory Symptoms And Lung Function Of Children In Delhi, http://cpcb.nic.in/upload/NewItems/NewItem_123_children.pdf

have sputum that contains four times more iron-laden macrophages than those from cleaner environs, indicating an increased propensity to pulmonary haemorrhage. The levels of these biomarkers in children have been found to be higher in areas with high PM10 levels. This study also found that health impacts were co-related with areas with higher pollution levels *(see Graph 2: Co-relation of health impact with areas of higher levels of pollution).*

Graph 2: Co-relation of health impacts with areas of higher level of pollution



Many other studies in Delhi, including those from the All India Institute of Medical Sciences (AIIMS), the Vallabhbhai Patel Chest Institute and St Stephens Hospital, confirm this evidence. This is not just Delhi's problem. As per the Global Burden of Disease (GBD) report released in 2013, air pollution is the fifth largest killer in India[2]. The World Health Organization (WHO) has classified air pollution, including diesel emissions, as a **Class 1 carcinogen**, which is based on detailed and comprehensive evidence from global studies. Automobile companies contest this data, saying that this study, which confirms diesel particulates as carcinogen is based on older vehicle and emission technology. However, this is not the case as the study establishes the carcinogenicity of diesel based on detailed global technologies and evidence. It is also clear that the modern diesel engine, which is referred to by Indian car manufacturers (see SIAM comments) is still not available in India. Also, as global evidence shows,

[2] GBD 2013: Global Burden of Diseases, Injuries, and Risk Factors, http://www.healthdata.org/sites/default/files/files/GBD_2013_Protocol.pdf

modern diesel vehicles, Euro 6 (which will come to India in 2020) have serious problems in meeting emission norms on roads.[3]

A 2010 study[4] of the Boston-based Health Effects Institute estimates that at least 3,000 premature deaths annually in Delhi are due to air pollution-related diseases. The World Allergy Organization Journal published a report[5] in 2013 on the high respiratory disorder symptoms in students living in Chandni Chowk (66 per cent) in north Delhi, Mayapuri (59 per cent) in west Delhi and Sarojini Nagar (46 per cent) in south Delhi. Heavy traffic movement has been found to be the factor responsible for the relative difference between the localities. The World Allergy Organisation alerts that allergies will increase further as air pollution increases. According to the GBD estimates, maximum deaths occur due to heart failure and stroke followed by respiratory and lung diseases and cancer.

There is enough evidence in Delhi now that shows how emergency hospital admissions increase phenomenally during winter when pollution levels peak and several smog episodes occur. Therefore, action to combat air pollution from all sources, particularly toxic emissions from combustion sources like vehicles, power plants and factories is critical.

5. EPCA's guiding principles for combating air pollution

Delhi, like several other cities, requires a clear framework to meet the national ambient air quality standards. Sustained air quality gains can be made with sustained action. Delhi and other cities need a comprehensive source-wise action plan—mix of short, medium, long and emergency measures—to meet clean air targets in a time-bound manner. These are the key guiding principles, which are used to device the actions for air pollution control:

a. **Setting clean air targets and directing action through Graded Response Action Plan**: Till now, action to combat air pollution has been driven by the urgency for immediate relief and it has often been reactive, ad hoc and intermittent. In 2016, the Hon'ble Supreme Court intervened to direct the Union government to frame a graded response action plan, which lays out the measures and actions that will need to be taken based on the levels of pollution. This graded response action plan also,

[3] SIAM Comments received in EPCA: "In the previous SIAM submission before the Supreme Court, it had been pointed out that the study done by WHO on diesel emission was done using an old vintage diesel engine used for generating electric power and without the necessary diesel filtration and exhaust emission devices. Also the engine was used in a closed environment of a mine. This does not represent the emission patterns for modern diesel engine that are far cleaner and employs necessary exhaust treatment and control devices. Such a reference by EPCA gives a wrong impression that vehicular diesel engines are as polluting as the vintage diesel engine used by WHO.

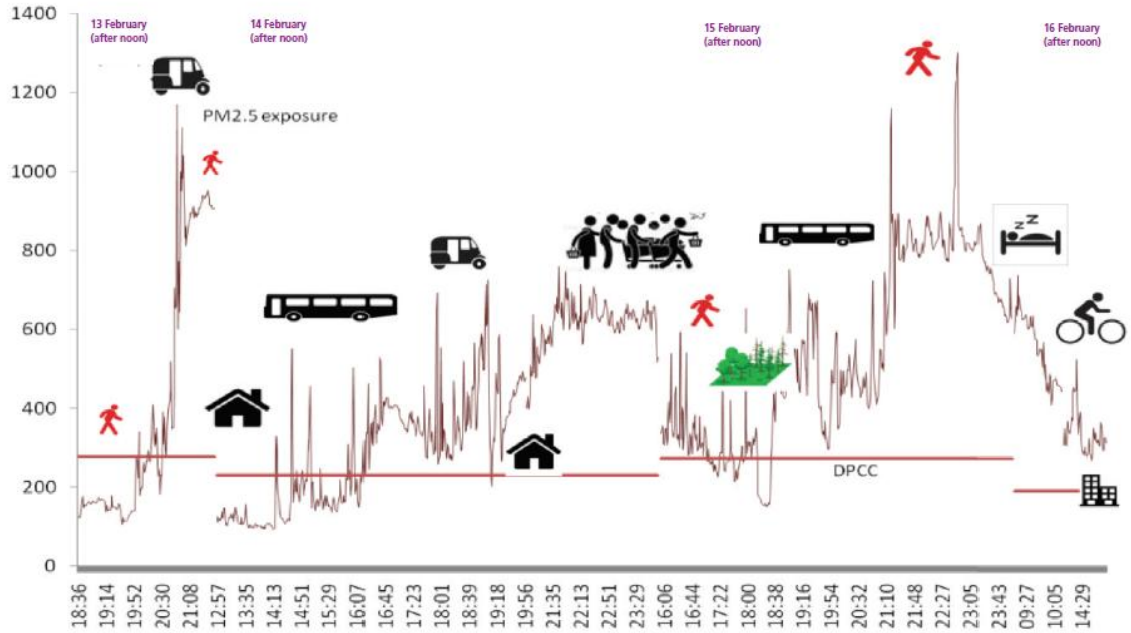
[4] 2010, Health Effects Institute, Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects, Special Report 17, Health Effects Institute, Boston, USA

[5] 2013, White Book on Allergy , http://www.worldallergy.org/UserFiles/file/WhiteBook2-2013-v8.pdf

for the first time, provides for actions that need to be taken when pollution reaches a public health emergency level. This plan provides a model for other cities to emulate and should be taken nationwide.

b. **Adding exposure monitoring to ambient air management:** Ambient concentration of pollution, which is monitored by the Union Ministry of Environment, Forests and Climate Change, helps measure the change in pollution trends over time and space. But this does not always well represent human exposures that are heavily influenced by nearby sources (such as stoves, vehicles, and neighbourhood trash burning) and less by general ambient concentrations. Thus, ambient concentration is not a good surrogate for total air pollution risk—it cannot indicate exposure and health outcomes. With new monitoring technologies, digital data management, remote sensing and modelling, it is possible to do exposure apportionment. Exposure mapping across micro-environments is needed. According to the US-based Health Effects Institute, people living within 500 meters from any roadside are most exposed to vehicular pollution. Over 55 per cent of Delhi's population lives in that direct influence zone *(see Graph 3: How much pollution people are exposed to while travelling in Delhi).*

Graph 3: How much pollution people are exposed to while travelling in Delhi



Source: Centre for Science and Environment, 2015

c. **Adopting a regional approach for common air-shed:** Over time, science has made it clear that local pollution cannot be solved without addressing the larger regional pollution. Satellite imagery shows how the entire north Indian belt stays polluted during winter. Landlocked plains trap air and pollution from biomass *chulhas*, industries and power plants, traffic and open fires. Recognising this, the Hon'ble

Supreme Court has provided that all actions to combat pollution must be applicable to the National Capital Region.

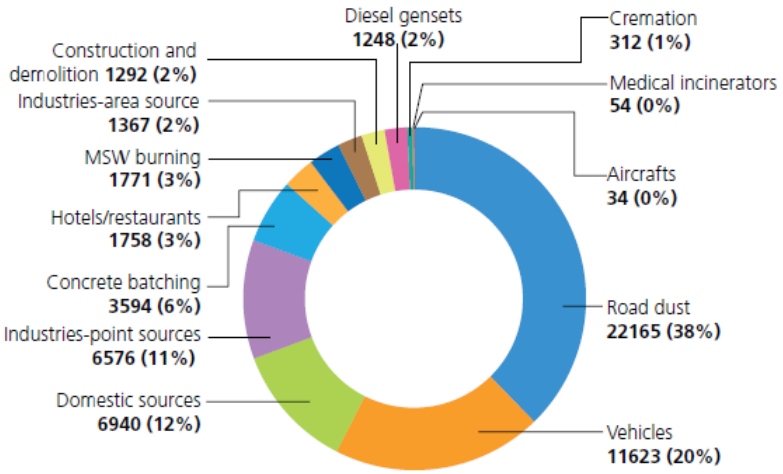
d. **Address quantum vs toxicity:** Yet another principle that has been established is the setting of priorities according to what is more toxic and dangerous. Recent global studies have authoritatively assessed differentiated health risks according to the source of particulates. A study by the Health Effects Institute, published recently in Environmental Health Perspectives[6], has found that particles from coal and diesel are more harmful than windblown dust, as they can lead to an increase in ischemic heart disease-related deaths. This suggests that we must prioritise the more harmful particulates for action.

6. The sources of air pollution in Delhi (and NCR)

In 2015, a source inventory and source apportionment study was carried out by the Indian Institute of Technology (IIT), Kanpur under the aegis of the Delhi government. The study assessed 13 key pollution sources and their relative contribution to different pollutants. Road dust dominates the particulate inventory in the study, followed by vehicles, industry and power plant sources. In the case of nitrogen oxide inventory, industry leads with more than half the share followed by vehicles (see Graphs 4 to 5: *Particulate apportionment in Delhi and Nitrogen oxide apportionment in Delhi*).

This study, for the first time, put the spotlight on the problem of secondary particulates that are formed in the air from gases that come from combustion sources. This means the relative contribution of traffic, industry, power plants and open burning to particulate load becomes even bigger and needs stronger control.

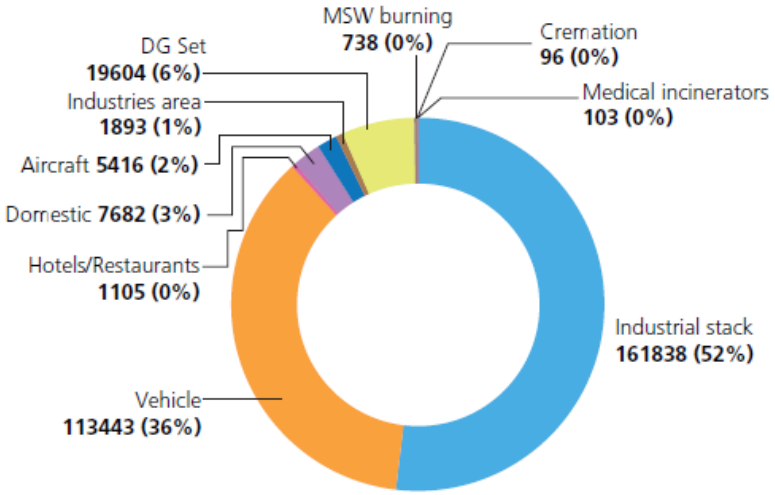
Graph 4: Particulate apportionment in Delhi (kg/day)



Source: IIT Kanpur 2015

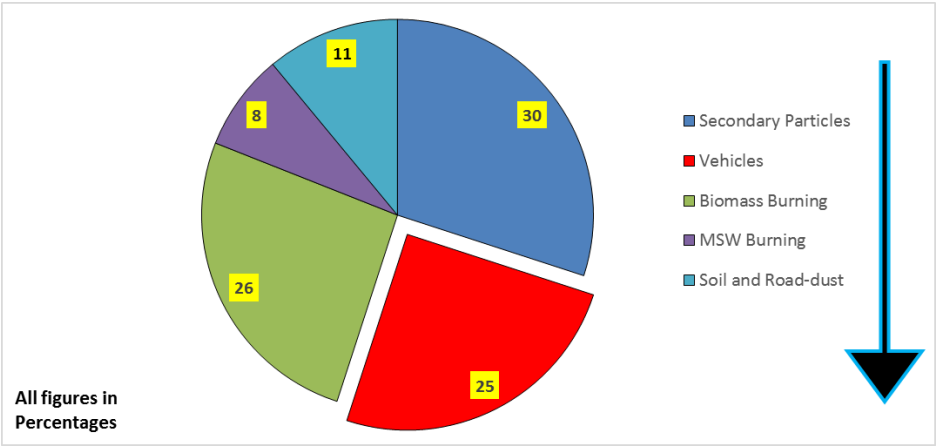
[6] http://www.downtoearth.org.in/news/pollution-emergency-demands-emergency-action-52377

Graph 5: Nitrogen oxide apportionment in Delhi (kg/day)



Source: IIT Kanpur 2015

Graph 6: PM2.5 share of sources during winter



Source: IIT Kanpur 2015

The study has also pointed to seasonal variations in the relative contributions to ambient pollution: winter experiences relatively higher contribution from combustion sources. During summer, the contribution of dust is higher.

The study has observed that vehicles are the most consistent and dominant source of pollution, from combustion sources, throughout the year, while most other sources are variable. In fact, the two most consistent sources for PM10 and PM2.5 in both the seasons are secondary particles and vehicles. The other sources, on an average, may contribute more (or less) but their contributions are variable from one day to another. Biomass and municipal solid waste burning are important sources, but they are variable. To get the average levels down, therefore, the focus must remain on consistent

sources such as vehicles.[7] This is particularly important as combustion sources like vehicles, power plants and industry, emit toxic gases, which are hazardous to health. There is now enough evidence to show that dust pollution is not as toxic as pollution from combustion sources (see HEI study on traffic related air pollution).

There is still no clear assessment of the contribution of pollution from sources outside Delhi. The seasonal incidents of farm fires in Punjab and Haryana have brought the matter of trans-boundary movement of pollution to the forefront, catalysing inter-state coordination. The farm fires greatly contribute to pollution in Delhi and in NCR towns during the season (roughly October 25-November 15). This pollution source has been taken up for action by Hon'ble NGT as well as Hon'ble Delhi High Court and clear directions have been issued to Punjab and Haryana state governments. However, it is also clear that the farm fires are seasonal and the trend shows that unless action is taken locally in Delhi and sub-regionally in NCR on other combustion sources, air pollution will not be mitigated. But this demands a regional action plan to address more dispersed pollution sources. There is also no such inventory done for NCR towns, but it is expected that by and large the sources of pollution will remain.

7. Summary of source-wise action and status

Based on the above source apportionment study, EPCA has been adhering to the following plan of action to combat pollution in Delhi. It is also clear that unless action is taken at the NCR airshed, the impact will be limited. It is therefore, recommending actions at the NCR wide level, wherever possible. It is also clear that there is a need for further studies to identify sources of pollution, which will then be used to guide action. EPCA's recent investigation into the use of highly polluting fuels, furnace oil (FO) and pet coke points to this.

Table 1: Summary of sources and required actions to combat air pollution, directions received from Hon'ble Supreme Court and status of compliance

S. No.	Pollution source and required action	Hon'ble Supreme Court directions	Status of Compliance
1.	**Road Dust:** 38% as per emission	SC direction dated	**Included in Graded Response Action Plan. Being monitored by LG/Delhi**

[7] SIAM Comments received in EPCA: It is incorrect to state that vehicles are the single largest contributor to pollution in Delhi. As per the IIT Kanpur report, vehicles as well as biomass burning account for equal amounts of pollution in a place like Okhla which is a high vehicle density area where the major sources contributing to PM2.5 was vehicular emission 109 µg/m3 ~ 29% followed by biomass burning 108 µg/m3 ~ 29%.

	inventory	December 16, 2016 to Delhi govt to repair, build payments; and ensure vacuum cleaning of roads.	**govt. Needs to be expedited and implemented across NCR**
2.	**<u>Vehicles</u>:** 20% of $PM_{2.5;}$ 36% of NO_X secondary particles; **Annexure 2**		
2.1	**Agenda 1: To improve quality of fuel and vehicle technology**	SC order dated 5.1.2016 requests SG to enquire into advancing date of introduction of BS VI	**GOI has notified BS VI on 16.9.2016 to be introduced in April 1, 2020. Will leapfrog over BS V and advance date. With introduction diesel emissions will be equalised with petrol. Is on schedule**
			GOI has notified BS IV nationwide by April 1, 2017. This will ensure that all trucks that travel long distances use clean fuel and new vehicles, which are much cleaner can be registered. EPCA has received representations from SIAM[8] that it would continue to sell BS III compliant vehicles till stocks are exhausted. SIAM is taken recourse to the notification of MoRTH that states that from April 1, 2017, only BS IV compliant vehicles will be manufactured. However, EPCA has held meetings giving industry 6-month notice to ensure that all inventories are exhausted and so the country takes advantage of BS IV fuel, which will be available from April 1,

[8] SIAM comments received in EPCA: MoRTH notification very clearly lays down that only BS IV vehicles will be manufactured from 1st April, 2017. It does not use the word "sold" or "registered". The note requires replacement of the word "registered" with the word "manufactured".

			2017 nationwide to sell cleaner vehicles. It must be noted that there is a reduction of 80 per cent in particulate emissions between BS III and BS IV (see Annexure 2)
			GOI has notified BS IV for two-wheelers from April 1, 2017, which will be big step towards improvement of emissions. 18 million two-wheelers sold annually and so impact is high
2.2	**Agenda 2: Transition to CNG**	SC orders dated 16.12.2015, 5.1.2016, 10.5.2016 directing CNG stations across NCR and taxis to convert to CNG	**Additional 105 stations to be made; last review on January 20, 2017 MOPNG lists 98 completed. Rest to be commissioned within 3 months. Total stations now 445, which provides good network for stations. Problem in offtake is related to price of CNG, which is higher in UP and Haryana because of VAT**
			Post SC order, diesel taxi plying in NCR (AITP (N)) has been reduced. Now 90% taxi registered are on CNG.
2.3	**Agenda 3: Dis-incentivize diesel because of toxicity and higher emissions as compared to petrol**	SC orders dated 16.12.2015, 30.4.2016, 12.8.2016 initial ban and then imposing ECC on registration of diesel vehicles over 2000 cc at 1%	**As of November 1, 2016 CPCB has collected Rs 8 crore on ECC charges**
2.4	**Agenda 4: Make PUC stringent for in-use vehicles**	SC orders 25.11.2016, 2.12.2016, 17.1.2017 directing govt and EPCA to audit stations and provide	**Audit of PUC stations and also assessment of procedures and standards for in-use vehicle inspection and certification in Delhi and NCR ongoing. Report to be submitted by March 15, 2017**

		assessment	
3	**Trucks:** 30% of vehicular emissions **Annexure 3**		
3.1	**Agenda 1: Reduction in no of trucks transiting through Delhi by imposing ECC**	SC orders dated 9.10.2015, 16.12.2015, 5.1.2016 directing ECC and diversion of non-destined trucks	**In December 2015 after 2 months, reduction noted and estimated that this would lead to 30-35% reduction in emissions. Haryana and UP have set up check-posts to divert non-destined vehicles. However, enforcement is difficult mainly because of cash payments and need for manual check of each vehicle because of exemptions given to laden/empty vehicles. EPCA has recommended move to RFID to improve compliance and also recommended that no further exemptions should be granted. EPCA has also recommended expediting bypass roads to ensure alternatives. As of October 28, 2016, over Rs 440 crore has been collected under ECC.**
3.2	**Agenda 2: Installation of RFID for compliance**	SC orders dated 9.10.2015, 5.1.2016, 22.8.2016	**SDMC is on schedule for tendering the RFID for 13 entry points, which comprise 80% of commercial traffic into Delhi. The system will be commissioned before next winter.**
3.3	**Agenda 3: Building/upgrading alternative bypass roads**	SC orders dated 11.2.2005, 11.3.2005, 1.8.2005, 31.3.2016	**There has been nearly 8-year delay in commissioning of Western (WPE) and Eastern Peripheral Expressway (EPE). EPCA has given a number of reports on this matter to the Hon'ble Supreme Court. Now work is progressing. As of date, the EPE is on schedule for completion in July 2018 and one stretch of WPE has been commissioned.** **In addition, EPCA has given report on existing alternative routes that need upgradation. This is also being pursued with MoRTH and NHAI.**

3.4	**Agenda 4: To install WIM for check of uploading**	SC order dated 5.1.2016 directing for WIM at entry points to Delhi	**NHAI has commissioned 60 WIM at 6 toll plaza for entry into Delhi. However implementation of its penalty, which is 10 times of applicable rate for over-loaded vehicle is still lagging**
4.	**Augmenting public transport, last-mile connectivity and car restraint**		
4.1	**Agenda 1: improvement in bus numbers and service**	SC order dated 27.7.1998 and 5.1.2016 directing Delhi govt to abide by SC direction to augment to 10,000 buses by 2000 and Union to provide land for bus depot	**EPCA report dated May 17, 2016 on bus deport land availability has been given to Delhi govt. Land for 2000 additional buses is available.** **Delhi government has to present plans for bus number augmentation and also service and ridership improvement urgently**
4.2	**Agenda 2: Augmenting service of metro for carrying more passengers**	SC order dated 5.1.2016 directing for augmentation of service/ coaches	**Metro has submitted to EPCA its plan for inducting 486 additional coaches by December 2017 for existing lines. Of this, 270 have been procured.** **In addition, metro has submitted proposal for 602 coaches, which is being examined by Delhi govt.**
4.3	**Agenda 3: Improvement of last mile connectivity through pedestrian, para-transport, cycle facilities**		**In Delhi nearly 40% of daily commuters walk or cycle but there is no provision on roads for their movement and safety. This requires urgent intervention in Delhi and in NCR**
4.4	**Agenda 4: NCR connectivity for**		Currently over I million private vehicles – 2 wheelers; cars; SUV travel to Delhi

	public transport		and from Delhi every day. This greatly adds to pollution load. There is urgent need for improvement of public transport services between NCR
4.5	**Agenda 5: Parking policy as car restraint measure**		The parking policy for travel demand management and reducing motorisation is yet to be made for Delhi and NCR towns
5.	**Power Plants** Contributes 16% of $PM_{2.5}$; 52% of NO_X and secondary particles	SC order 21.1.2016 directing SG to examine EPCA report on power plants pending	Rajghat power plant closed. This winter, Delhi government has ordered closure of Badarpur. Flyash pond to be cleared Substation to be made for supply to Delhi Move to Bawana gas plant for power supply to Delhi
6.	**<u>Domestic Sources</u>:** Contribute 12% to PM and 2% to NO_x.		
6.1	**Household stoves:** Are toxic on prolonged direct exposure and lead to reduced lung function		Delhi government has initiated action to restrict usage of kerosene by providing LPG connections to households. CPCB has also mandated elimination of Kerosene use in Delhi for cooking purposes**. Action on this needs to be taken because of health impact of cooking on biomass fuels on women and not because of ambient air pollution**
7.	**<u>Industry:</u>** 17% of $PM_{2.5}$; 53% of NOx		Air polluting industries, which were previously operating in Delhi have been shifted to neighbouring states and is adding to pollution in NCR air-shed. The information on action taken on industrial air pollution in Delhi and NCR is also unavailable. EPCA has directed DPCC to prepare report on air polluting industries in non-conforming areas. EPCA report to ban use of Furnace oil

			and Pet coke will greatly reduce air pollution from these sources, not just in Delhi but NCR.
8.	**<u>MSW Burning:</u>** Contributes 3 % of $PM_{2.5}$	SC order dated 16.12.2015 directing for complete ban on garbage burning	**This is being monitored by Delhi and NCR state governments. However enforcement is difficult, given the poor state of solid waste management in the region**
9.	**<u>Dust from Construction and Demolition:</u>** Contributes 2% of $PM_{2.5}$	SC order dated 16.12.2015 directing Delhi govt to ensure measures are taken to mitigate dust pollution from construction	**This is being monitored by Delhi and state governments. Clear guidelines have been given for dust control in construction project. Penalties have also been enhanced.** **However enforcement is difficult given the scale of the problem**
10.	**<u>Diesel Generator sets:</u>** Contributes 2 % of $PM_{2.5}$		**Delhi government has banned use of diesel generator sets other than for essential purposes. EPCA has also for listing of such essential purposes to be clarified by DPCC**

Annexure 1: Minutes of the Meeting of Environment Pollution (Prevention &Control) Authority for the NCR (EPCA) held on January 20, 201 at 3.45 pm

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Minutes of the Meeting of Environment Pollution (Prevention &Control) Authority for the NCR (EPCA) held on January 20, 2017 (Friday) at 3.45 pm

(at Chairman, EPCA office at MCD Supreme Court Monitoring Committee, 3rd Floor, Core VI, IHC, Lodi Road, New Delhi)

Agenda: 'Graded Response Action Plan' to combat air pollution situations according to pollution levels in Delhi and NCR

Attendance:

Chairman and Members EPCA

1. Dr. Bhure Lal, Chairman, EPCA
2. Ms. Sunita Narain, Member, EPCA

3. Mr. Chandraker Bharti, Secretary Environment, Delhi Government
4. Dr. A. B. Akolkar, Member EPCA

Substitutes of EPCA members or officers accompanying EPCA Members

5. Dr. Vivek Kumar, Transport Department Delhi
6. Mr. Dilip Ramnani, CE, SDMC
7. Dr. Dipankar Saha, Sc. E, CPCB
8. Mr. A. Sudhakar, Sc. E, CPCB
9. Nazimuddin, Sc. E, CPCB

Representatives of other concerned agencies

10. U.P.
11. Mr. Sanjiv Saran, Additional Chief Secretary - Environment, U.P. Government
12. Mr. Ashish Tiwari, Special Secretary - Environment, U.P. Government
13. Dr. Rajeev Upadhyay, Chief Environmental Officer, UPPCB

Haryana

14. Mr. S. Narayanan, MS, HSPCB

Rajasthan

15. Dr. Vijay Singhal, CEE, RSPCB

Delhi

16. Mr. S. M. Ali, Member Secretary, DPCC
17. Dr. Anil Kumar, Department of Environment, Delhi Government
18. Dr. M. P. George, DPCC
19. Mr. V. K. Saraswat, Transport Department Delhi

Discussions on the graded response action plan for NCR and directions given

EPCA said that the 'Graded Response Action Plan' to combat air pollution situations according to pollution levels in Delhi and NCR, which was prepared by CPCB in consultation with EPCA under directions of Supreme Court, has been adopted and notified by Gazette Notification dated 12th January 2017 of Central Government, and through this notification EPCA has been entrusted the task of implementing the 'Graded Response Action Plan' in Delhi and NCR and directing action.

EPCA said that considering the nature of actions to be taken under the 'Graded Response Action Plan' it is required that state level task force be constituted under Chief Secretary of concerned states in NCR for coordinating and overseeing the actions. It was discussed that this function may be performed by the state level committee, which is headed by the Chief Secretary and has been formed by orders of NGT.

EPCA said that Central Government vide letter dated 13th January 2017 has further decided that the central level task headed by Chairman, CPCB will meet very frequently during periods of poor air quality. The CPCB headed task force is charged with informing EPCA of the different levels of AQI so that measures can be directed.

EPCA was informed that meetings at the CS level have been held in UP and Haryana and state level committee formed. It was discussed that LG Delhi also holds regular meetings on air pollution. CS, Delhi is also requested to take stock of actions in respect of the 'Graded Response Action Plan'.

These regular meetings will help to increase compliance and enforcement of the measures under the action plan.

EPCA directed that based on the current air quality levels as monitored by CPCB, the graded plan would be in force in the 'Moderate to Poor' category in all districts of NCR. In Delhi, where the air pollution levels have been either 'Very

Poor' or 'Severe', the Graded Action

Response Plan would be Severe category in force. However, certain actions as detailed in the category of Very Poor or Severe would not be implemented till these were discussed further and implementation safeguards provided. These actions are noted below.

EPCA desired that special attention be paid to i) zero tolerance for garbage and leaf burning, ii) improving pavement, greening road sides, and keeping sides of the roads dust free, iii) taking action against brick kilns which have not converted to Zig-Zag type as directed by CPCB, iv) action against visibly polluting vehicles by deputing sufficient teams and mobile squads, v) strengthening PUC system through regular calibration, auditing and data integration, vi) expediting introduction of RFID for checking non-destined trucks.

EPCA directions to Delhi, Haryana, Uttar Pradesh and Rajasthan for implementation of Graded Response Action Plan in the category of 'Moderate to Poor' are as follows:

1. All measures as detailed in the Moderate to Poor category of the Graded Response Action Plan are to be implemented immediately and stringently. The Chief Secretary headed state level committee should monitor all actions to ensure compliance.
2. All brick kilns, which have not installed improved emission technology, either zigzag or any other that have been vetted by the state pollution control board, will be closed. All efforts will be made to ensure that this measure in the Graded Response Action Plan can be fully implemented by next winter. State Pollution Control Boards must discuss the transition with existing brick kilns so that emission control and abatement measures are taken.
3. All thermal power plants in NCR will be strictly monitored by the State Pollution Control Board to ensure compliance with existing standards. CPCB will provide link to EPCA for remote monitoring of the online system for power plants in NCR.
4. State governments will take all steps to reduce dust pollution through mechanised sweeping and plantations on the side of the road. The dust pollution in Gurgaon was red-flagged for priority action. The Haryana government will address this issue and prepare a plan for its control.
5. State governments in NCR will urgently improve their pollution under control certification system. The Haryana government was directed to particularly review the current system of PUC, which has been found to be extremely inadequate and to prepare a time-bound plan for improvement. This is a priority action for the NCR states and will be audited by EPCA in the coming month.

6. Delhi government will undertake a special drive to target visibly polluting vehicles, which will be penalised heavily during this period. EPCA will be informed of the results of this drive.
7. All governments will take actions to enforce rules for dust control in construction activities. The CS headed state level committee will ensure compliance and enforcement. State governments will inform builders of the provisions and the actions that are required for control of dust pollution in sites. All efforts will be made to disseminate this information publicly.
8. Haryana and Uttar Pradesh will provide turn-round facilities before entry into Delhi for commercial vehicles. This will allow governments to ensure that vehicles that are not destined for Delhi are turned back.
9. State governments will ensure that ash ponds are watered and pollution is minimised. Delhi government will ensure that the management of Badarpur Thermal Power Plant is required to take action, after February 1, 2017, to remove and dispose of the ash from the pond. The ash must be transported in vehicles that do not lead to air pollution.
10. All other measures must be monitored closely so that there is compliance.

EPCA directions to Delhi government for implementation of Graded Response Action Plan in the category of 'Very Poor and Severe' are as follows:

These are in addition to the steps that need to be enforced under the Moderate to Poor category.

1. Closure of brick kilns, hot mix plants and stone crushers.
2. Closure of Badarpur and steps to maximise use of natural gas based power plants.
3. Increase frequency of mechanised sweeping and sprinkling of water, particularly on road stretches with high dust generation.
4. Stop use of diesel generator sets. Delhi government is directed to list out the essential activities for which diesel generators will be allowed to operate so that compliance with this measure is made effective.
5. Stop use of coal/firewood in hotels and open eateries.
6. DPCC will undertake a time-bound study through a suitable agency to survey to identify all water or air polluting and hazardous industries in areas other than industrial areas and redeveloped industrial areas.

It was agreed that the implementation of the following measures included in the Very Poor and Severe categories would be kept on hold:

1. **Intensify public transport services and introduction of differential rates to encourage off-peak travel.** It was discussed that the current system is over-loaded and therefore the first step is to augment public transport systems in the

capital. It was also discussed that studies would be done to look at the feasibility and implementation of the differential rates before this is implemented so that public transport is not further compromised.

2. **Enhance parking fee by 3-4 times.** It was agreed that the hike in parking fee must be implemented with simultaneous efforts to increase the enforcement against illegal parking. It was also discussed that the current penalties for illegal parking are stipulated under the Central Motor Vehicles Act and Rules (CMVR)are so low that they do not allow for any deterrence. It was agreed to discuss this further with the Ministry of Surface Transport and Highways and also the Delhi police so that enforcement could be improved.

EPCA directions to Haryana, Uttar Pradesh and Rajasthan to prepare for implementation of the measures listed under 'Very Poor and Severe' are as follows:

1. All state pollution control boards will enumerate the commercial and institutional generator sets that are installed in NCR. In addition, state governments will adopt a policy for ban of diesel generators, which are not for essential usage. This will then allow for implementation of the Graded Response Action Plan, which requires ban on generators for non-essential usage.

2. State governments will discuss the implementation of parking rates in NCR so that these can be hiked during periods of high pollution.

3. State governments will discuss plan for augmentation of public transport so that measures that require greater usage of this mode of transport during high pollution periods can be implemented.

Agenda: Increase of ambient air monitoring stations in NCR

The MoEF letter directing the Graded Response Action Plan (January 13, 2017) notes that the air quality index for implementation of Graded Response Action Plan should be based on the readings of at least 50 per cent of the Continuous Ambient Air Quality Monitoring Stations (CAAQMS). Currently there are 20 CAAQMS in Delhi (6 of CPCB, 6 of DPCC and 8 of SAFAR). In future the number shall become larger as more stations are set up in NCR and data from other stations are included. CPCB has also given a schedule for augmenting stations to the Hon'ble Supreme Court.

CPCB and SPCBs informed EPCA that the increase of air monitoring stations was under progress and they were confident that the schedule for implementation would be adhered to. The list of stations and schedule is annexed.

In addition, CPCB informed that an APP SAMIR has been developed where AQI for 33 cities can be seen. Data of all continuous monitoring station of CPCB, DPCC and IMD will be linked and this App will give a daily pollution forecast and health advisories.

MS, CPCB said that CPCB had given direction to state government officers in NCR in Nov-Dec 2016 covering various actions for air pollution abatement but when the progress was reviewed recently it was observed that many officers at ground level were not very much aware about the matter. Therefore, proper awareness among ground level officers in each state is very important.

It was agreed that the next meeting to review implementation of the above mentioned directives and measures would be held in two-weeks. In addition, EPCA would seek time with Chief Secretaries to discuss implementation of the Graded Response Action Plan and would request that the meetings be held in different regions of the NCR so that local officials are informed of the plan and accountability increased for enforcement.

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Plan for strengthening of Air Quality Monitoring Stations

1. Haryana State Pollution Control Board

S. No.	State	Name of District HQ	Existing Stations		Stations Planned	
			Manual	Real-time	Manual	Real-time
1	Haryana	Faridabad	2	1 (CPCB)	NIL	2 (CPSU + HSPCB)
2	Haryana	Gurugram	NIL	1 (HSPCB) + 1 (IITM)	NIL	1 (HSPCB)
3	Haryana	Mahendragagh	NIL	NIL	2	1 (HSPCB)
4	Haryana	Bhiwani	NIL	NIL	2	1 (HSPCB)
5	Haryana	Mewat	NIL	NIL	2	1 (HSPCB)
6	Haryana	Rohtak	NIL	1 (HSPCB)	2	NIL
7	Haryana	Sonepat	NIL	NIL	2	1 (HSPCB)
8	Haryana	Rewari	NIL	NIL	2	1 (HSPCB)
9	Haryana	Jhajjar	NIL	NIL	2	1 (HSPCB)
10	Haryana	Panipat	NIL	NIL	2	1 (HSPCB)
11	Haryana	Palwal	NIL	NIL	2	1 (HSPCB)
12	Haryana	Jind	NIL	NIL	2	1 (HSPCB)
13	Haryana	Karnal	NIL	NIL	2	1 (HSPCB)
Total			**2**	**4**	**22**	**Total =13 (1=CPCB + 12=HSPCB)**

2. Uttar Pradesh Pollution Control Board

S. No.	State	Name of District HQ	Existing Stations		Stations Planned	
			Manual	Real-time	Manual	Real-time
1	UP	Meerut	2	NIL	NIL	3 (CPSU)
2	UP	Ghaziabad	2	NIL	NIL	1 (CPCB)
3	UP	Gautam Buddh Nagar	2 (Noida)	1 (IITM-Noida)	2 (Gr. Noida)	1 (CPCB in Noida) 1 (UPPCB in GN)
4	UP	Bulandsahar	2	NIL	Nil	1 (UPPCB

						Khurja)
5	UP	Baghpat	NIL	NIL	2	1 (UPPCB)
6	UP	Hapur	2	NIL	Nil	1 (UPPCB)
7	UP	Muzzafarnagar	NIL	NIL	2	1 (UPPCB)
Total			**10**	**1**	**6**	**10**

3. Rajasthan State Pollution Control Board

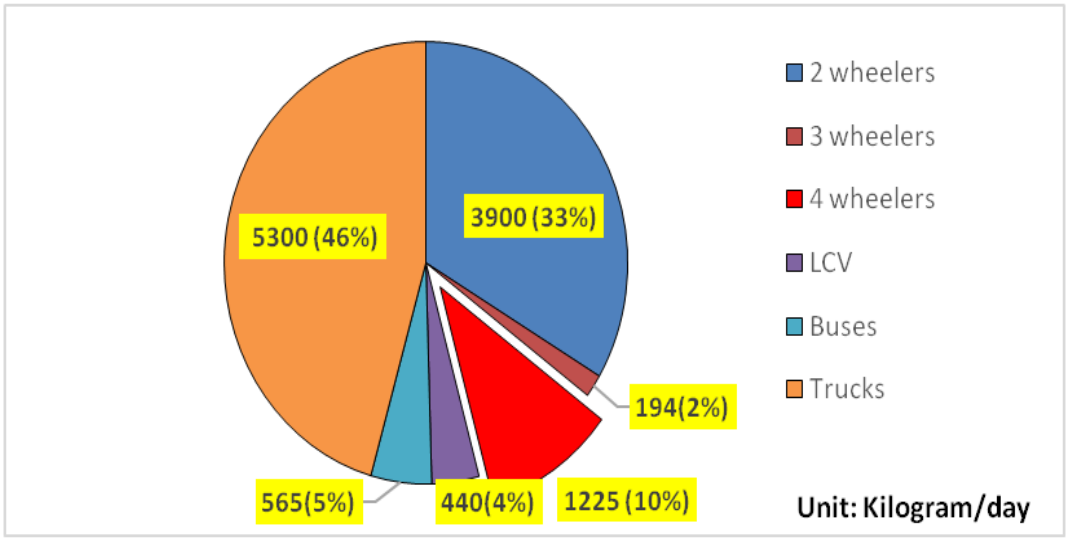
S. No.	State	Name of District HQ	Existing Stations		Stations Planned	
			Manual	Real-time	Manual	Real-time
1	Rajasthan	Alwar	6 (3 in Alwar & 3 in Bhiwadi)	NIL	NIL	1(CPCB at Bhiwadi) 1 (RSPCB at Alwar)
2	Rajasthan	Bharatpur	3	NIL	NIL	NIL
Total			**9**	**0**	**0**	**2**

4. Delhi Pollution Control Committee

S. No.	State	Name of District HQ	Existing Stations		Stations Planned	
			Manual	Real-time	Manual	Real-time
1	Delhi	Delhi	10 (CPCB)	6 (CPCB) + 4 DPCC + 8 (IMD	NIL	20 (DPCC)
Total			**10**	**18**	**0**	**20**

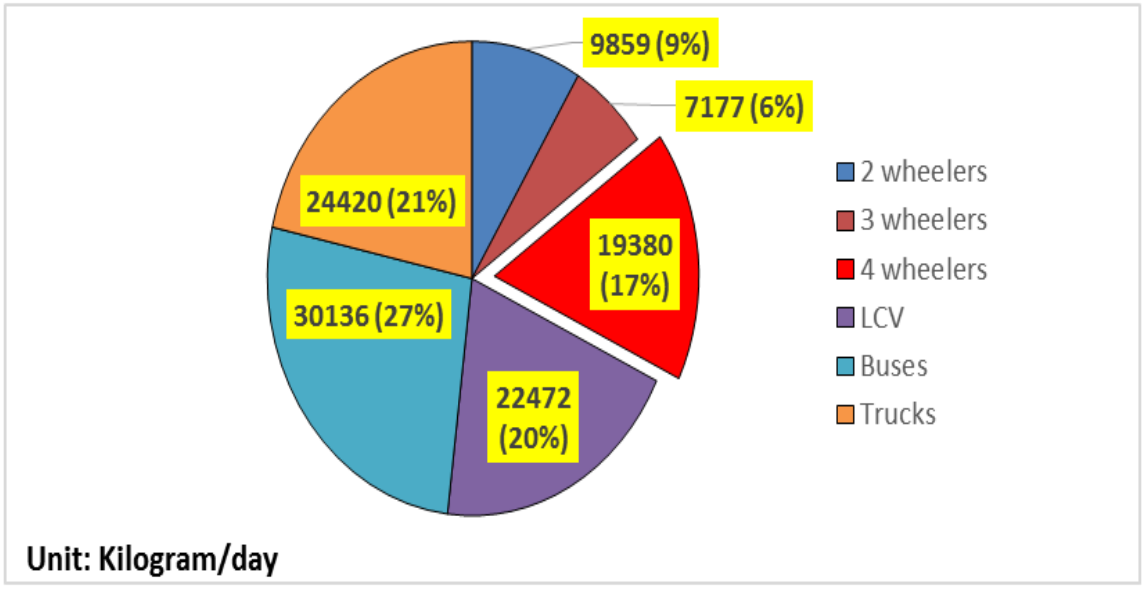
Annexure 2: Combating emissions from vehicle

Graph 7: Break-up of PM2.5 by category of vehicle as percentage of total vehicular emission load



Source: 2015, IIT-Kanpur

Graph 8: Break-up of NOX by category of vehicle as percentage of total vehicular emission load



Source: 2015, IIT-Kanpur

Agenda1: To improve quality of fuel and vehicle technology

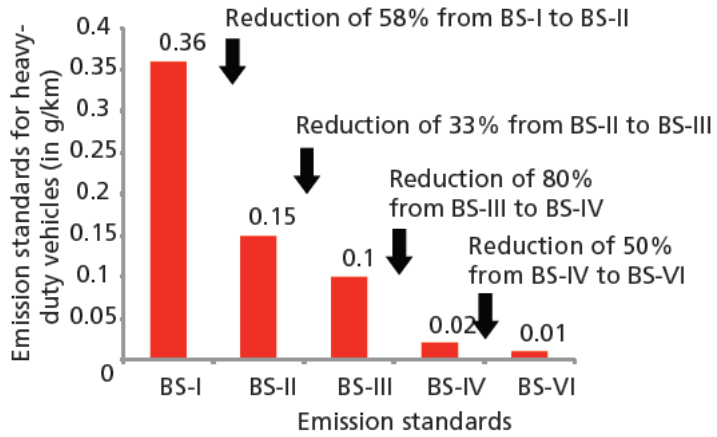
Directions from the Hon'ble Supreme Court order dated *5.1.2016*
"Mr Salve prays for a direction to the Govt of India to examine whether the date already fixed viz. 1 April 2020 for making BS-VI grade auto fuel can be suitably advanced. We request Mr Ranjit Kumar to take instructions on this aspect also"

Status of compliance
On September 16, 2016, the Union Ministry of Road transport and Highways (MoRTH) has notified that the country will leapfrog directly to Bharat Stage VI emissions standards in 2020 and skip Euro V altogether. These standards will lower emissions from the new vehicles by 60 to 89 per cent over BS IV levels. Only at this level will petrol and diesel emissions begin to equalise and the norms become more stringent. These standards will be applicable across the country. This will stop the current practice of following two sets of emissions standards in the country. This is urgently needed to provide uniform health protection to all and to ensure that all segments of vehicles, especially highway vehicles like trucks and buses, graduate to improved emissions standards to minimise health impacts. The government has informed EPCA in its last meeting (held in October 2016) that it is on schedule to meet these standards.

In addition, as of April 1, 2017 onwards only Bharat Stage IV-compliant vehicles will be manufactured and sold across the country. Transport departments across the states will have to take appropriate steps to ensure this. This will vastly improve the emissions from trucks, which are currently registered on BS III technology (see Graph 9 and 10: Reduction in PM and NOx emissions). **EPCA has received representations from SIAM[9] that it would continue to sell BS III compliant vehicles till stocks are exhausted. SIAM is taken recourse to the notification of MoRTH that states that from April 1, 2017, only BS IV compliant vehicles will be manufactured. However, EPCA has held meetings giving industry 6-month notice to ensure that all inventories are exhausted and so the country takes advantage of BS IV fuel, which will be available from April 1, 2017 nationwide to sell cleaner vehicles. It must be noted that there is a reduction of 80 per cent in particulate emissions between BS III and BS IV (see Annexure 2)**

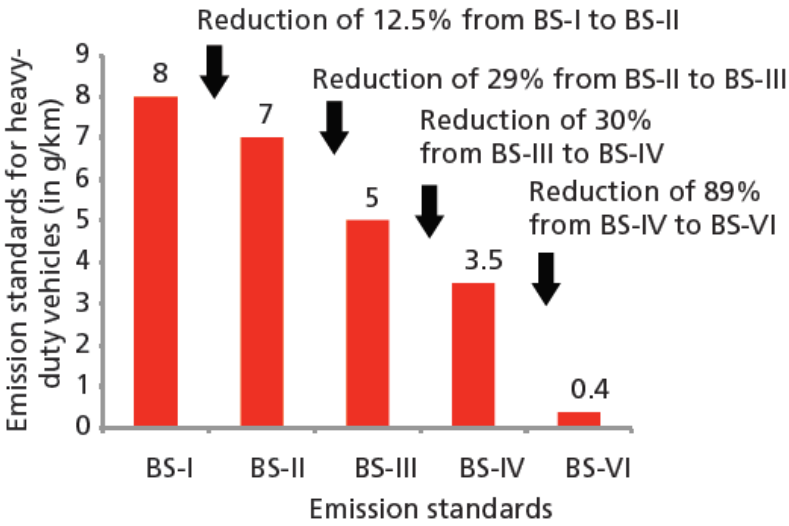
[9] Even when BS I, BS II, BS III vehicle emission norms were introduced by Government of India, the respective Notifications stipulated the dates from which such emission norms were to be implemented and that no vehicles could be "manufactured" after such date for the defined regions as per the said notifications. All Government notifications issued under the Central Motor Vehicle Rules, 1989 with regard to the automotive industry always prescribe and is with respect to a "date of manufacture" and not from the date of sale or registration.

Graph 9: Effect of successive Bharat Stage standards in particulate matter norms



Source: CSE computation based on data provided by transportpolicy.net

Graph 10: Effect of successive Bharat Stage standards in NOx norms



Source: CSE computation based on data provided by transportpolicy.net

The BS IV standards are also applicable to two-wheelers as of April 1, 2017. These norms crafted for two-wheelers are also more stringent. For the first time, PM standards have been set for two-wheelers; hydrocarbon and nitrogen oxides will be regulated separately. These vehicles will also be equipped with on-board diagnostic systems that can help advance the maintenance regime.

Agenda 2: Transition to CNG for reduction in emissions

Directions from Hon'ble Supreme Court

Order dated 5.1.2016

"We request EPCA to pursue the matter further to ensure setting up of 104 additional CNG stations in the 10 districts of NCR by March 31, 2016."

Order dated 16.12.2015

"We, therefore, direct that all taxis including those operating under aggregators like OLA and UBER in the NCT of Delhi, plying under city permits shall move to CNG not later than 1st March, 2016".

Order dated 10.05.2016

"Having heard learned counsel for the parties at some length, we direct the following arrangement in modification of our earlier orders:
(1) Government of National Capital Territory of Delhi shall permit the city taxies having validly issued permits under Section 74 of the Motor Vehicles Act, 1988 to operate within the National Capital Region not limited to National Capital Territory of Delhi provided such permits are duly counter-signed by the competent authorities under Section 88(1) of the Act. (2) Registration of new city taxies shall be permitted only if the vehicles operate on dual fuel or petrol or C.N.G. We make it clear that no vehicle shall be registered as a city taxi if it runs on diesel fuel. The competent authorities shall faithfully comply with this direction. (3) All existing All India Tourist Permit (AITP) taxies operating in the National Capital Region shall be converted into AITP (O) category and will be allowed to operate until such time their existing permits expire by afflux of time. We make it clear that the registering authority shall not renew such permits once they have expired. We also direct that the permission hereby granted shall be subject to the AITP taxies complying with all Government directives concerning security, safety and fare issued from time to time. (4) All new AITP permits will be issued as AITP (N) category permits. These permits shall not authorise the taxies to pick-up or drop passengers from point to point within the NCR. The authority issuing the permits shall insist upon an undertaking from the person seeking an AITP permit to the effect that he shall not use the taxi for point to point service within the NCR. This direction shall continue till such time, the Government frame suitable rules to that effect and publish the same in the official gazette."

Status of compliance

The Hon'ble Supreme Court's directives dated May 10, 2016 has laid down conditions for operations of taxis in NCR. It has permitted city taxies having validly issued permits under Section 74 of the MV Act to operate within NCR not limited to NCT provided such permits are duly counter-signed by the competent authorities under Section 88(1) of the Act.

Further, it has permitted registration of new city taxies in NCR only if the vehicles operate on dual fuel or petrol or CNG.

All new AITP permits are to be issued as AITP (N) category permits, and are to be issued only on undertaking from the person seeking an AITP permit to the effect that he shall not use the taxi for point to point service within the NCR.

The state governments have reported compliance with the directives of the Hon'ble Court, which is showing up in the numbers of diesel taxis registered.

Between May 10 and October 4, 2016, the registration of diesel AITP(N) taxies in the NCT of Delhi stands at 74. This is in comparison to 11065 diesel AITP registrations in 2015

There is a clear shift towards CNG/petrol taxi. Between May 10 to October 4, 2016 over 90 per cent of all taxi registered were on CNG, as compared to less than 45 per cent prior to the order.

The Hon'ble Court also directed that all existing AITP taxies operating in the NCR would be converted into AITP (O) category and will be allowed to operate until such time their existing permits expire by afflux of time. Such permits would not be renewed. It was also directed that the permission hereby granted would be subject to the AITP taxies complying with all Government directives concerning security, safety and fare issued from time to time.

EPCA has held several meetings on the issue since May 10, with the Transport Departments of Delhi, Haryana and Uttar Pradesh, MoRTH and representatives of various stakeholders – registered taxi operator's unions, tour operators and aggregators. In the meeting held on May 20, 2016 MoRTH informed EPCA that it has set up a committee to examine all issues related to various permits under the MV act, and to formulate a credible and acceptable plan of action and draft the relevant taxi scheme.

MoRTH has informed EPCA that on August 19, the Delhi High Court has revised the scope of the committee and revised its constitution to include representation from state governments in NCR, in addition to the traffic police. The court has given the committee a period of 3 months to submit its report, and MoRTH has informed EPCA that the recommendations of the committee will be ready by the end of October.

Setting up of additional CNG stations: The MoPNG has submitted to EPCA that as of January 20, 2017 a total of 98 of the 105 new stations to be commissioned. This takes the total number of operating CNG stations in NCR to 445, compared to 347 prior to December 16, 2015.

However, it must be noted that the number of CNG stations in certain districts of Haryana and Uttar Pradesh are insufficient currently. EPCA is taking up this matter with state governments.

In addition, the prices of CNG are unequal across the NCR, and this creates imbalances in demand. EPCA and MoPNG have taken up the issue of harmonisation of VAT on CNG across the NCR region with the states.

Agenda 3: Dis-incentivise diesel because of toxicity

Directions from Hon'ble Supreme Court

Order dated 16.12.2015

"M/s. Dushyant Dave and Dhruv Mehta, learned senior counsel appearing for the automobile dealers selling diesel vehicles, also opposed any ban on registration of new private vehicles and commercial light duty diesel vehicles as proposed by Mr. Salve. Having given our anxious consideration to the submissions made at the Bar, we are of the view that the new commercial light duty diesel vehicles can for the present continue being registered in Delhi on account of the dependence of the public on such vehicles for supply of essentials. There is, however, no reason why registration of private cars and SUVs using diesel with an engine capacity of 2000 cc and above should not be banned up to 31st March, 2016. It is noteworthy that diesel vehicles of 2000 cc and above and SUVs are generally used by more affluent sections of our society and because of the higher engine capacity are more prone to cause higher levels of pollution. A ban on registration of such vehicles will not therefore affect the common man or the average citizen in the city of Delhi. We accordingly direct that Registration of SUVs and private cars of the capacity of 2000 CC and above using diesel as fuel shall stand banned in the NCR up to 31st March, 2016."

Order dated 30.04.2016

"*We permit registration of vehicles mentioned in para 3 of the application purchased by and for use by the Delhi Police subject to the condition that the purchasers shall deposit ECC at the rate of 30% of the purchase value before registration. The deposit shall be made before the Delhi Pollution Control Committee and a proof of deposit produced before the Transport Authority at the time of registration."*

Order dated 12.08.2016

"We accordingly direct that the CPCB shall open a separate account in a Scheduled public sector bank to receive the amount representing 1% of the Ex-show room price of every diesel car that is sold by any manufacturer/dealer in Delhi and NCR region."

Status of compliance

Member Secretary, CPCB has informed EPCA that ECC is being collected at the rate of 1% of the ex-showroom value of all new Diesel cars registered in NCR. As on November 01, 2016, the total collection of ECC stands at Rs. 8 crore.

Agenda 4: Improve Pollution Under Control (PUC) certification programme and its compliance for in-use vehicles

Directions from Hon'ble Supreme Court

Order dated 24.11.2016

Mr. Kumar may also in the meantime take instructions and place the following information on record: 3 (1) What is the system of issuing Pollution under Control Certificates to vehicle owners and who licenses the Centre where such pollution checks are carried out and certificates issued in the form of stickers. (2) How are the Centre, so licensed, monitored and by whom. (3) How many licences, given to such Centres, have been cancelled on account of the Centre's not performing their duties satisfactorily. (4) What steps, if any, can be taken to check vehicular pollution randomly either through the Transport Department or motor vehicle/traffic department concerned. (5) Whether the pollution check Centres are computerised and whether data available to it is uploaded on Net, if so, which is the agency that monitors the entire process.

Order dated 02.12.2016

"We had by our order dated 25.11.2016 asked the Government to answer a few queries set out in the said order in regard to what is the system of issuing "Pollution Under Control Certificate" (PUC) to vehicle owners and as to who licenses the centres where such pollution checks are carried out. Mr.Ranjit Kumar, learned SG has today filed his response to the said queries and explained the position at some length. We request Ms.Sunita Narayan to examine the reply to the queries filed by Mr.Ranjit Kumar and to file her response to the same along with her suggestions if any for improvement of the prevalent system."

Order dated 17.01.2017

"The fourth issue is with regard to the functioning of Pollution Under Control (PUC) Centres set up in various parts of Delhi. We have been shown the response given by the EPCA and we find that some of the Centres were inspected way back in 2013. In any event, full details as on date are not available from the response. For example, it is not known whether all Centres have been inspected or not and if so on what date and the result of the inspection. We do not know the status of the show-cause notices issued to 174 stations and whether they are functioning effectively or not or whether their licence has been cancelled. We expect a final, proper and accurate response with regard to the functioning of the PUC Centres after a

thorough inspection of each one of them. We are told by the learned amicus curiae that the inspection will take about eight weeks."

Status of compliance

The EPCA has submitted a report on examination of the Pollution Under Control (PUC) system in the Hon'ble Supreme Court on January 17, 2017. EPCA is now working on a comprehensive audit of existing stations and also system and standards for PUC. The report will be submitted to Hon'ble Supreme Court by March 15, 2017.

Annexure 3: Pollution from trucks in Delhi

Agenda 1: Reduction in the number of trucks transiting through Delhi through the imposition of ECC to provide dis-incentive and to make existing bypass roads a preferable option and to divert trucks not destined for Delhi

Directions from the Hon'ble Supreme Court

Order dated 9.10.2015

"Learned Amicus Curiae Shri Harish Salve, learned Solicitor General Shri Ranjit Kumar and Shri Dushyant Dave, learned senior counsel appearing for the Government of NCT Delhi have jointly suggested that ECC ought to be imposed by the Delhi Government at the following rates :
(i) Category 2 (light duty vehicles etc.) and Category 3 (2 axle trucks) Rs. 700/-
(ii) Category 4 (3 axle trucks) and Category 5 (4 axle trucks and above) Rs.1300/-"

"The above charge shall not be imposed on
(a) Passenger vehicles and ambulances
*(b) On vehicles carrying essential commodities, that is, food stuffs and oil tankers." (*On February 15, 2016, the Government of NCT of Delhi notified the list of essential commodities).

Order dated 16.12.2015

"We, however, direct that for Delhi bound vehicles loaded with goods, the ECC will be twice the charge stipulated by us by our order dated 9th October, 2015. This measure shall, in our opinion, discourage any vehicle trying to enter Delhi on a false pretext of the goods loaded on it being Delhi bound."

"We are further of the view that empty/un-laden vehicles bound for Delhi, can enter Delhi on payment of the ECC earlier stipulated by us @ Rs.700/- and Rs.1300/- per vehicle depending upon the category to which the vehicle belongs."

"We accordingly direct that while vehicles "bound for Delhi" may enter on payment of ECC at the rates stipulated hereinabove, those registered in the year 2005 or earlier shall not qualify for such entry. State Governments and Union Territories concerned shall ensure that vehicles bearing registration numbers of the year 2005 or earlier do not enter Delhi. The governments will evolve a suitable system for implementation of this direction."

"No vehicle which is not bound for Delhi will be allowed to enter from N.H.-8 and N.H.-1. We accordingly direct that traffic from these two entry points viz. Kundli border on N.H.-1 and Rajokri on N.H.-8, shall be diverted to bypass Delhi through such alternative routes as the transport/traffic departments of the governments concerned may stipulate".

Order dated 5.1.2016

"We direct that heavy commercial traffic from NH-2, NH-10, NH-58 and from state highway no 57 shall not be allowed to enter Delhi from the entry point mentioned above. Commercial vehicles that are Delhi bound shall however remain unaffected.

We direct the state governments and NHAI shall take immediate steps for identifying and prescribing alternative routes for the heavy commercial traffic with a view to bypassing Delhi

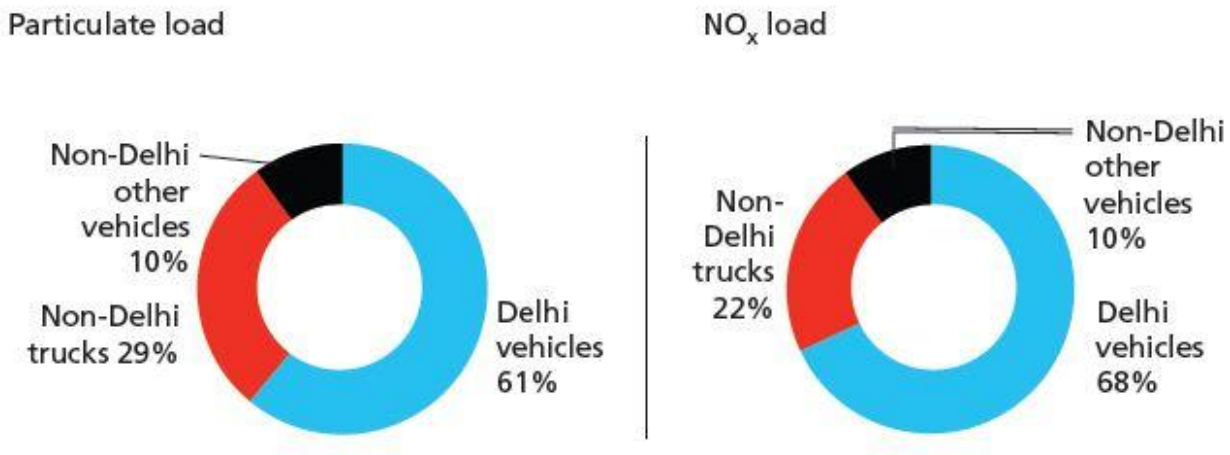
Order dated 16.12.2015

"We are further of the view that empty/unladen vehicles bound for Delhi, can enter Delhi on payment of the ECC earlier stipulated by us @ Rs.700/- and Rs.1300/- per vehicle depending upon the category to which the vehicle belongs. We, however, direct that for Delhi bound vehicles loaded with goods, the ECC will be twice the charge stipulated by us by our order dated 9th October, 2015. This measure shall, in our opinion, discourage any vehicle trying to enter Delhi on a false pretext of the goods loaded on it being Delhi bound".

Status of compliance

EPCA report to the Hon'ble Supreme Court in October 2015 revealed that incoming light and heavy trucks emit close to 30 per cent of the total particulate load and 22 per cent of the total NOx load from the transport sector in Delhi. It also found that there were transit routes to bypass Delhi, but these were not preferred because it was cheaper to transit through Delhi (see Graphs 11 and Table 2)

Graph 11: Percentage contribution to pollution



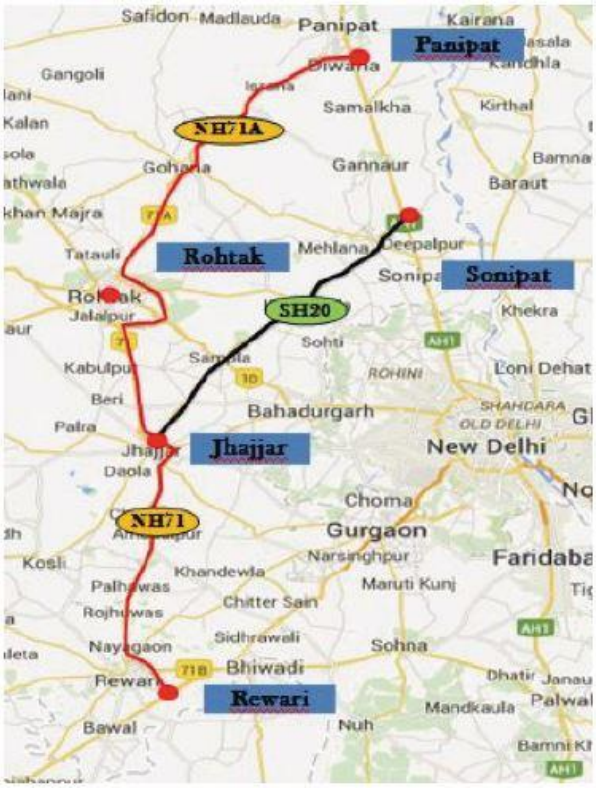
Source: 2015, EPCA

EPCA report had also pointed to the fact that alternative bypass roads exist, but that these are more expensive to use and so commercial trucks prefer to transit through Delhi (see table)

Table 2: Comparison of toll rates along alternative routes around Delhi

Comparison of Toll Rates along various Alternatives						
Route (From Panipat to Rewari)		**Length, in Km**	**Toll Rate for LGV**	**Toll Rate for 2-axle Trucks**	**Toll Rate for 3-axle Truck**	**Toll Rate for 4-axle and above**
Alternative 1	NH71A - NH71 (Through Rohtak)	172	450	930	1420	1550
Alternative 2	Through Delhi	163	120	225	450	1120

Figure 1: Map of alternative route



Based on this report and its findings, the Hon'ble Supreme Court on October 9, 2015, imposed an environment compensation charge (ECC) on commercial goods vehicles

entering Delhi from the 124 entry points. The Court asked that this revenue should be used for augmenting public transport and for improving the road infrastructure for pedestrians and cyclists.

Impact of SC order on ECC on trucks

1. EPCA report dated October 2015 had estimated that light and heavy-duty commercial trucks contributed 30 per cent of the PM load of transport sector.

2. EPCA based on a study commissioned through V R Techniche Consultants had estimated that on a daily basis there were 38,588 commercial vehicles in category 2-5 that entered Delhi from 9 main entry points.

3. In December 2015, EPCA commissioned another survey to V R Techniche Consultants, which found that there was a 20 per cent decline in the number of commercial vehicles entering Delhi. The then toll concessionaire contented that the drop in the number of vehicles was greater – 31 per cent.

4. The findings of vehicle number reduction up to December 2015 are as follows:

	Daily entry prior to ECC (category 2-5)	Daily entry post ECC (category 2-5)	Difference (%)
SMYR	35,143	24,087	-31.5%
CSE	38,588	31,326	-19 %

Source: SMYR Consortium LLP, CSE Traffic Count Study

5. On December 16, 2015, the Hon'ble Supreme Court increased the quantum of the ECC, which has had further impact on the volume of traffic entering Delhi.
6. On February 1, 2016 SDMC changed its toll concessionaire and made enforcement of collection stricter. It has also mandated computer receipts so that there is compliance with the directions of the Hon'ble Supreme Court. EPCA directions were as follows:

    i. Toll concessionaire will create a computer-generated receipt, integrating the collection of toll and ECC in the 9 collection points where the bulk of the traffic enters Delhi.
    ii. In the non-computerised collection tolls, the contractor will use handheld devices to issue receipts and to transfer data to SDMC within 30 days from the date of being awarded the contract.
    iii. Will provide an online-backup of the transactions to the SDMC and Delhi government server.

iv. Will ensure system of effective enforcement for collection of ECC, through regular checks and action against defaulting staff. The collection of ECC is imposed by the Supreme Court and has to be monitored strictly.
v. Any default/misappropriation detected in the system by joint teams of SDMC and transport department, government of Delhi will result in imposition of penalty for each default at the rate of Rs 10 lakh.

7. On February 28, 2016, EPCA directed Delhi government and SDMC that ECC would be levied by beyond 29.2.2016 till further orders. On 4.3.2016 the Delhi government issued a notification that the ECC shall be levied by the Corporation beyond 29.2.2016 till further orders.

8. In early March, SDMC brought to EPCA's notice that were vehicles, which were making multiple entries into Delhi and were refusing to pay ECC. There was also an incident where truck making entry shot upon the toll operator's worker. On March 10, EPCA convened an emergency meeting with senior representatives of police to discuss enforcement of ECC and took the following decisions:
   - The toll collector shall flash the vehicle number of the violator on Police Control Room No-100 immediately after the incident
   - The toll collector shall file FIR at the concerned Police Station and the Police shall take appropriate action at earliest.
   - If a vehicle is caught either without paying ECC / non-destined to Delhi/ pre-2006 registered, then a fine of 10 times of the applicable ECC shall be imposed. In case of the offence of unauthorized entry is committed on more than three times, the vehicle shall be impounded for a minimum period of 1 month and the Registration Certificate of the vehicle will be suspended.

9. In compliance with Hon'ble Supreme Court order Haryana government has set up 13 check posts and is diverting roughly 6,300 vehicles every day. In the period between January 21, 2016 to March 28, 2016, Haryana has diverted 4,29,095 vehicles. These concerted efforts are verified also through the increase in numbers seen on the toll highway, NH71 and NH 71A.

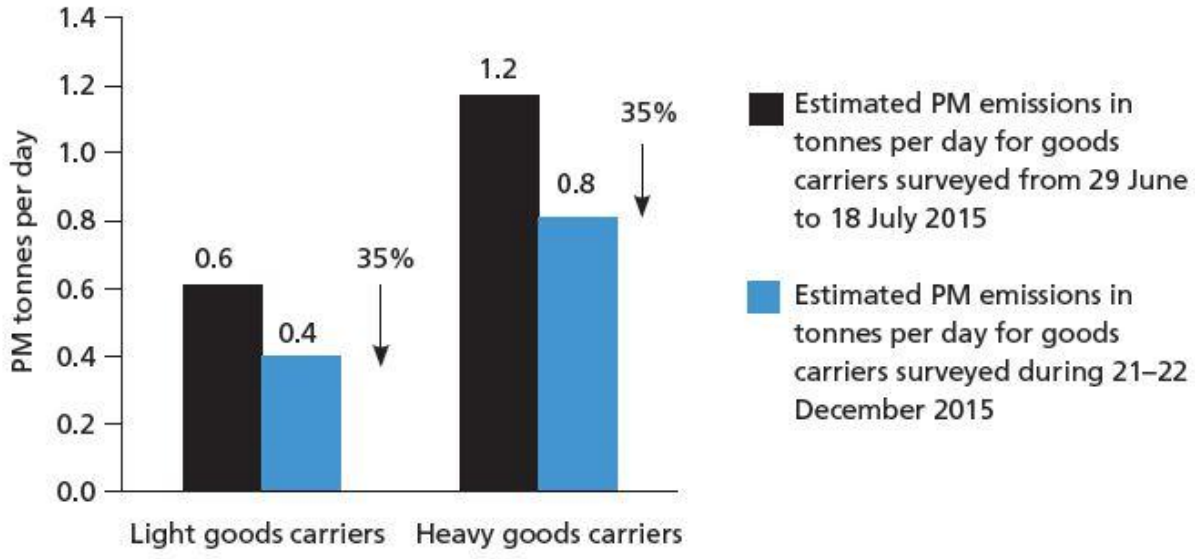
10. Between 21.01.2016 to 25.04.2016, Haryana had set up 13 check posts and this has resulted in diversion of a total of 6,00,880 vehicles. Uttar Pradesh has also taken steps to set up check posts and also install billboards about the diversion of traffic not bound for Delhi. While the number of vehicles diverted till 11.04.2016 were only 3278, representatives of the state govt have informed EPCA that information about diversion and cost of entry to Delhi has resulted in fewer vehicles on the road for diversion. The diversion of vehicles was strictly done over the winter months in 2015-16 by UP and Haryana. However, both state governments have reported staff

limitations to keep up the active diversion of vehicles. However, the bill boards have been installed at key points and check post installed. The diversion is continuing as a result.

11. Based on all these actions and improved enforcement there has been a marked decline in the number of commercial vehicles entering Delhi.

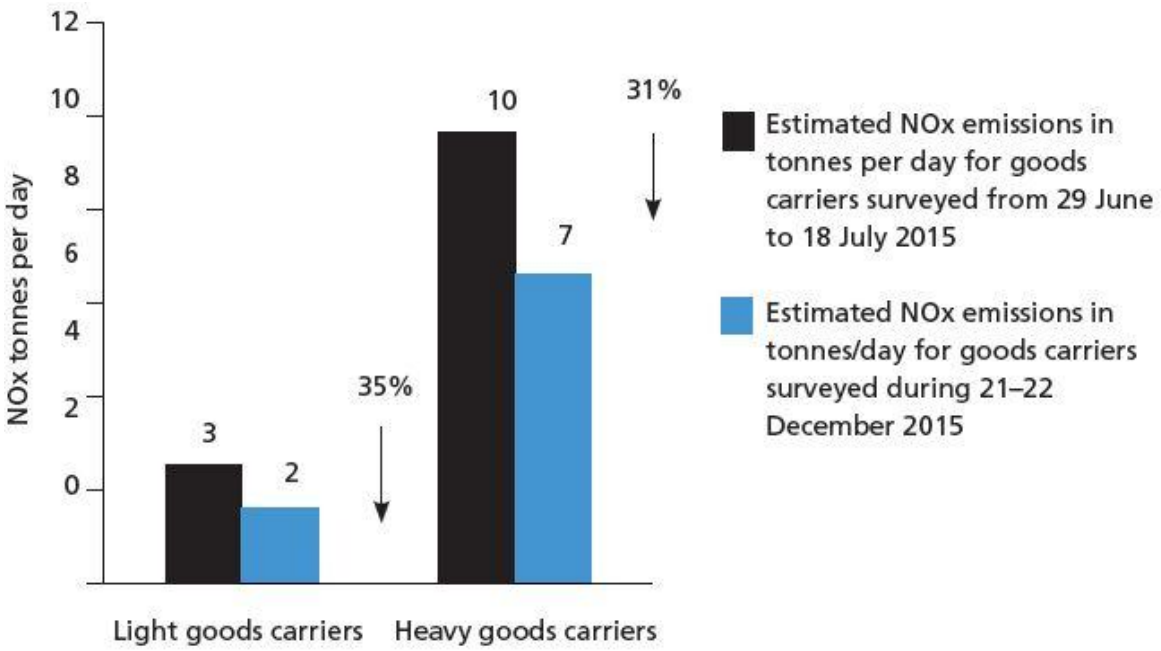
12. A follow up study by EPCA in 2016 showed a decrease in truck traffic leading to reduction of as much as 30-35 per cent in PM and NOx levels in this vehicle category. (Graph 14 and 15 on reduction at night time and winter)

Graph 12: Reduction in Particulate matter emissions in Delhi



Source: CSE estimates based on vehicle data real time traffic survey by V R TECHNICHE Consultants Pvt Ltd

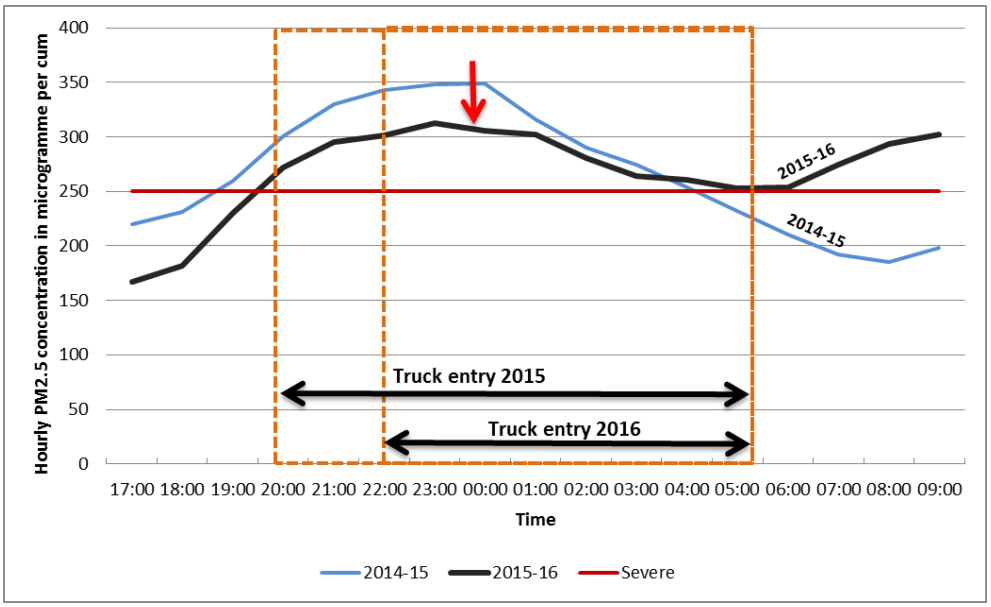
Graph 13: Reduction in NOx emissions in Delhi



Source: CSE estimates based on vehicle data real time traffic survey by V R TECHNICHE Consultants Pvt Ltd

Trucks are mainly responsible for pollution during night, as was visible in the previous years. To understand the impact of the reduction in the numbers of vehicles on air quality, EPCA compared the night pollution levels of the previous year. It has found a clear trend showing that the concentration of PM 2.5 is lower this winter in the night, as compared to the previous year.

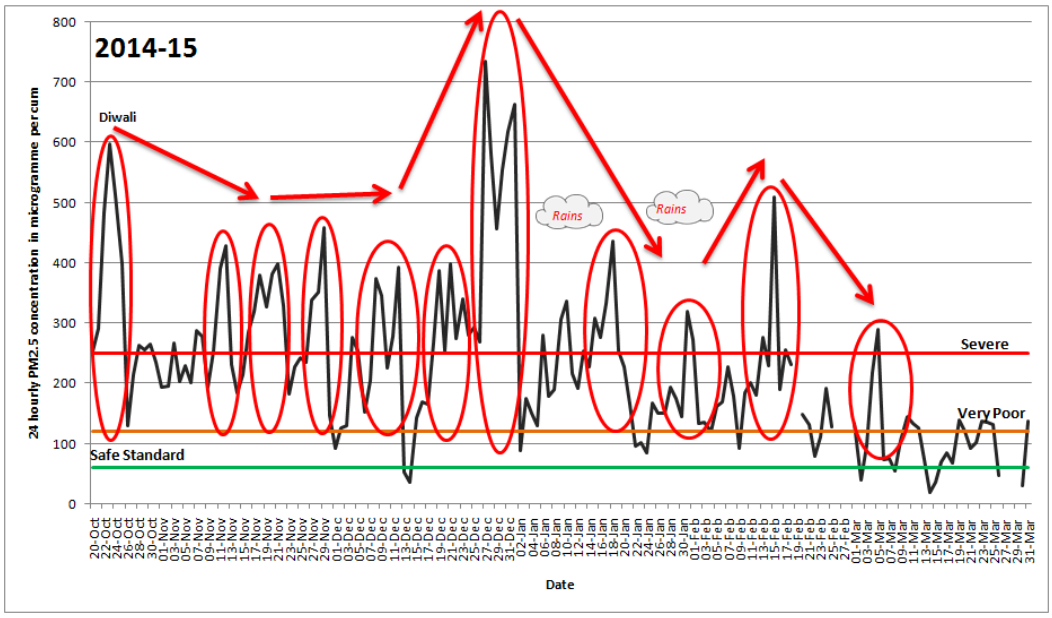
Graph 14: Average night peak pollution has drops this winter in comparison to last winter



Source: Based on DPCC Real Time Monitoring Data

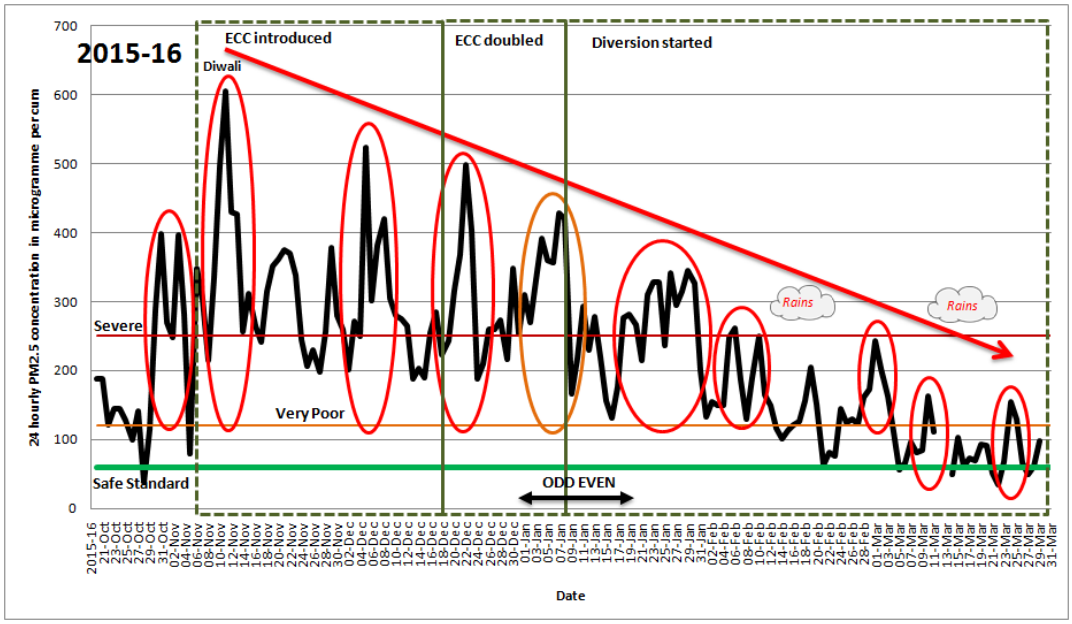
The analysis of DPCC data (average of 4 stations across the city), shows that there is a clear trend that is visible since the imposition of ECC and all other steps that are being taken to combat air pollution. Against the previous year, when there is no trend in the reduction of pollution, other than what is caused by weather events, in the current year in spite of adverse weather, the pollution peaks shows a steadily declining trend. This suggests that actions being taken by the Hon'ble Supreme Court are making a difference. It also suggests that levels of pollution are still high and require more enforcement and more steps to combat this deadly health scourge.

Graph 15: Sustained pollution control measures in winter of 2015-16 helped lower the pollution in a systematic fashion compared to winter of 2014 - 15



Source: Based on DPCC Real Time Monitoring Data

Graph 16: Sustained pollution control measures in winter of 2015-16 helped lower the pollution in a systematic fashion



Source: Based on DPCC Real Time Monitoring Data

Agenda 2: Installation of RFID to improve compliance and enforcement of orders Direction from the Hon'ble Supreme Court

EPCA report to Hon'ble Supreme Court on August 12, 2016 recommended for an RFID system to be installed for key entry points into Delhi. According to EPCA the RFID system is essential to enforce the directions of the Hon'ble Supreme Court. The current system is based on collection in cash and it involves human discretion to check all vehicles, which is open for misuse. It found that the volumes of cash collected are large – currently collection of ECC is roughly Rs 9 crore/week. It is also difficult to estimate the quantum of leakage in the system as there is no physical verification of the number of vehicles that are entering Delhi. The CCTV cameras installed by Delhi government at key entry points are not designed to count the exact numbers of vehicles that are entering Delhi. EPCA has found that enforcement of the system, which is critical as laxity in allowing vehicles to enter Delhi will mean that the objectives of the Hon'ble Court Order are negated, is difficult without the use of modern technology.

With the setting up of RFID:

1. The system of collection of toll and ECC will move from ***cash to cashless***. Each vehicle seeking to enter Delhi will have to pay toll and ECC on an online portal (for which discussions are underway with SBI). In addition, they will also be able to pay at RFID issuing points, which will be located at strategic points.
2. The system will necessitate pre-registration of vehicles, which will allow for checking of the age of the vehicle that seeks entry. This will ensure compliance of the orders of the Hon'ble Supreme Court that only commercial vehicles registered after 2005 will be allowed entry into Delhi.
3. The system will ensure compliance with directions of Hon'ble court that only vehicles destined for Delhi would be allowed entry as it would capture information on destination and also track if the vehicle has used Delhi as a bypass.
4. The system will allow vehicles, like ambulances, petroleum and water tankers to be pre-registered and therefore exempt from payment of ECC. All other exempt vehicles will also seek pre-registration based on the nature of goods that they carry or seek cash reimbursements from government post entry into Delhi.
5. Implementation of RFID will make the system easier to operate and reduce the delays and harassment faced by transporters. It will also improve collection efficiency.
6. The RFID system as detailed in the RFP document is designed to be compatible with the nationwide e-tolling system that will be implemented through the Indian Highways Management Company, set up through 25% equity participation of NHAI.
7. The system will be rolled out at 13 points, which bring 80% of commercial traffic to Delhi. It is clear that in the remaining points, the volume of commercial traffic is low, but to ensure that there is no diversion of traffic barriers will be installed to stop heavy traffic from entering. It is not envisaged that the RFID system will have to be

installed at all remaining 105 points and that if at all there is a need, it may be at another 5-10 points of entry, which can be done in the future. The cost of the system will therefore, not increase further.

Order dated 22.8.2016

"Mr. Salve, learned Amicus, submits that this Court could in modification of our Order dated 9th October, 2015, grant "in principle approval" for the use of a part of the ECC collected in the past towards the proposed installation of RFID in Delhi.

He submits that the depending upon the improvement and the extent of collection of ECC, post installation of RFID, this Court could issue appropriate directions suitably balancing the equity among the State and the stakeholders. We see no reason to decline that prayer. We accordingly direct that a sum of Rs.93 lakhs shall be released in favour of the RITES towards the fees payable to them for the service rendered. We further declare that the estimated cost on the installation of RFID may, in principle, be incurred from out of the ECC collection subject to further directions from this Court."

Status of compliance

SDMC is in advanced stage of its tendering for RFID for 13 points. The schedule is to commission the system before the onset of next winter. EPCA is closely monitoring the commissioning of this system. RFID will also open up enormous possibility of tracking vehicle operations and performance. It can be broadened to include all vehicle segments and advance operational aspects of traffic and pollution control in future.

Agenda 3: To provide alternatives for bypass by building Eastern and Western Peripheral Expressway and to improve/upgrade the existing alternative routes

Direction from the Hon'ble Supreme Court

Order dated 31.3.2016

"We therefore direct the Director General of Police of the States of Uttar Pradesh and Haryana to ensure that requisite protection required by the National Highway Authority Concessionaires, agents and contractors, is extended to them as and when the same is demanded. We however reserve liberty to the States of Uttar Pradesh and Haryana to seek modification of this order and/or clarification of this order should the demand for such protection and co-operation go beyond what is necessary for enabling the Highway Authority officials and contractors to carry out their duties in execution of the project in question."

Status of compliance

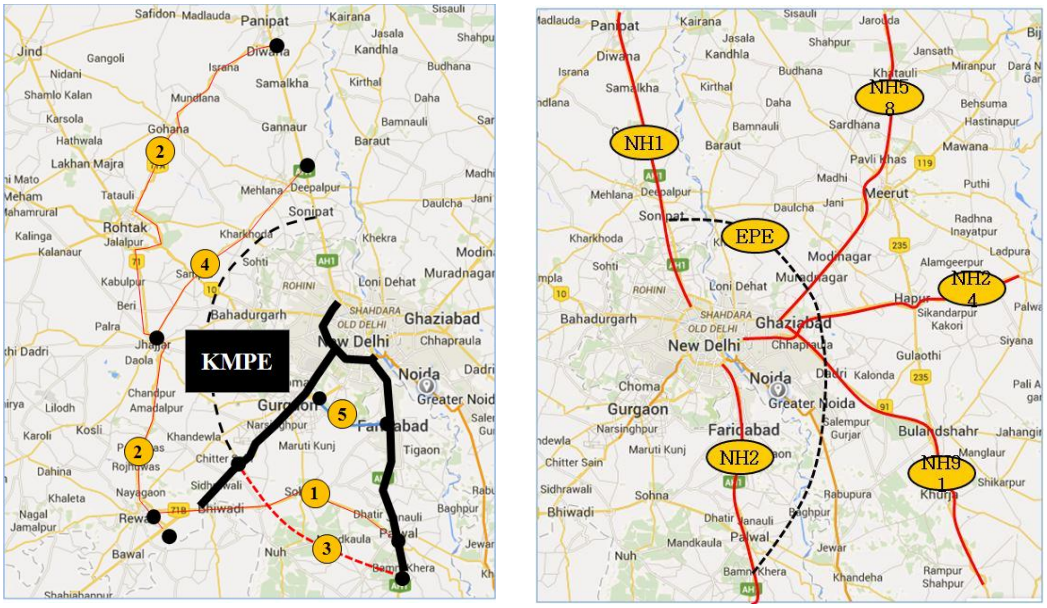
In 2005, the Supreme Court directed creation of two peripheral expressways to divert transit traffic away from Delhi. The eastern and western peripheral expressways are within the jurisdiction of the neighbouring states of Uttar Pradesh and Haryana respectively.

The Hon'ble Supreme Court's directions for the speedy commissioning of the two expressways – Eastern (EPE) and Western Expressways (WPE) to bypass Delhi – have been long pending. Based on Hon'ble Supreme Court's recent interventions and specific directions there has been progress made to complete these expressways. NHAI has informed EPCA that EPE is on schedule and will be completed by early 2018. This is critical for Delhi as currently there is no bypass for traffic on its eastern side.

Haryana government has informed EPCA that the concessionaire is awaiting financial closure and that it is making all efforts to complete the remaining portion of WPE.

In addition, EPCA has conducted a study which highlighted the critically sub-standard conditions of certain key roads, needed to bypass Delhi. It is now pursuing the matter with MORTH and NHAI to get expedited upgradation of these roads.

Figure 2: Eastern and Western peripheral expressways



Agenda 4: To install WIM for check of uploading

Direction from the Hon'ble Supreme Court

Order dated 5.1.2016

"We further direct EPCA shall examine the feasibility of setting up way-bridges at all such entry points and submit a report within 3 weeks."

NHAI has commissioned 60 WIM at 6 toll plaza for entry into Delhi. However, implementation of its penalty, which is 10 times of applicable rate for over-loaded vehicle is still lagging as NHAI has not been able to provide for turn-around facilities for these vehicles.

Figure 3: Toll Plazas on Entry Roads to Delhi

Annexure 4: Improve and scale up public transport in Delhi, NCR and last mile connectivity

Directions from the Hon'ble Supreme Court *dated 5.1.2016*

"Mr. Salve also pointed out that by our Order dated 27th July, 1998 M.C. Mehta v. Union of India and Others - (1998 (6) SCC 63), this Court had directed the Government of NCT of Delhi to augment its bus fleet by raising the number of buses from 5,000 to 10,000 by April 2001."
"We request Mr Ranjit Kumar to take instructions whether land in question (allotted 70 acres of which 45 acres not delivered) stands allotted and if so the reasons for non-delivery of the entire extent of land and also the time-frame within which DDA shall ensure delivery of such land."

Status of compliance

In 1998, the Hon'ble Supreme Court directed the augmentation of the CNG bus fleet to 10,000. Subsequently, the Delhi High Court ordered that Delhi should have 11,000 buses. But, by mid-2016, Delhi had only 6,000 buses (4,500 DTC and 1,500 cluster buses). The procurement needs to be expedited.

In compliance with the directions of the Hon'ble Supreme Court, EPCA has assessed that the Delhi government is in possession of 68 acres of land, which can park 1600 buses. In addition, DTC also has surplus land capable of accommodating 500 buses. In this way, there is depot land currently with the Delhi government, which can park up to 2000 additional buses.

EPCA's assessment is that the city requires between 132 to 330 acres of additional land to meet its target of 11,000 to 16,000 buses. It is also clear that current depot land will need to be optimised through multi-storey use so that this land requirement can be reduced. EPCA has directed DDA to do the needful to facilitate clearance of plans to build multi-storey bus parking.

Furthermore, there needs to be improvement of the bus service, multi-modal integration and expansion of public transport connectivity in NCR. This is an urgent agenda for the city.

Annexure 5: Stop pollution from power plants

The Solicitor General was to respond to this matter, as per the order of the Hon'ble Court dated January 21, 2016.

EPCA is of the firm view that coal based power plants must not be allowed in hot spot regions like NCR. The airshed of the region is one and this requires all use of coal and furnace oil to be stopped and to move to cleaner fuels like natural gas.

The current closure of Badarpur by the Delhi government is the right step in the direction. But now the effort has to be to ensure that power is sourced from Bawana natural gas plant and this means working out the economic feasibility of operating Bawana based on pooled gas – cheaper APM gas with available LNG.

This strategy must be followed across the NCR airshed and first older plants should be closed and moved to cleaner fuels.

EPCA would like to request the Hon'ble Supreme Court for an urgent hearing on this matter. In the meantime, Badarpur Power Plant must remain closed so that it does not contribute to the already toxic pollution in winter months.

Annexure 6: Pollution from waste burning

Directions from the Hon'ble Supreme Court

Order dated 16.12.2015

"We accordingly direct that the State Government and the local bodies concerned including M.C.D., N.D.M.C. and all other institutions that are generating solid waste shall take steps to ensure that no part of such waste is burnt and that proper arrangements are made for disposal of such waste in a scientific way without causing any hazard to environment".

This is a serious problem in the city as its garbage dumps have been mismanaged over the years and are prone to fires. Also leaf and garbage burning continues across the city and this requires stringent enforcement of the Hon'ble Supreme Court directions.

Delhi's three landfill sites—Bhalswa, Okhla and Ghazipur—have problems of fires, which then adds to the burden of air pollution in the city. These are 'processing sites' for the entire waste of Delhi, which amounts to about 10,000 tonnes per day. The un-segregated waste, which includes liquids, organics and food waste decomposes, releasing the highly combustible global warming gas, methane. The 2015 study by IIT-Kanpur finds that burning of municipal solid waste contributes to 3 per cent of all particulates in the city. The figure in the winter months is 5 per cent.

Under the Graded Response Action Plan all governments in NCR are required to formulate emergency plans to deal with fires at landfill sites. This work is urgent and ongoing. However, given the larger problem of lack of well-prepared strategies solid waste management in the region, this agenda is difficult to implement.

Annexure 7: Pollution from construction activities

Directions from the Hon'ble Supreme Court

Order dated 16.12.2015

"*It was submitted that Union of India and State Governments concerned must be directed to take steps to enforce the CPCB rules and norms against those engaged in such construction activities to prevent further rise of pollution levels. We see no reason to decline a direction to that effect. CPCB norms regarding prevention of pollution by putting curtains and other devices at construction sites must be strictly enforced by the enforcement agencies concerned. We direct accordingly."*

Status of compliance

The Delhi Pollution Control Committee (DPCC), under the Delhi government is responsible for ensuring that all construction projects meet the dust pollution norms as laid down by CPCB. EPCA has developed a guidance note for inspection of such sites, which will assist inspections and improve enforcement.

In 2016, MoEF&CC has issued the country's first ever notification on construction and demolition (C&D) waste management. So far, C&D waste had found a brief mention in Schedule III in the Municipal Solid Waste (Management and Handling) (MSWM) Rules, 2000. This was extremely inadequate. The new notification is, thus, a significant step forward. C&D waste is inert but bulky waste. It is either dumped in city landfills or in open spaces, water bodies and flood plains, choking up great chunks of urban land and water bodies.

The new notification creates the legal framework for recycle and reuse of C&D waste in the construction industry**.** These can substitute material mined from nature and prevent damage to water bodies, public spaces and green areas. As per these rules, local bodies will have to utilise 10-20 per cent of material from C&D waste in municipal and government contracts for construction. All cities will have to set up facilities in a phased manner. All large generators of waste will have to pay charges for transportation, collection, processing and disposal. They will be responsible for segregating construction and demolition waste before disposal. All large waste generators would need environment management plans.

The big tasks would be implementation and appropriate resource (financial and human power) allocation to local authorities. This will also require scaling up of the capacity building and recycling infrastructure.

Annexure 8: Paddy burning in the states of Punjab, Haryana and Uttar Pradesh

The matter of crop burning has been heard and important directives passed by NGT, Delhi High Court and the MoEF&CC, EPCA has focussed on working with state governments to improve technology for detection of crop residue burning (CRB) using remote sensing and spreading public awareness of the existing notification, which bans paddy burning at the village level through the community.

Banning burning of crop residues: Crop residue burning was notified as an offence by the state governments under the Air Act of 1981, the Code of Criminal Procedure, 1973 and various appropriate acts. In addition, a penalty is imposed on any offending farmer. Village and block-level administrative officials are being used for enforcement.

Detection and prevention: As per the state governments a combination of remote sensing technology—use of satellite imagery—and a team comprising local officials being used to detect and stop occurrences of crop residue burning in real-time. However, this last season, these efforts have been not very successful as paddy burning incidents have not been mitigated.

Establishment of a marketplace for crop residue burning: Efforts are being made to increase the avenues for alternate uses of paddy straw and other crop residues. For instance, paddy straw has a considerable calorific value, making it suitable for use as a fuel in biomass-based power plants. The strategy, broadly, is to assign a real economic and commercial value to the agricultural residue and making burning it an economic loss to the farmer.

Subsidy on agricultural implements: The state governments, in collaboration with the Centre, have rolled out schemes for providing subsidy on mechanical implements that help tillage of soil, so that crop residues can be retained in the soil, adding to its fertility. However, the high cost of these implements means that in spite of subsidies, only a small number of farmers have access to them at the moment.

Crop diversification: There are various ongoing, long-term efforts at diversification of cropping techniques. This is being attempted through cultivation of alternate crops (apart from rice/paddy and wheat) that produce less crop residue and have greater gap periods between cropping cycles.

Annexure 9: Pollution from brick kilns

The brick industry is one of the five largest industrial consumers of coal, and there are serious environmental concerns associated with the production of fired clay bricks. The Supreme Court, in an order in 1996, had directed that all kilns operating in Delhi should close. As a result, the brick kilns moves to areas bordering Delhi such as Ghaziabad, Noida, Bhagpat and Meerut. There are currently around 2,080 brick kilns in Delhi-NCR—with about 700 in the three districts of Ghaziabad, Gautam Budh Nagar and Hapur. Kiln capacity has increased by four-eight times.

A majority of the brick kilns in Delhi-NCR are of FCBTK type (Fixed Chimney Bull Trench Kiln), having chimneys/stacks emitting pollutants continuously during the manufacturing season from January to June every year. Many of them do not have gravity settling chambers which purify the effluent gas from the stacks. Even If the kiln owners have installed the chambers, they are either not working or are damaged.

There are options available for FCBTK to lower emissions. As options like VSBK, HHKs and tunnel kilns need initial investment, the most appropriate option therefore is the zigzag kiln. Zigzag kilns are better than FCBTKs when it comes to the amount of coal being consumed; they significantly reduce emissions of different types of pollutants arising due use of coal. A shift from FCBTK to zigzag has a number of other advantages as well: for instance, specific energy consumption is reduced by almost 20 per cent due to proper hot air circulation, the SPM and black carbon emissions are reduced drastically to about 75 per cent, and the number of good quality bricks goes up by around 25 per cent.

The Uttar Pradesh Pollution Control Board (UPPCB) has directed brick kiln owners of Ghaziabad, GautamBuddh Nagar and Hapur to upgrade their technology from natural draft brick kilns to induced draft brick kilns within 90 days. The UPPCB notice was issued in 2016 under Section 31(A) of the Air (Prevention and Control of Pollution) Act, 1981.

A roadmap needs to be developed with a proper vision which can convert the polluting kilns into a cleaner industry with the help of technology.

Annexure 10: Mandating 'acceptable' fuel to be used in NCR for air pollution control

Directions from Hon'ble Supreme Court

Order dated 2.12.2016

"Mr. Harish N. Salve, learned Amicus Curia next argues that one of the major causes of pollution in the NCR region happens to be the use of Petcoke and furnace oil as fuel generally for industrial purpose and for power generation. He has tendered before us a report which indicates that use of both these types of fuel is highly harmful in view of high sulphur content in the same. He submits that this Court could direct the Government to ban the use of Petcoke and furnace oil as industrial fuel and for generation of electricity in the NCR region."

"Mr.Ranjit Kumar, learned Solicitor General seeks time to examine the issue and to take appropriate steps. In the circumstances we grant to the Central Government four weeks' time to examine the issue whether Pet coke and furnace oil if used as industrial fuel and for generation of electricity are harmful because of high sulphur content in the same. In case the Government come to the conclusion that the use of the said fuel is indeed harmful for human beings, the Government may consider issuing appropriate directions in terms of Section 3(2)(v) of the Act which empowers the Government to regulate the industries' operations and processes or impose safeguards on such industries' operations and processes. We are of the view that forbidding use of Petcoke and furnace oil as industrial fuel and for generation of power will tantamount to safeguards for such operations or processes as may require the use of such fuel."

Order dated 17.1.2017

"The third issue that has been raised is with regard to the very high sulphur content in Pet coke and furnace oil and their utilization in industries in the NCR thereby causing immense air pollution. The learned Solicitor General says that action has been taken in this regard and necessary discussions with the stakeholders will take place tomorrow, i.e., 18th January, 2017 based on the response received from various institutions, such as CSIR, TERI, NPL, CPCB and Ministry of Petroleum and Natural Gas. He says that perhaps more than one meeting will be required in this regard and submits that the matter may be adjourned for some time so that a final response can be given in this regard."

1. It is well recognized that the quality of fuel used for combustion has a critical role in the quantum of pollution generated. It is for this reason India has moved from petrol/diesel with 10,000 ppm of Sulphur in 1996 to 50 ppm in 2010 (this will be

extended nationwide in April 2017). The improvement in fuel quality then allows for effective pollution control devices to be installed. In the case of diesel vehicles, for instance, only when fuel has Sulphur below 10 ppm, can after-treatment pollution devices be effective. The quality of fuel used for industrial production is equally important in terms of its pollution impact.

2. The key contaminant in fuel that is responsible for high levels of pollution is Sulphur – this is emitted in the form of particulates and also in the form of gas, Sulphur Dioxide (SO2). Depending on the level of moisture in the air, gas gets converted into particles. These 'secondary' particles are a key source of air pollution in Delhi/NCR. According to the IIT-Kanpur report, as much as 25-30 per cent of the winter sources are secondary particles, which are emitted from vehicles, power plants and industries. Any fuel, which is high in Sulphur will also have heavy metals, which will add to contamination of the environment.

3. In 1996, the Delhi Pollution Control Committee issued a notification mandating the 'acceptable fuels' that could be used in Delhi. This notification was issued under section 19 of Air Act. The list did not include furnace oil or pet coke or other fuels that could have high Sulphur. In 1996, it specified that coal with low Sulphur (4000 ppm) could be used in Delhi and also termed fuel oil with 18,000 ppm of Sulphur as low-Sulphur.
4. This notification did not extend to NCR and therefore, there was no restriction in the use of extremely polluting fuel at the border of Delhi and in the same air-shed.
5. Recently, it came to the notice of EPCA that with the crash in international fuel prices, the price of furnace oil (FO) and pet coke has also come down, which was increasing their use as fuel in industry and in generator sets above 1 mw. It was also learnt that other fuels, which were by-products of refineries and petro-chemical processes were also being used for combustion. EPCA also learnt that in most cases there were no specifications for the quality of this fuel.
6. The only BIS specification that exists is for fuel oil, which is also used for furnace oil (FO), and allows the product to have between 35,000-45,000 ppm of Sulphur. Furnace oil is the last grade produced by refineries and this 'bottom of the barrel' product is therefore, extremely polluting.
7. Pet coke, a by-product, of refineries, which is even more polluting does not even have any specifications for the Sulphur content that is permissible.
8. EPCA's investigation has found that large quantities of FO are sold in Delhi and NCR by oil Public Sector Undertakings (PSUs) and Reliance Industries Limited (RIL). This year, in fact, sale is even higher than last year and some 30,000 metric tonnes (mt) has been sold every month in NCR. According to this data, RIL has sold 51,000 mt in Delhi in the

past 7 months. However, RIL has informed EPCA that only its point of billing is in Delhi and not its customers. EPCA is unable to verify this but it is clear that even if this fuel is sold in NCR, it adds to the burden of pollution in the region.

9. There is no information about the quantum of sale of pet coke in NCR as oil companies do not collate this. During its factory visits in NCR, EPCA found that industries were importing pet coke for use. It then found that data from the Ministry of Commerce showed that pet coke imports are up – in 5 months up to August 2016, India had imported 7 million mt as against 10 million mt imported in 2015-16.
10. EPCA has also learnt that refineries and petro-chemical industries are selling by-products as fuels and that there are no specifications for these in the country.
11. EPCA has also had the samples of these fuels, namely FO and pet coke, which it collected personally during its visits, analysed to check on the Sulphur content.

11.1 **The analysis of the samples of pet coke done has found that the Sulphur level is between 69,000 ppm (imported) and 74,000 ppm (Indian)**.

11.2 **The analysis of the samples of FO has found that Sulphur level is between 15,000 to 20,000 ppm**.

12. The key substitute for FO is natural gas, which is cleaner and environmentally friendly. EPCA has learnt that pricing of FO is kept lower than gas so that it can be more competitive. Currently, FO sells for Rs 22-24/litre and the cost of power is Rs 5-6/unit; as against natural gas or electricity from the grid, which would cost Rs 6-7 per unit. In other words, substitutes for FO exist and they are competitive. The key substitute for petcoke, which is used in furnaces, would be electricity, natural gas or even low-sulphur coal. All these will be less polluting than pet coke.
13. However, while governments provide tax exemptions to FO – Uttar Pradesh does not charge VAT on FO – natural gas is taxed. In Uttar Pradesh, cleaner natural gas is charged VAT at 10%. This is the case in other states as well. Therefore, if policy is made to incentivize clean fuel over polluting fuel, it would increase the competitiveness of natural gas.
14. It is also clear that even though Delhi has closed down its industries because of pollution, it has only transferred the problem to its neighbouring states, where these industries using polluting fuel now operate. EPCA visited industries in Ghaziabad, which is in the same air-shed, which were using furnace oil and pet coke and therefore, greatly adding to pollution. Also many industries in Delhi operate in non-authorised colonies (illegal colonies) and so are outside the 'control' of the Delhi Pollution Control Committee (DPCC). It is therefore, necessary to mandate the need for clean fuel, not just in Delhi but across NCR, so that there are clean air benefits.
15. There are no standards for SO2 and therefore, the pollution from the use of these fuels in industry furnaces and generators is enormous. It is also clear that controlling pollution from such high Sulphur fuels requires huge investment in abatement

technologies and this is why it must be restricted. Pet coke, for instance, which is a high calorific by-product of refineries can be used by cement industry, where combustion technology is regulated.

16. There is no doubt that the use of such high Sulpur fuel is greatly contributing to pollution in the region and needs urgent steps to curtail use.
    Based on these findings, **EPCA recommends the following**:

16.1 The list of 'acceptable fuels' that can be used in NCR (not just Delhi) as per section 19 of the Air Act should be as follows:

a. Coal with low-Sulphur (1000 ppm or less) for use in power plants (until these can be switched to natural gas)
b. Petrol (BS IV with 50 ppm Sulphur)
c. Diesel (BS IV with 50 ppm Sulphur)
d. Natural gas/CNG
e. LPG
f. Kerosene (for domestic use)
g. Naptha (for power plants and under strict enforcement for pollution)
h. Aviation turbine fuel (for aircraft)
i. Firewood(only for domestic use in rural areas and crematorium)
j. Biogas

16.2 **The use of furnace oil and pet coke would be strictly banned in NCR**. Pet coke will be allowed only in cement plants, where combustion and emissions are controlled. However, if any cement plant requires the use of pet coke in NCR, it will have to seek permission from CPCB and EPCA.

16.3 All other fuels, which do not have specifications laid down by BIS would be banned for use in NCR. Any new fuel to be added to the list of acceptable fuels will be done only after consideration of its parameters as laid down by BIS and its fuel test reports by CPCB and EPCA.

16.4 Government should finalise specifications for fuels used for industries/generators urgently so as to make sure that only low-Sulphur and clean fuels are available for use in the country.

16.5 The use of pet coke should be regulated across the country. All industrial fuels should be included in the list of hazardous waste so that import and use is regulated by the Ministry of Environment and Forests and Climate Change.

16.6 The NCR governments should be directed to provide fiscal incentives to clean fuel as against polluting fuel.

16.7 The GoI should revise its fiscal policies, which incentivize polluting fuels over cleaner fuels.