

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

(Under Section 14 & 15 r/w section 18 (1) of National Green Tribunal
Act, 2010)

ORIGINAL APPLICATION NO. 588 OF 2025

IN THE MATTER OF:

SANJAY SHARAN

...APPLICANT

VERSUS

UNION OF INDIA & ORS.

...RESPONDENTS


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Place: New Delhi
Dated: 16.05.2026

Applicant
Through



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**REJOINDER/REPLY ON BEHALF OF THE APPLICANT TO THE
ADDITIONAL AFFIDAVIT FILED BY THE RESPONDENT NO. 1,
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE**

MOST RESPECTFULLY SHOWETH,

1. That I am the Applicant in the present matter and Competent to depose the present Rejoinder Affidavit/Reply. I have received and perused the present additional affidavit of the Respondent No. 1. At the outset, the answering Applicant denies all the averments, as made in the additional affidavit which are contrary to what is stated in the present Original Application. Nothing may be deemed to be admitted unless the same is specifically admitted herein.
2. That the present Original Application was filed challenging the Notification dated 11.07.2025 issued by the MoEF&CC [Respondent No. 1] whereby MoEF&CC has diluted the emission norms for

Sulphur Dioxide of thermal power plants by prescribing stack height standards of an erstwhile 30.08.1990 Notification of MoEF&CC, and is in clear violation of the principle of Non-Regression, which is now a law of the land as espoused not only by this Hon'ble Tribunal but also confirmed and now relied upon by the Hon'ble Supreme Court. The Applicant has also challenged the arbitrary categorization of Thermal Power Plants (TPPs), leading to complete exemption for certain categories of TPPs even for Non-Attainment Cities, as well as Critically Polluted Areas.

3. That this Hon'ble Tribunal vide Order dated 21.01.2026 issued Notice and granted time to the MoEF&CC [Respondent No. 1] to file their reply affidavit within six weeks. Thereafter, MoEF&CC has filed its Reply Affidavit on 17.03.2026. The Applicant herein vide Order dated 17.03.2026 was granted liberty to file his Rejoinder to the Reply Affidavit dated 17.03.2026. Accordingly, the present Rejoinder is being filed to highlight and confirm the discrepancies and arbitrariness in issuing the impugned Notification dated 11.07.2025 by the MoEF&CC [Respondent No. 1], in clear violation of the Orders of this Hon'ble Tribunal as well as the Hon'ble Supreme Court and also in total contravention of the specialist statutory agency, namely CAQM

PRELIMINARY SUBMISSIONS

A. The Reports of CAQM, along with ICMR, TERI, and CREA, have repeatedly highlighted the failure of Thermal Power Plants to adhere to emission norms, specifically for SO₂ standards as per the MOEF&CC Notification dated 07.12.2015.

4. That the Respondent No. 1 has placed reliance upon various orders passed by the Hon'ble Supreme Court, whereby the Respondent No. 1, along with the Respondent No. 13, namely the Commission for Air Quality Management (CAQM), were directed to ensure strict and time-bound compliance with the emission norms prescribed under the notification dated 07.12.2015, particularly in respect of TPPs operating in and around the NCR and adjoining areas.
5. That it is submitted that the EPCA, in its Report No. 81, after undertaking a comprehensive review of the compliance status of Thermal Power Plants, recorded with concern that a substantial number of plants had failed to install the requisite pollution control technologies such as Flue Gas Desulphurization (FGD) systems for controlling sulphur dioxide (SO₂) emissions, as well as systems for controlling Nitrogen Oxide (NO_x) and particulate matter emissions. The said report highlighted persistent delays, lack of adherence to timelines, and the adverse impact of such non-compliance on ambient

air quality in the NCR region. Consequently, the EPCA recommended strict adherence to the emission norms and emphasized that all defaulting units must ensure installation and operationalization of emission control systems within the prescribed timelines, originally targeted for completion by the year 2020.

6. That further, in the Report No. 84, the EPCA undertook a follow-up assessment and noted that despite repeated directions and the lapse of the initial deadline, compliance remained inadequate and uneven across TPPs. The Commission underlined the urgency of expeditious implementation of emission control measures and reiterated that continued non-compliance posed a serious threat to public health and environmental sustainability. The report also recommended the adoption of coercive measures, including restrictions on operation of non-compliant units, imposition of environmental compensation, and prioritization of cleaner fuels and technologies. True copy of the relevant pages of Report No. 84 of EPCA is annexed herewith as **Annexure A-1/1**.
7. That thus, both the Report Nos. 81 and 84 of EPCA unequivocally demonstrate that the concerned authorities and Thermal Power Plants were required to achieve full compliance with the emission norms notified on 07.12.2015 by the year 2020, and that any continued delay or deviation therefrom was viewed seriously by the regulatory

authorities in light of its direct bearing on air quality management in the region.

8. However, despite the clear statutory framework and the recommendations of EPCA, the Respondent No. 1, MoEF&CC, has adopted a contradictory and dilatory stand and has sought to justify repeated deferments in the implementation of the emission norms prescribed under the Notification dated 07.12.2015.
9. That further, it is reiterated that apart from EPCA Report, there have been numerous reports which have time and again emphasised the highly polluting nature of thermal power plants due to their failure to comply with the emission norms prescribed by the MOEF&CC, which include –
 - a. Performance Audit Report on Air Pollution Control by the Government of Gujarat, 2022 [**Annexure 8, Page No(s). 73 to 81**] *inter alia* notes at Page 76 that Torrent Power Limited (TPL) was alone responsible for 66% of the emission load [PM, NO_x and SO₂] of the city of Ahmedabad;
 - b. Study by Centre for Research on Energy and Clean Air dated 15.11.2024 [Annexure 9, Page No.(s) 82 to 86];
 - c. Indian Council for Medical Research Report dated 06.12.2018 [Annexure 12, Page No.(s) 82 to 86];

- d. Report by The Energy and Resource Institute stating that coal-fired power generation accounts for the highest source of pollution in India [**Annexure 14, Page No.(s) 105 – 115**];
 - e. Centre for Financial Accountability report dated 27.03.2020 stating that the emission hotspots around the world are in India [**Annexure 15, Page No.(s) 116 – 118**];
 - f. Advice on FGD Technology Selection for Different Unit Sizes by the Central Electricity Authority [**Annexure 16, Page No(s). 119 – 122**]
10. That infact, the latest report of CAQM titled 'Report of the Air Quality Experts on Identification of the causes for worsening AQI in Delhi-NCR' dated January 2026 records that Thermal Power Plants are one of the main and second-highest contributors to pollution in Delhi NCR. Based on the report and suggestions of the CAQM, the Hon'ble Supreme Court in the case of MC Mehta vide Order dated 23.02.2026 had sought a proposal from the Ministry of Power and MoEF&CC to submit a proposal for restricting the establishment of new thermal power plants within 300 km of Delhi. Thus, the relaxation of the emissions norms by MoEF&CC has clearly worsened the air quality to the extent that the Hon'ble Supreme Court deemed it appropriate to restrict the establishment of any new thermal power plants within 300 km of Delhi. True copy of the report of

CAQM dated January 2026 titled Report of the Air Quality Experts on Identification of the causes for worsening AQI in Delhi-NCR' is annexed herewith as **Annexure A-1/2**. True copy of the Supreme Court Order dated 23.02.2026 in MC Mehta v. Union of India and Others [W.P. (C) No. 13029 of 1985] is marked and annexed as **ANNEXURE –A-1/3**.

B. The reliance on Reports of IIT Delhi, NIAS, CSIR NEERI and CPCB by MoEF&CC [Respondent No. 1] is without any merit, as the Notification dated 11.07.2025 was arbitrarily issued just one day after the recommendations of the CPCB on 10.07.2025.

11. That the reliance upon certain studies conducted by institutions such as IIT Delhi, NIAS, and CSIR-NEERI is wholly misconceived and untenable in law and on facts because they do not comprehensively cover the full spectrum of TPPs, nor do they adequately account for the population exposure and pollution load in critically polluted areas and non-attainment cities, which are the primary focus of air quality management measures in the country. The sampling framework, geographical scope, and temporal analysis of such studies are restricted and fail to capture cumulative and long-term impacts of SO₂ emissions, particularly their role in the formation of secondary particulate matter (PM_{2.5}). The report of IIT Delhi is based on a limited survey of only 10 cities across India. Despite such a restricted

sample size, the findings have been generalized and presented on a pan-India basis, which renders the conclusions inherently unreliable and overbroad.

12. That with respect to the report of NIAS, the same is an interim study report based on a survey conducted on only two TPPs based in Telangana. Such a limited sample survey is wholly inadequate to draw any broad-based or representative national conclusions. Further, the economic benefit of non-installation of FGD is baseless as a greater cost will be incurred on pollution mitigation measures for any high ash content coal, domestic or imported and more importantly resulting in further deteriorating the air quality affecting right to breathe clean air itself.
13. That it is further submitted that these studies do not sufficiently consider the disproportionate burden of pollution on densely populated regions, including the National Capital Region (NCR) and other non-attainment areas identified under the National Clean Air Programme (NCAP). By excluding or inadequately representing such high-risk zones, the conclusions drawn therein are inherently incomplete and incapable of forming a sound basis for public policy decisions affecting environmental and public health.
14. That moreover, the said studies fail to adopt a precautionary and health-centric approach, which is a settled principle of environmental

jurisprudence. Instead of evaluating worst-case scenarios and cumulative exposure risks, the studies appear to rely on limited datasets and assumptions, thereby understating the adverse impacts of SO₂ emissions from TPPs. Consequently, any inference drawn to dilute or defer the mandatory installation of statutorily mandated APCDs such as FGD systems is not only scientifically questionable but also legally unsustainable.

15. It is also submitted that the report of the Central Pollution Control Board (CPCB), comprising more than 500 pages, was admittedly submitted on 10.07.2025, whereas the impugned notification was issued on 11.07.2025. The proximity of these dates clearly demonstrates that the Respondent Ministry could not have, in the ordinary course of administrative functioning, examined, analysed, and applied its mind to such a voluminous and technical report within a single day and it is humanly improbable to scrutinize a report of such magnitude overnight, obtain necessary inter-departmental consultations, secure approval from the competent authority at the highest level in the Ministry, and thereafter issue a policy decision by issuance of notification dated 11.07.2025 of such significance on the very next day. In these circumstances, it is evident that the impugned notification was premeditated, and the decision-making process had been concluded much prior to the receipt of the CPCB report, and

thus rendering the reliance on the said report was a mere formality and an afterthought. Such action reflects non-application of mind, arbitrariness, and a colourable exercise of power, thereby vitiating the impugned notification in law, which is required to be struck down.

16. That the CPCB report placed on record by the MoEF&CC notes that the coal consumption, especially domestic coal & lignite has increased from 335.4 MT to 894.94 MT during 2005-6 to 2323-24 and the coal import has increased from 268.34 MT in the year 2023-24 to 1,274.6 MT during 2023-24. Further, the report also states that at present there are 600 Thermal Power Plants with 2,11,519.5 MW capacity and the Government of India has proposed to increase Thermal Power Plant capacity by 80,000 MW. However, due to the exemption from the requirement of SO₂ norms, the existing and new TPPs of more than 2,11,519.5 MW capacity will not be operating without the requisite pollution control measures apart from utilization of stack height for dispersion of the SO₂ in the atmosphere. Till date as per the CPCB Report, only 49 units out of 600 have installed FGD. The recommendations of the CPCB are in stark contrast to the rest of the contents of the report which clearly notes that one of the best available technologies for SO₂ emissions is FGD.
17. That in effect, the Respondent No. 1, instead of acting as a regulator and guardian of environmental protection, is seeking to create

ambiguity around the necessity and efficacy of APCD such as the statutorily mandated FGD technology, thereby enabling continued non-compliance by TPPs. Such conduct defeats the fundamental right of citizens to a clean and healthy environment under Article 21 of the Constitution of India and warrants strict judicial scrutiny.

18. That further this Hon'ble Tribunal in the case of SPENBIO v. Union of India and Others [O.A. No. 677 of 2016] has *inter alia* stated that an amendment to the existing environmental laws should be done with the least impact on environmental protection that was available under the existing law or regime. However, in the present case, there is not a dilution by way of amendment but a complete exemption from the legal requirement of complying with emission norms by exempting TPPs from the installation of the requisite pollution control devices.
19. That further, the MoEF&CC has failed to provide any clarification for lower standards for compliance for TPPs located in Non-Attainment Cities as well as Critically Polluted Areas, when in fact the said plants are required to be treated at par as Category A Plants, if not more stringently as per NCAP. Thus, the relaxation from compliance with SO₂ norms by only relying upon the stack height standards is clearly baseless and to the detriment of environment protection.

C. The challenge to the Notification dated 11.07.2025 is not pending consideration before the Hon'ble Supreme Court.

20. That the Respondent No. 1, Ministry of Environment, Forest and Climate Change (MoEF & CC), is erroneously contending that the present issue is sub judice before the Hon'ble Supreme Court in W.P. (C) No. 13029/1985, *M.C. Mehta v. Union of India & Ors. (In Re: Power Plants)*, wherein the Ministry has filed an affidavit seeking to justify the impugned notification dated 11.07.2025 for compliance with SO₂ emission norms. The distinction between the present Original Application No. 588 of 2025 and the matter pending before the Hon'ble Supreme Court in W.P. (C) No. 13029/1985, *M.C. Mehta v. Union of India & Ors. (In Re: Power Plants)*, is clearly delineated as under:

- (a) That the present Applicant has specifically assailed the Notification/Office Memorandum dated 11.07.2025 issued by the Respondent No. 1, MoEF&CC, which did not form part of the subject matter under consideration before the Hon'ble Supreme Court in the aforesaid proceedings. Moreover, the Applicant herein had first filed a Writ Petition under Article 32 before the Hon'ble Supreme Court in the W.P.(C) No. 750 of 2025. On 08.08.2025, the Hon'ble Supreme Court directed the

Applicant(Petitioner therein) to approach National Green Tribunal or the jurisdictional High Court.

- (b) That the present Original Application seeks redressal of issues relating to control and eradication of pollution on a pan-India basis, whereas the proceedings before the Hon'ble Supreme Court were confined to a limited number of TPPs, situated in and around the Delhi/NCR region.
- (c) That the impugned Notification/Office Memorandum dated 11.07.2025 was not in existence during the pendency of proceedings before the Hon'ble Supreme Court. Consequently, any material or affidavit filed subsequently seeking to justify the said Notification is clearly an afterthought and cannot be said to have been under consideration by the Hon'ble Supreme Court.
- (d) Moreover, on 12.03.2026, a Chief Justice-led Bench of the Hon'ble Supreme Court of India formally closed the aforesaid Writ Petition (Civil) No. 13029 of 1985 – M.C. Mehta v Union of India. The Bench simultaneously directed the Registry to register suo motu proceedings on different aspects of Air Pollution, titled In Re: Issues of Air Pollution in the NCR.

Thus, in view of the aforesaid facts and circumstances, it is respectfully submitted that there is no question of any judicial overlapping between the present proceedings and those in “Curbing

Air Pollution in the National Capital Region – Pollution by Construction Activities, Power Plants and Other Industries”. It is further submitted that the proceedings in the Hon’ble Supreme Court already stand concluded/closed, and therefore, the present Original Application deserves to be adjudicated independently by this Hon’ble Tribunal on its own merit.

D. The adoption of FGD will facilitate greater compliance by TPPs with the emission norms.

21. That it is also submitted that many countries such as Vietnam, China, Japan, Indonesia, etc. are using different technologies including the installation of FGD systems to curb the air pollution. Thus, India also followed a similar pattern of installation of FGD systems as mentioned in the Notification dated 07.12.2015.
22. That the MoEF&CC has sought to justify the deferment of mandatory installation of FGD systems by citing factors such as limited availability of technology providers, supply chain constraints, potential escalation in electricity prices, low sulphur content in Indian coal, and the alleged financial burden on consumers. It is respectfully submitted that none of the aforesaid grounds can withstand judicial scrutiny for the reasons elaborated herein below. The said justifications are extraneous, unsubstantiated, and contrary to the

object of the Notification dated 07.12.2015, which mandates strict compliance with emission norms in the larger interest of public health and environmental protection.

- (i) At present more than 10 manufacturing companies have adopted technologies of different countries for curbing SO₂ pollution, including the FGD technologies which are successfully working after tying-up with foreign technology partners.
- (ii) Negative impact on supply chain- There is no hindrance to the supply chain, as major components of FGD technologies/plants are being manufactured in India.
- (iii) Increase in stack height - MOEF&CC through its notification dated 11.07.2025, has mandated an increase in stack height for all Category C TPPs in accordance with the standards prescribed under notification dated 30.08.1990. However, it is evident that merely increasing stack height does not reduce or eliminate the SO₂ emissions from the atmosphere; it only disperses the pollutants over a wider area without addressing the underlying environmental harm caused by such emissions.
- (iv) With respect to the long installation time of any technology for curbing the SO₂ pollution, it is verily believed that such timelines

are exaggerated and public data shows that it has been far reduced now.

(v).It is submitted that the contention of the Respondent that electricity cost would increase by approximately 70 paise per unit is incorrect and misleading. As per the reasonable estimation and calculations of the Applicant, the likely increase, if any, would be in the range of only 30–35 paise per unit and even assuming such a marginal increase, the same cannot be a ground to dilute or defer statutory environmental obligations. The Central and State Governments, being welfare states, are well within their capacity to absorb or offset such minimal increase through subsidies or policy measures, as is already being done by several State Governments by providing subsidized or free electricity to consumers. Accordingly, the plea of substantial tariff burden is exaggerated, untenable, and cannot override the paramount consideration of environmental protection and public health.

It is further noted that as per the suggestion made by the Chief Engineer of Madhya Pradesh Power Generating Company Limited in his report annexed with the counter affidavit of Respondent No. 1 as annexure R12/6, the cost of electricity has increased by approximately 30–35 paise per unit due to

installation of FGD systems; however, the same can be reduced by approximately 27 paise per unit if GST Compensation Cess @ Rs. 400 per tonne is extended to TPPs, thereby resulting in a net increase of only about 8 paise per unit. Therefore it is wrong to say that on installation of FGD Plants, the cost of electricity shall increase substantially.

23. That further the notification dated 11.07.2025 was issued based on the 2011 census. Therefore, the population data taken was from 14 years ago, and does not reflect the present population reality of the critically polluted areas or non-attainment cities.
24. That the Respondent No. 1, MoEF&CC, has averred in its affidavit that consultations were undertaken with various stakeholders, including CPCB and the Ministry of Power (MoP). However, it is respectfully submitted that no consultation whatsoever was conducted with the local affected population residing in and around the TPPs, particularly through statutory bodies such as Gram Panchayats/Wards. It is submitted that such consultation with the affected public is a fundamental requirement under environmental jurisprudence and forms an essential component of the process for grant of environmental clearance to any project. The complete absence of public participation renders the decision-making process

arbitrary, non-transparent, and violative of the principles of natural justice. It is further submitted that the Respondent has selectively relied only upon certain institutional studies, while completely disregarding ground realities and the concerns of the affected communities. Such an approach vitiates the impugned action and defeats the very object of participatory and sustainable environmental governance.

25. That the latest report dated 24.12.2025 published by the Centre for Research on Energy and Clean Air (CREA) categorically establishes the significant contribution of coal-based TPPs to noxious SO₂ emissions. The report notes that the highest annual SO₂ contribution is observed in Chhattisgarh (42%), followed closely by Odisha (41%), both being states dominated by coal-fired power plants. The report further emphasizes that reinstating mandatory FGD requirements across coal-fired TPPs is critical for reducing SO₂ emissions and consequent secondary PM_{2.5} pollution under the National Clean Air Programme. It is further submitted that a report published in *The Lancet* dated 29.10.2025 highlights the grave public health impact of fossil fuel usage, stating that fossil fuels (coal and liquid gas) contributed to approximately 7.52 lakh deaths in 2022, out of which coal alone accounted for 3.94 lakh deaths, primarily due to its use in power generation. The true copy of the CREA report dated 24.12.2025

is annexed herewith as **Annexure A-1/4**, and the true copy of *The Lancet* report dated 29.10.2025 is annexed herewith as **Annexure A-1/5**. The above reports were submitted by way of I.A. for urgent hearing, which was withdrawn subsequently and hence are being submitted here as Annexures.

REPLY ON MERITS

26. That the contents of the Para No. 1-3 are matter of records and need no reply.
27. That the contents of para no. 4 are a matter of record. However, it is respectfully reiterated that the Notification/Office Memorandum dated 11.07.2025 constitutes a complete and unjustified departure from the earlier consistent policy of the Government of India, which had earlier taken effective steps to control pollution from TPPs through the Notification dated 07.12.2015. It is submitted that the OM dated 07.12.2015 of MoEF&CC, mandated strict compliance with emission norms without carving out any exemption for Category B and C TPPs. In contrast, the subsequent Notification/OM dated 11.07.2025 dilutes and deviates from the said framework, thereby amounting to a policy reversal without any cogent scientific or legal justification.
28. That the contents of the Para No. 5-6 are matter of records and need no reply. It is precisely this reason why the Impugned Notification is a completely regressive Notification from the environmental stand point

which needs to be quashed by this Hon'ble Tribunal in the interest of environment.

29. That in response to para No. 7, it is respectfully submitted that, pursuant to the application filed by the Learned Amicus Curiae seeking implementation of the 2015 emission standards, the Respondent No. 1, has failed to take any effective or concrete steps to ensure compliance with the Notification dated 07.12.2015 and in fact has come out with a more regressive notification clearly allowing more pollution potential throughout the country whereby more than 86% of the TPPs shall be unregulated and will make even the non-attainment cities more polluted without adequate Pollution Control devices. It is important to give one example of how this Hon'ble Tribunal has dealt with such units that did not comply with the mandatory requirement of putting FGD in a TPP in Chandrapur in Maharashtra. Reliance in this regard is placed on the case *Madhusudan Roongta v. State of Maharashtra & Ors.* [O.A No. 74 of 2020], A copy of the Order dated 19.01.2022 in the abovementioned case is appended as **Annexure A-1/6**. What is significant is that this Hon'ble Tribunal may reaffirm its correct stand in this regressive step of MOEF&CC too and set aside the Impugned Notification.
30. In response to para no. 8, it is respectfully clarified that the majority of the contents of the affidavit filed by the Respondent No. 1, as reflected in the affidavit filed before the Hon'ble Supreme Court, pertain to issues

such as furnace oil, pet coke, and conversion of TPPs from coal-based to gas-based operations, which are not directly relevant to the implementation of the Notification dated 07.12.2015. Moreover, even assuming the commitment of the MoEF&CC to put the APCD such as FGD in a phased manner. The timeline was 2022, which has long gone. Instead of complying with their own commitment vide a sworn affidavit, the baby has been thrown with the bathwater. The requirement of putting the APCD such as FGD, has been done away with in atleast 86% of the TPPs in Category B and C in the country with the impugned Notification. This is a ground alone to set aside the Impugned Notification.

31. That the contents of the Para No. 9 are matter of records and the content of the preliminary response, as well as Para 21, is reiterated as a response to this Para.
32. In response to para No. 10, it is respectfully submitted that Report No. 81 of the CAQM specifically recommended that the timeline for implementation of the Notification dated 07.12.2015 be advanced to 2020 as against existing December, 2022 further fortifying the contention of the OA and the perverse Notification that has now been issued. The report further emphasized that, in respect of TPPs located in critically polluted areas, compliance with SO₂ emission norms ought to have been enforced as early as 2019. However, despite such clear and time-bound recommendations by the CAQM, the Respondent No. 1,

MoEF&CC, failed to act in accordance therewith. On the contrary, the Respondent diluted and disregarded the said recommendations and proceeded to extend the timelines for compliance from time to time without any cogent justification in the Impugned Notification.

33. In response to para No. 11, it is pertinent to note that on 16.02.2018, the Hon'ble Supreme Court was informed by the Learned ASG that Report No. 81 of the CAQM was under active consideration of the Respondent No. 1, MoEF&CC, and that a decision would be taken within a period of two weeks in consultation with the MoP. It is respectfully submitted that, despite such an assurance given before the Hon'ble Supreme Court, no meaningful progress or decision appears to have been taken by the Respondent No. 1 in this regard. The inaction on the part of the Respondent no 1 clearly demonstrates a lack of bona fide and a continued pattern of delay in implementing the recommendations aimed at controlling pollution from TPPs. Instead of compliance, a regressive Impugned Notification has been issued that deserves to be set aside.
34. In response to para no. 12, it is submitted that the Report No. 84 of EPCA, once again reiterated its earlier recommendations and specifically advised that the timeline for implementation of SO₂ emission norms be advanced to the year 2020 instead of 2022. However, Respondent No. 1, MoEF&CC, failed to act upon the same and continued to extend the compliance timelines.

35. In response to para 13-21, it is respectfully submitted that the Hon'ble Supreme Court, from time to time, issued directions to the Respondent No. 1 as well as Government and private TPPs to ensure compliance with the Notification dated 07.12.2015. The Hon'ble Court also issued notices to private entities and State Governments, directed convening of joint meetings, and sought periodic progress reports. However, it is submitted that on each occasion, the Respondents sought time on one ground or another, thereby causing continuous delay in the implementation of the said Notification. However, in complete disregard and violation of the directions of the Hon'ble Supreme Court, the Respondent No. 1 issued a Notification dated 31.03.2021, whereby TPPs were categorized into A, B, and C categories, and the timelines for compliance were extended up to December 2029. Such extension is ex facie contrary to the binding directions of the Hon'ble Supreme Court and defeats the very purpose of timely implementation of emission norms. Further, instead of compliance with deadlines for putting APCDs such as FGD, the MOEF&CC has now come up with this regressive Impugned Notification, which deserves to be set aside on the mere conduct as admitted by the MOEF&CC in this Affidavit.
36. That in response to para nos. 22 and 23, it is respectfully submitted that the Hon'ble Supreme Court, vide proceedings dated 27.01.2025, called upon the Respondent No. 1 to explain the modifications introduced

through Notifications/OMs dated 31.03.2021, 05.09.2022, and 30.12.2024. Further, vide order dated 02.04.2025, the Hon'ble Supreme Court specifically sought clarification regarding the reduction of the compliance timeline of December, 2029 and the rationale behind categorization of TPPs into three categories. It is submitted that, instead of ensuring compliance with the emission norms prescribed under the Notification dated 07.12.2015 and addressing the concerns raised by the Hon'ble Supreme Court, the Respondent No. 1, without any cogent scientific basis or reliance on any credible and comprehensive study, proceeded to issue the Notification dated 11.07.2025, whereby approximately 86% of TPPs have been exempted from compliance with the said norms. Such action is arbitrary, lacks transparency, and is contrary to the directions and intent of the Hon'ble Supreme Court and public health, thereby defeating the very purpose of environmental regulation and protection.

37. That in response to the para 24, it is respectfully submitted that the Notification dated 07.12.2015 itself granted sufficient time for compliance, and the plea of site-specific complexity and long installation timelines is an afterthought, particularly when similar technologies have been successfully implemented worldwide within reasonable timeframes. It is further submitted that the contention regarding limited domestic manufacturing capacity prior to 2015 and dependence on

import of critical components is misconceived, as adequate time and policy support have already facilitated development of domestic capability to the tune of about 85% of FGD equipment. Moreover, such logistical challenges cannot override statutory environmental obligations. The plea of vendor constraints and high capital investment is equally untenable, as financial considerations cannot take precedence over the fundamental right to a clean and healthy environment. In any event, mechanisms such as tariff adjustments and government support are available to mitigate such concerns. The apprehension of increase in electricity cost is also exaggerated and cannot be a valid ground to defer compliance, particularly when the environmental and public health costs of continued pollution far outweigh such marginal increases.

38. That in response to the para no. 25 to 28, it is respectfully submitted that, insofar as the report of IIT Delhi is concerned, the same is based on a limited survey of only 10 cities and yet its findings have been generalized on a pan-India basis, rendering the conclusions unreliable and not representative of the diverse geographical and pollution conditions prevailing across the country. It is further submitted that the contention of the Respondent No. 1 stands contradicted by the reply of the Hon'ble Minister of Power in the Rajya Sabha dated 16.12.2024, which reveals a materially different and more alarming picture, indicating that SO₂ emissions from several TPPs are exceeding the

prescribed norms by two to three times (as evident from pages 129 to 142 of OA No. 588/2025). It is also submitted that the report of NIAS is based on a survey of only two TPPs, which is grossly inadequate to draw any broad-based conclusions. The findings of such a limited study cannot be generalized or applied on a pan-India basis. Accordingly, reliance on the aforesaid reports to dilute or defer implementation of emission norms is wholly misplaced, as the same lack comprehensive data, scientific robustness, and representativeness.

39. That in response of the para no. 29, it is submitted that the contention of the Respondent No. 1 is emphatically denied. It is respectfully submitted that no consultation whatsoever was undertaken with the local Gram Panchayats, local bodies, or other affected stakeholders, including investors and vendors. It is submitted that such consultations are essential for informed, transparent, and participatory decision-making, particularly in matters having significant environmental, economic, and social implications. The failure to engage with key stakeholders renders the decision-making process arbitrary, non-transparent, and violative of principles of natural justice. Some of the Reports specially CPCB report, which is supposed to be the most comprehensive report, have not been examined by the MOEF&CC itself, as brought out by the paragraph below.

40. That in response to submissions in para nos. 30 -31, it is submitted that the contention of the Respondent No. 1 is vehemently denied. It is respectfully submitted that the CPCB report, comprising more than 500 pages, was submitted on 10.07.2025, whereas the impugned notification was issued on 11.07.2025. It is submitted that it is humanly/administratively impossible for the Respondent No. 1 to have meaningfully examined and applied its mind to such a voluminous and technical report within a single day or to have obtained requisite approvals from the competent authority at the highest level, and thereafter to have issued a policy decision of such significance on the very next day. Accordingly, it is evident that the impugned OM had been premeditated and the decision-making process was concluded much prior to the receipt of the CPCB report, rendering the reliance on the said report a mere formality and an afterthought. Such action reflects clear non-application of mind, arbitrariness, and a colourable exercise of power. This is a ground alone to set aside the Impugned Notification. It is crystal clear that the primary report (CPCB Report) of the Ministry, which has been relied upon to issue the Impugned Notification, has not been examined at all as brought out and admitted by the MOEF&CC vide a sworn Affidavit itself.
41. That in response of the para no. 32 -33, it is respectfully submitted that the criterion of restricting applicability to a radius of 10 km from cities

having population exceeding 10 lakhs is wholly arbitrary and based on an erroneous premise. The reliance on Census 2011 data, which is more than 14 years old, renders the classification outdated and unrepresentative of the current demographic realities. It is further submitted that air pollution, particularly SO₂ and its secondary particulates, does not remain confined within an artificial boundary of 10 km, and such a narrow criterion is scientifically untenable. In this regard, the CAQM has recommended a much wider impact assessment radius of 300 km from TPPs. The Hon'ble Supreme Court, in para 6 of its order dated 23.02.2026 in W.P. (C) No. 13029/1985 (*M.C. Mehta v. Union of India & Ors.*), has taken note of the recommendation of the CAQM that no new coal-based TPPs should henceforth be established within a radius of 300 km from Delhi. The said observation clearly recognizes the wide-ranging impact of emissions from TPPs and reinforces the principle that air pollution cannot be confined to narrow geographical limits. Accordingly, the approach adopted by the Respondent No. 1 in restricting applicability of the emission norms to an arbitrary 10 km radius is contrary to the scientific and judicial understanding acknowledged by the Hon'ble Supreme Court. The CAQM in its direction No. 42 at para no. 14 clearly recommended that coal based TPPs must be situated beyond the radius of 300 Km of Delhi. True copy of the said direction No. 42 of CAQM is annexed herewith as

Annexure A-1/7. Further, the optional and exempted categories in Category B and C would be the real causes for increased air pollution. Category B, which has now been made optional even in Critically Polluted Areas and Non-attainment Cities, along with the totally exempted category C in other cities constitute about 86% TPPs as per the information provided to a Rajya Sabha Query. This clearly demonstrates the regressive nature of the impugned Notification and deserves to be set aside. Further, the grace period given to so-called retiring plants till 2030 again is a regressive step, as if pollution is legally allowed to perpetuate for a further period of four years without any consequences on the impact on public health that it will ensue. The prescribed norms of SO₂ emission in such Thermal Power Plants which are established from 1st January, 2017 is 100mg/nm³.

42. That in response to the para 34, it is respectfully submitted that, at best, there may be a marginal increase in electricity cost in the range of approximately 30–40 paisa per unit; however, the same cannot be a ground to dilute or defer statutory environmental obligations. It is further submitted that the Central and State Governments, being welfare states, are fully competent to absorb or mitigate such minimal increase by way of subsidies or policy interventions for larger public health issue which part of fundamental right to life itself. In fact, several State Governments are already providing subsidized or free electricity, including up to 200

units per month to consumers. Accordingly, the plea of financial burden on account of increased tariff is misconceived, exaggerated, and cannot override the paramount consideration of environmental protection and public health.

43. In response to para no. 35-39, it is respectfully reiterated that the Office Memorandum dated 11.07.2025 constitutes a complete and unjustified departure from the earlier statutory framework, wherein the Government of India had taken effective steps for controlling pollution from TPPs through the Notification dated 07.12.2015. It is submitted that under the said Notification dated 07.12.2015, no exemption was granted to Category B and C TPPs, and all TPPs were mandatorily required to comply with the prescribed emission norms. Available literature shows that FGD technology is a proven and globally accepted mechanism for significantly reducing SO₂ emissions (up to 90–95%), thereby controlling formation of secondary PM_{2.5}, preventing acid rain, and protecting public health and the environment, while ensuring compliance with the emission norms prescribed under the Notification dated 07.12.2015. Accordingly, the subsequent Impugned Notification dated 11.07.2025, by introducing exemptions and diluting the compliance framework, amounts to a diametrically opposite stand without any cogent scientific or legal basis, and is therefore liable to be set aside.

PRAYER

In the circumstances it is most respectfully prayed that this Hon'ble Tribunal may be pleased to:

- (a) reject the contentions of the Respondent No. 1, MoEF&CC, as set out in its counter affidavit, being untenable in law and on facts, and allow the present Original Application in terms of the reliefs as prayed for,
- (b) stay the operation of the impugned notification No. G.S.R 465(E) dated 11.07.2025 pending final adjudication of this Original Application.
- (c) Pass such other and further order/orders as are deemed fit and proper in the facts and circumstances of the case.

Place: New Delhi
Dated: 16.05.2026

Applicant
Through



Counsel

Mohd Faisal, Advocate
E-231, LGF, G.K.-II, New Delhi -
10028. M-9711017506, Email:-
faisalmohd007@gmail.com

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

(Under Section 14 & 15 r/w section 18(1) of National Green Tribunal Act, 2010)

ORIGINAL APPLICATION NO. 588 OF 2025

IN THE MATTER OF:

SANJAY SHARAN

...APPLICANT

VERSUS

UNION OF INDIA & ORS.

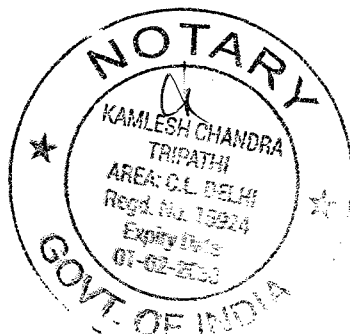
...RESPONDENTS

AFFIDAVIT

I, Mr. Sanjay Sharan S/o Late Shri Rajeshwari Sharan, aged about 68 years, R/o C-8/8712, Vasant Kunj, South West Delhi, New Delhi - 110070, do hereby solemnly affirm and state as under:-

1. That I am the Applicant in the accompanying rejoinder to the reply of Respondent No. 1 and well conversant with the facts and circumstances of the instant case hence, competent to swear the instant affidavit.
2. That the facts stated in the aforesaid affidavit are true to the best of my knowledge. No part of it is false and nothing material has been concealed.
3. That the Annexures annexed with the application are true copies of the respective original.

S. Sharan
DEPONENT



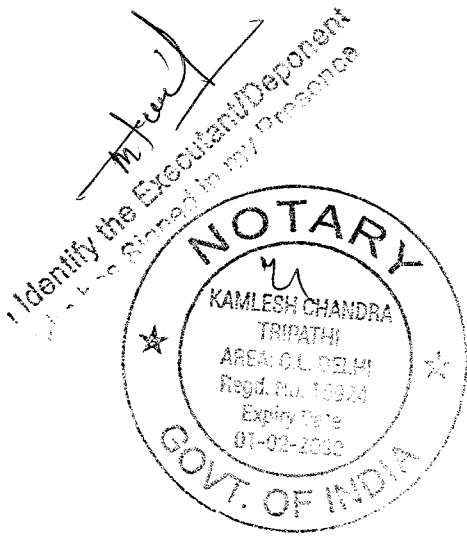
VERIFICATION:

I, the above named deponent, do hereby verify that the contents of my above affidavit are true and correct to the best of my knowledge and belief and nothing material has been concealed there from.

Verified at New Delhi on this 14th day of May, 2026.

14 MAY 2026

Sharan
DEPONENT



CERTIFIED THAT THE CONTENTS EXPLAINED TO THE DEPONENT/EXECUTANT WHO IS SEEMED PERFECTLY TO UNDERSTAND AFFIRMED & DEPOSED BEFORE ME AT NEW DELHI

Adv. Mohd. Iqbal

IDENTIFY THE EXECUTANT/ DEPONENT WHO HAS SIGNED IN MY PRESENCE
KAMLESH BHANDARI TRIPATHI Advocate Reg. No. 16924
NOTARY PUBLIC (C.L. DELHI)

(14) NK-4/129

14 MAY 2026

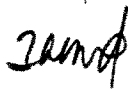
COMMISSION FOR AIR QUALITY MANAGEMENT
IN NATIONAL CAPITAL REGION AND ADJOINING AREAS
17th Floor, Jawahar Vyapar Bhagwan (STC Building)
Tolstoy Marg, New Delhi-11001

F. No. A-110018/01/2021-CAQM 1054 DT

Dated: 10.10.2024

Subject: Implementation of the plans of action for prevention and control of Paddy Stubble Burning, targeting elimination in 2024 - effective enforcement mechanism reg.

1. WHEREAS, the Ministry of Environment, Forest and Climate Change, Government of India, in exercise of the powers conferred under Section 3 of the Commission for Air Quality Management in National Capital Region and Adjoining Areas Act 2021, has constituted the Commission for Air Quality Management in National Capital Region and Adjoining Areas (hereinafter referred to as the Commission);
2. WHEREAS, under section 12(1) of the Act, the Commission has powers to take all such measures, issue directions, etc., as it deems necessary or expedient for the purpose of protecting and improving the quality of the air in the National Capital Region and Adjoining Areas;
3. WHEREAS, Section 12 (1) of the Act, empowers the Commission to issue directions in writing to any person, officer, or any authority and such person, officer or authority shall be bound to comply with such directions;
4. WHEREAS, Paddy stubble burning is a matter of grave concern due to its impact on air quality in NCR and the Commission has been deliberating upon the issue in a series of meetings held with major stakeholders including with the State Governments of Punjab, Haryana, Uttar Pradesh and Rajasthan, GNCTD, State Pollution Control Boards of NCR states, Punjab and Delhi Pollution Control Committee (DPCC) and knowledge institutions;



Direction No. 84

5. WHEREAS, the Commission through Direction dated 10.06.2021 had provided a Framework to the states concerned for control/elimination of crop residue burning and directed to draw up detailed state-specific action plans, based on the major contours of the Framework;
6. WHEREAS, an advisory dated 28.07.2021 was issued from the Commission on effective *Ex-Situ* stubble management for Punjab, Haryana and Uttar Pradesh;
7. WHEREAS, the Commission through directions issued on 16.08.2021 had also advised the Government of NCR States, Government of NCT of Delhi and Government of Punjab to adopt the standard protocol developed by ISRO for the monitoring and reporting of the fire event using the Satellite data;
8. WHEREAS, the Government of Punjab, Haryana, Uttar Pradesh, Rajasthan and Government of NCT of Delhi had formulated the state specific action plans for prevention and control of paddy stubble burning during the paddy harvest season in 2021, 2022 and 2023;
9. WHEREAS, based on field experience and learnings during 2021, 2022 and 2023, the action plans for Punjab, Haryana and UP (NCR Districts) were further updated for 2024;
10. WHEREAS, the salient features of the above noted updated action plans were presented by the representatives from Government of Punjab, Haryana, Uttar Pradesh before the full Commission in its meetings held on 15th March, 2024 and the Commission approved the respective action plans;
11. WHEREAS, the Commission issued Statutory Direction No. 80 dated 11.04.2024 to the State Governments of Punjab, Haryana and Uttar



Direction No. 84

Pradesh to effectively implement the respective action plans for 2024, in letter and spirit,

12. WHEREAS, the directions as above besides detailing the means of management of paddy stubble, *inter alia*, also called for the following enforcement and safeguarding measures towards complete elimination of paddy stubble burning:
 - i. Enhanced level of IEC/sensitisation activities.
 - ii. Timely deployment of Nodal/Cluster/Village level officers for strict surveillance and enforcement actions.
 - iii. Mechanism for pin-pointing and inspection of the farms/areas where paddy straw is burnt, if any, as per standard ISRO protocol and ensuring red-entries/accountability in such farm records, including levying and realization of prescribed EC.
13. WHEREAS, towards effective implementation of the plan of action for 2024, various consultative and review meetings have been held from time to time with all stakeholders concerned in the State Govt. of Punjab including the Dy. Commissioners of various districts of the State, including a review meeting with the DCs and State Level authorities on 18.09.2024 and 19.09.2024 respectively.
14. WHEREAS, during the various review meetings, the State Governments in Punjab and Haryana committed to targeting elimination of paddy residue burning practice;
15. WHEREAS, despite targeted elimination of fire counts during 2024, a total of 267 and 187 paddy residue burning events have been reported during the period from 15th September – 9th October, 2024, from the States of Punjab and Haryana respectively;



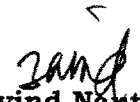
Direction No. 84

16. WHEREAS, the Commission from time to time during paddy harvesting season has called for immediately arresting this trend and initiate appropriate and effective enforcement mechanism, entrusting responsibility and accountability on the identified nodal officers for various villages / blocks and the supervisory officers;
17. WHEREAS, the Commission, on 25.09.2024 had directed for a detailed report from the State Governments of Punjab and Haryana regarding action taken to implement Direction No. 80 dated 12.04.2024 to ensure complete elimination of paddy stubble burning;
18. WHEREAS, effective implementation and enforcement of the action plans towards targeted elimination of paddy stubble burning does not seem to be forthcoming at the level of various agencies of the State Governments;
19. WHEREAS, the Act under Section 12(2)(xi) specifically empowers the CAQM to issue Directions to any person, officer or an authority who shall be bound to comply with such directions;
20. WHEREAS, Section 14 of the Act also stipulates that any non-compliance or contravention of any provisions of the Act, Rules, Directions or Orders issued by the Commission shall be an offence;
21. WHEREAS, the Commission has taken a serious note of the situation arising on account of number of paddy stubble burning incidences and has noted that due enforcement measures towards prevention of paddy stubble burning in the States of Punjab, Haryana and NCR areas of Uttar Pradesh need to be stepped up;
22. WHEREAS, through appropriate orders issued by the various State Governments, open burning of paddy and other agricultural stubble in the fields is already a prohibited activity;



Direction No. 84

23. NOW, THEREFORE, in exercise of the powers conferred upon the Commission under Section 14(2), the Deputy Commissioners / District Collectors / District Magistrates in the States of Punjab, Haryana, NCR areas of Rajasthan and Uttar Pradesh and in the NCT of Delhi are hereby authorized to file a complaint/ prosecution before jurisdictional judicial magistrate, in case of inaction in respect of officials, including nodal officers and supervisory officers at various levels and Station House Officers, responsible for effective enforcement towards ensuring elimination of paddy stubble burning in their respective jurisdiction.
24. The District administrations and the State Governments are expected to maintain constant and strict vigil towards elimination of paddy stubble burning.


(Arvind Nautiyal)
Member-Secretary
Tel No: 011-23701197
Email: Arvind.nautiyal@gov.in

To

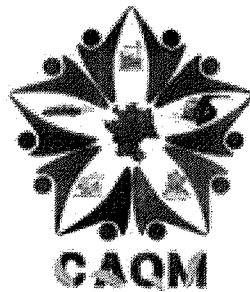
1. The Chief Secretary, Government of Punjab, 6th Floor, Punjab Civil Secretariat-1, Sector-1, Chandigarh-160001.
2. The Chief Secretary, Government of Haryana, 4th Floor, Haryana Civil Secretariat, Sector-1, Chandigarh-160001.
3. The Chief Secretary, Government of Uttar Pradesh, 101, Lok Bhawan, U.P. Civil Secretariat, Vidhan Sabha Marg, Lucknow-226001.
4. The Chief Secretary, Government of NCT of Delhi, Delhi Secretariat, I.P. Estate, New Delhi-110001.
5. The Chief Secretary, Government of Rajasthan, Government Secretariat, Jaipur-302005.

Copy to:

The Chairperson and all Members, CAQM.


(Arvind Nautiyal)

Report of the Air Quality Experts
on
**Identification of the causes for worsening AQI in
Delhi-NCR**



Commission for Air Quality Management in NCR and
Adjoining Areas

January, 2026

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1. Context

The Hon'ble Supreme Court, vide its order dated 06.01.2026 in WP(C) No. 13029 of 1985 (M.C. Mehta vs. Union of India & Ors.), observed that the Commission for Air Quality Management (CAQM), as the statutory expert body, is primarily obligated to bring domain experts under a single platform to seek a uniform and unanimous opinion on the causes of deteriorating air quality.

The Hon'ble Court noted that this exercise should not be time-consuming, as expert bodies such as the IITs and other agencies have already undertaken the necessary research. By sharing these findings and collating data, CAQM can form a comprehensive understanding of the actual causes and the proportional attribution of each source. Consequently, the Hon'ble Supreme Court directed as follows:

"...Let a meeting of the experts, as may be shortlisted by CAQM, be convened within two weeks and based upon their continuous deliberations, a report regarding the major causes of worsening AQI be brought on record as well as in the public domain. Such an exercise must be completed before the next date of hearing...."

In pursuance of these directions, the Commission shortlisted a panel of experts [as listed in Annexure I] for the identification of causes and the attribution of various pollution sources. This has brought together the domain experts from IITs, academia, research institutes, NGOs and other reputed institutes to provide a unified scientific assessment.

A series of meetings of the Experts, coordinated by a full-time independent Technical Member, CAQM, were held on **08.01.2026**, **09.01.2026**, **12.01.2026**, and **13.01.2026**. The deliberations focused on the following key questions:

1. What are the primary causes for the worsening AQI in Delhi-NCR?
2. What are the major sources of pollution, and what is their sectoral origin?

To expedite this process, the Experts have:

- i). Shared, integrated, and analysed existing research and data from various research papers and technical reports to form a 'broad idea' and a unanimous opinion;

- ii). Deliberated to identify and validate the specific causes leading to the worsening of the Air Quality Index (AQI) in the Delhi-NCR; and
- iii). Estimated the proportional contribution of various pollution sources. A meta-analysis was conducted to reach a consensus on the air pollution contributing sectors to the deterioration of air quality in the Delhi-NCR region.

As per the directive of the Hon'ble Supreme Court, the findings are to be placed in the public domain. Efforts have been made to complete the deliberations and submit the findings within the two-week window stipulated by the Hon'ble Supreme Court (prior to the next hearing).

2. Rationale and Guiding Principles

While conducting the meta-analysis, the primary focus has been to bring a uniform and unanimous opinion on air pollution sources to help bridge the gap between existing data and actionable policies. As several studies with diverse methodologies exist, the Experts collated, aligned and systematically analysed the data to understand the dominant causes and the proportional contribution of each source to effectively target interventions. This has addressed the seasonal trends and patterns in prominence of air pollution sources while recognising the influence of dynamic meteorology and atmospheric conditions through different seasons. It has been recognised that Delhi and NCR's air quality is influenced by both local sources as well as the transboundary effect of regional movement of pollution across the airshed. Recognising $PM_{2.5}$ as the prominent pollutant that determines the AQI of Delhi, the studies conducted between 2015 and 2025 have been considered for the meta-analysis, and no single report has been relied upon.

The rationale for this selection includes:

- i). **Reconciling variations:** Different studies often show different results due to varying time periods, different locations, different chemical constituents analysed, and different modelling assumptions. A meta-analysis estimates contributions with reasonable confidence by accounting for these differences.
- ii). **Reflecting policy interventions:** Source contributions change over time due to new interventions in the sectors. Selecting studies from the last few years ensures the data reflects the impact of these recent interventions.
- iii). **Data reliability:** The selection was limited to studies from experts and peer reviewed publications to ensure the technical integrity of the findings.

This review has recognised the limitations of the studies that may make direct comparison complex. Different studies employ varying methodologies (receptor-based, dispersion-based, or hybrid approaches), sampling strategies, analytical techniques, and modelling frameworks. They are often conducted in different time periods, at different locations, and under varying meteorological conditions. In addition, assumptions related to emission inventories, chemical profiles, source classification, and boundary conditions vary across studies. While such variability in reported source contributions is scientifically expected and does not undermine the validity of individual studies, it limits the direct comparability of results unless the underlying reports, assumptions, and methodological frameworks are carefully examined. Spatial and temporal heterogeneity in emissions, atmospheric chemistry, and transport and removal processes further contribute to observed differences. Availability of studies is also uneven in the region, with most of them focusing on Delhi. As the indicative numbers for the larger NCR are sparse, the meta-analysis is based on the studies carried out for Delhi. The analysis has recognised the importance of both primary emissions (that are emitted directly from the sources (from the tailpipe of vehicles, industrial stacks, open burning, etc.) as well as the secondary particulates that are formed from chemical reactions of gases emitted by the primary anthropogenic combustion and natural sources, in the atmosphere. This analysis will also help sensitise the general public about the dominant pollution sources and reasons for high levels of air pollution in Delhi-NCR. Therefore, the meta-analysis has created a range of estimates for each source and considered the median of the results to provide an indicative estimate for each source. These results may be considered as indicative and not absolute.

3. Trends in Air Quality

As this exercise is premised on the context of high levels of air pollution in the region, it is therefore prudent to understand the air quality trends as well as the changes in the daily AQI and prominent pollutants over time.

3.1 Trends in PM_{2.5} and PM₁₀ in Delhi

A gradual decline and stable trends are noted in both PM_{2.5} and PM₁₀ concentrations in Delhi since 2016, despite increasing population and rapid urbanisation, however there is still a huge gap to meet the annual NAAQS, as indicated in Figure 1 and Figure 2.

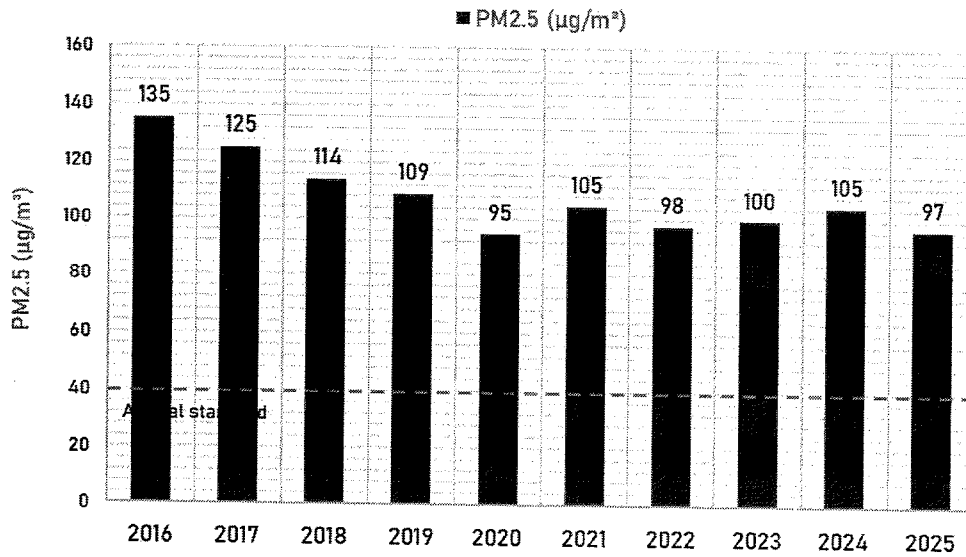


Figure 1: Trend in annual PM_{2.5} concentration in Delhi (from 2016 to 2025)

Source: Central Pollution Control Board

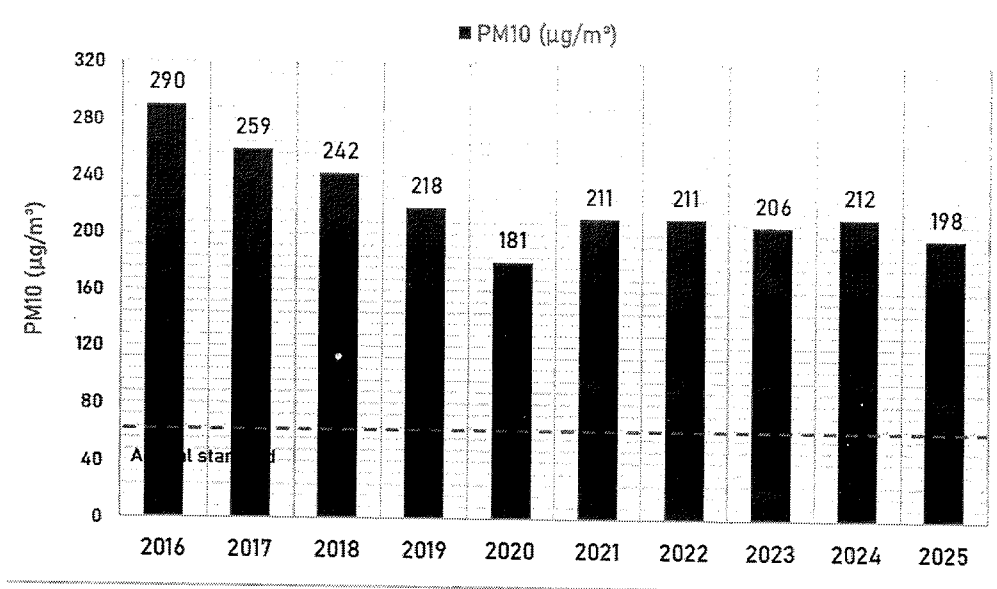


Figure 2: Trend in annual PM₁₀ concentration in Delhi (from 2016 to 2025).

Data Source: Central Pollution Control Board

The Delhi-NCR region, as a critical hotspot within the densely populated IGP, faces persistent and extreme air pollution levels due to a combination of rapid urbanisation, fossil fuel dependence, unsustainable behavioural patterns, and geographical traps. During winter, these factors are compounded by meteorological conditions such as low wind speeds and

frequent temperature inversions that prevent the dispersion of pollutants, creating a major regional airshed crisis, leading to frequent smog and severe pollution episodes.

The IGP covers only ~18 % of India's land but accommodates ~40 % of its population. This region is estimated to emit ~35 % of India's total emissions, making it an emission hotspot. Rapid urbanisation and lack of public transport/ last-mile connectivity have led to an over-reliance on private vehicles. The use of fossil fuels for various applications drives high emission levels. Construction and Demolition (C&D) activities, including massive infrastructure projects and industrial activities, contribute significantly to ambient dust and debris. Seasonal crop residue burning in adjoining states, combined with local biomass and municipal solid waste (MSW) burning for heating, adds a massive pollutant load during winter. The continuous urban sprawl across the NCR creates a massive, uninterrupted area of high emissions. It is estimated that around two-thirds of the $PM_{2.5}$ in Delhi is contributed by the sources outside Delhi, i.e. NCR districts and outside NCR, including transboundary and around one-third is contributed from the sources within Delhi.

3.2 Seasonality of Air Quality Index and its Trend

The Air Quality Index (AQI) is a tool for the public that communicates to the public how clean or unhealthy the air is at any given moment, making it easy for the general public to understand complex pollution data in terms of numbers and colour codes indicating air quality from Good to Severe category. The AQI is calculated by measuring eight major pollutants (with a minimum of three pollutants) and is determined by the "worst" pollutant of the day, which, for most parts of the year, is $PM_{2.5}$ in Delhi and NCR. This alert is provided on a daily basis to the public. The daily AQI since 2018, depicted in **Figure 3** indicates the seasonality of the high and low index. This visualisation of data shows worsening of the AQI during winter when it reaches very poor and severe categories. Such days are also observed sometimes during summer, but those are far fewer in number. Most of the days during other seasons are in moderate to poor levels. Only monsoon months record days with good to satisfactory levels.

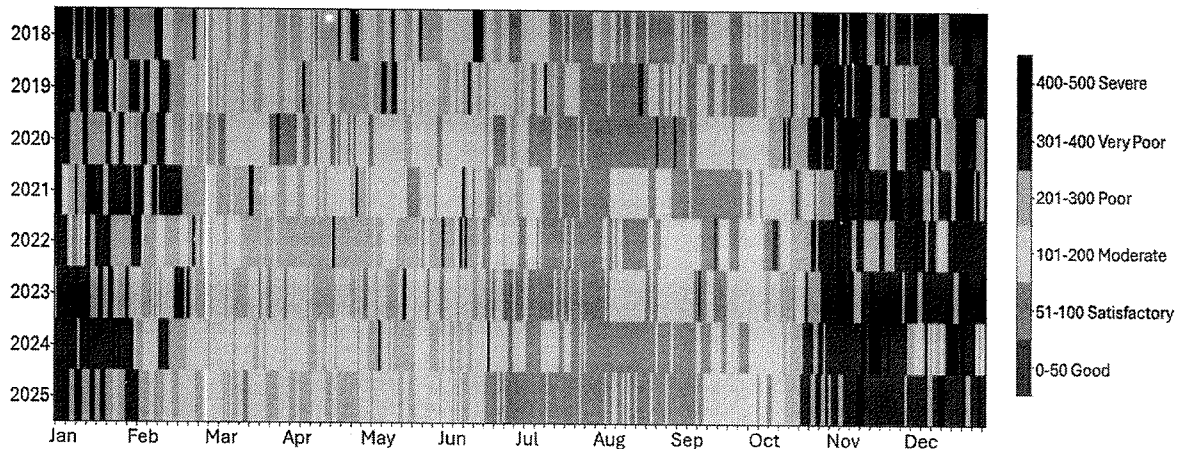


Figure 3: Heatmap: Visualisation of the daily AQI data (2018-2025)

Data source: Central Pollution Control Board

This variability is due to the impact of meteorology and atmospheric conditions, especially during winter (see box: **Why does Air Pollution Intensify during Winter in Delhi-NCR**). The pollution levels peak during winter, not because of an increase in pollution sources but largely due to atmospheric stagnation, which traps pollutants in the region. However, to prevent such winter peaks, it is necessary to reduce the round-the-year emissions in the region.

The analysis of daily AQI between 2018 and 2025 shows that:

- i). Days in the Good to Moderate category show an overall improvement over time, increasing from 159 days in 2018 to about 200 days in 2025.
- ii). Poor to Very Poor days declined from 186 days in 2018 to 157 days in 2025.
- iii). Severe and Severe+ days reduced substantially from 20 days in 2018 to 8 days in 2025.

The analysis has highlighted the changes in the distribution of days with different categories of AQI since 2018. It shows that the number of days with better AQI has increased over time.

Why does Air pollution intensify during winter in Delhi-NCR?

The intensification of winter air pollution in Delhi arises not from a sudden increase in emissions alone, but from the synergistic effects of sustained emissions, regional transport of pollutants, and unfavourable meteorological conditions of the Indo-Gangetic Plain.

The winter pollution episode in Delhi-NCR can be broadly divided into two phases. The first phase typically occurs from mid-October to November and is largely associated with emissions from agricultural residue burning in neighbouring states, along with decreasing wind speed and shallow planetary boundary layer (PBL) height. Pollutants generated from these activities are transported over long distances and contribute substantially to elevated particulate concentrations across the IGP, including Delhi.

The second phase generally extends from December to January and is dominated by extremely adverse meteorological conditions. Very low wind speeds, shallow mixing layers, persistent fog, and reduced solar radiation severely limit atmospheric dispersion and enhanced secondary aerosol formation. Although emission sources remain relatively constant during this period, except for increased biomass burning for heating, the reduced atmospheric dispersion capacity leads to a pronounced buildup of pollutants, resulting in persistently poor air quality.

The atmospheric chemistry within the IGP airshed significantly amplifies particulate pollution through secondary aerosol formation. SO_2 emissions (primarily from coal combustion and brick kilns) undergo oxidation on aerosol surfaces and gas-phase reactions with OH radicals, forming sulfuric acid (H_2SO_4). Further, NO_x emissions undergo photochemical and nocturnal oxidation to form nitric acid (HNO_3). Both H_2SO_4 and HNO_3 react with ammonia (NH_3) from agricultural activities and human/animal excreta to form ammonium sulfate and ammonium nitrate aerosols. In a similar way, ammonium chloride can also form, which stays in the atmosphere for a longer time. These acids can also react with dust and form a layer of corresponding salts on the dust particles. Volatile organic compounds (VOCs) from vehicular emissions, biomass burning, industries and vegetation undergo oxidation to form Secondary Organic Aerosol (SOA).

Winter meteorology significantly restricts pollutant dispersion and often favours secondary aerosol formation. Calm wind conditions, reduced atmospheric mixing height, low temperatures, frequent fog formation, and diminished solar radiation collectively inhibit vertical and horizontal dilution of pollutants. These conditions promote the accumulation and persistence of particulates and gaseous pollutants near the surface.

3.3. Seasonality of Pollution and Meteorology

Air quality in Delhi-NCR is also governed by a recurring seasonal cycle of meteorological parameters. The city's highest pollution levels are systematically linked to "stagnant" winter conditions, while the monsoon and pre-monsoon periods offer natural relief through dispersion and wet removal. The temperatures peak in May and June. Rainfall is minimal from January to May, peaks sharply in July and August, and drops rapidly after September.

Wind speed and planetary boundary layer height move in tandem. They reach their maximum in May and June, facilitating atmospheric mixing, and gradually decline to their lowest values during winter. Trends of the meteorological parameters are depicted in **Figure 4**. The seasonal degradation of air quality in Delhi is a result of the Planetary Boundary Layer (PBL) height and wind speed acting as a "lid." When these are high (Summer/Monsoon), pollutants are ventilated fast; when they are low (Winter), pollutants are trapped close to the ground and disperse very slowly (see box: **Why Air Pollution Intensifies during Winter in Delhi-NCR**). Seasonal breakdown of air quality drivers is presented in **Table 1**.

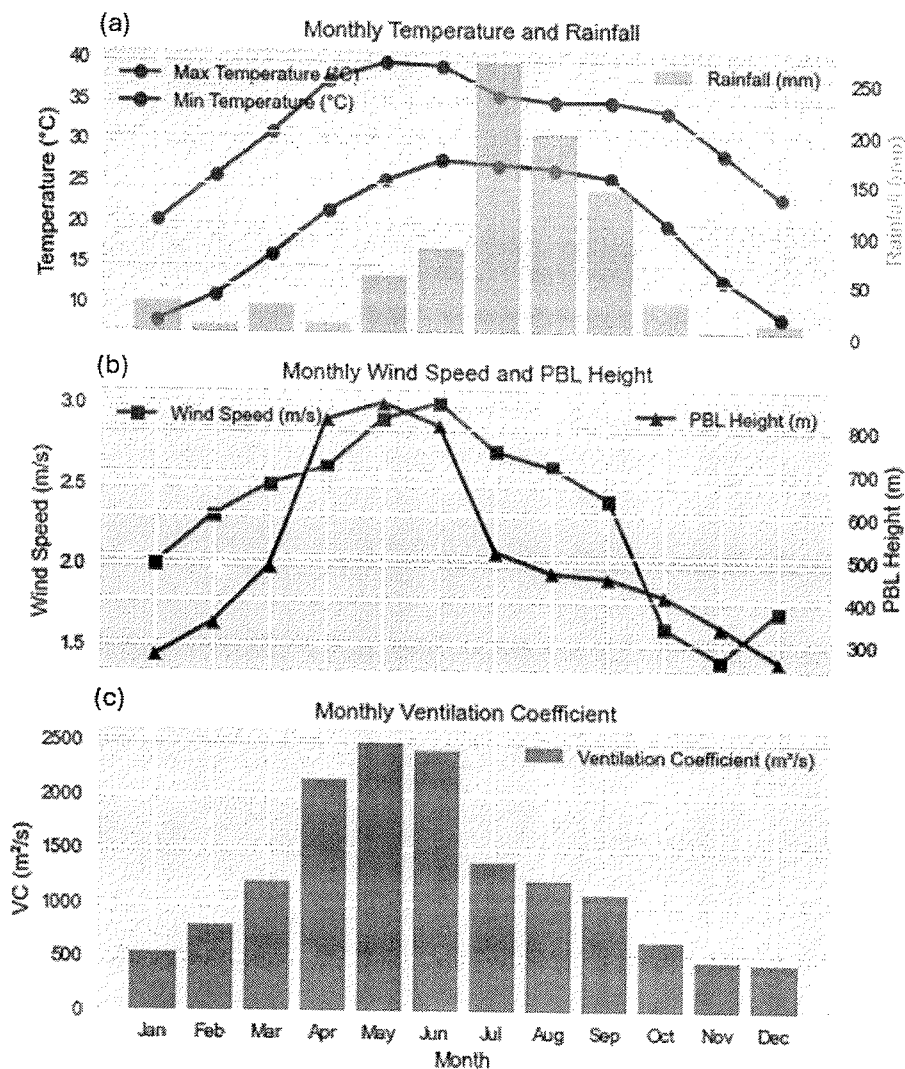


Figure 4. Meteorological Trends (2015–2025) (a) monthly average of maximum temperature (red), Minimum temperature (Blue) and Rainfall (Bar Chart) from 2015 to 2025. (b) shows the monthly average of wind speed (Green) and Planetary boundary layer height (maroon) over Delhi from 2015 to 2025, and (c) represents the ventilation coefficient. (Data Source: IMD)

Table 1: Seasonal Breakdown of Air Quality Drivers

Season*	Meteorological Characteristics	Impact on Air Quality
Monsoon (Jun–Sep)	High temperatures, strong winds, high Planetary Boundary Layer (PBL) height, and substantial rainfall.	Improved: Efficient dispersion and wet removal of pollutants.
Post-Monsoon (Oct–Nov)	Decreasing temperature, wind speed, PBL height, and rainfall.	Accumulation: Marks the onset of rising pollutant levels.
Winter (Dec–Feb)	Lowest temperatures, wind speeds, and PBL heights of the year.	Worst: Shallow boundary layers and weak winds suppress dispersion.
Summer (Mar–May)	Increasing temperatures, wind speeds, and PBL heights.	Relief: Enhanced vertical mixing and dispersion reduce concentrations.

4. Methods to ascertain the Sources of Air Pollution

Source Apportionment is a scientific approach used to identify and quantify the relative contribution of different emission sources to ambient air pollution. Broadly, there are two main methods used for Source Apportionment (SA) of air pollution for proportional attribution to the sources of air pollution. The schematic of Source Apportionment methods is depicted in **Figure 5**.

a. Receptor Modelling (Observation-Based) - Top Down Approach

Receptor Modelling is a scientific technique used to apportion ambient air pollution by analysing pollutant concentration measured at receptor locations, where a sample of aerosols (PM) is taken at a site and later analysed in the laboratory for its different chemical composition. Using the chemical composition of PM at a receptor site, along with source profiles and applying statistical techniques such as Positive Matrix Factorization (PMF), Chemical Mass Balance (CMB) or Principal Component Analysis (PCA), contributions from vehicles, industries, biomass burning, or dust, etc. are inferred. This method is sensitive to the location of measurement and source profiles. This method, while identifying the sources, cannot provide the exact location of the source.

b. Chemical Transport Modelling (CTM, Process-Based) - Bottom Up Approach

Chemical Transport Models (CTMs) based source apportionment is a process-driven approach that uses emissions inventories, meteorological data, and atmospheric chemistry to simulate how pollutants are formed, transformed, dispersed, and transported. In this, suitable CTMs such as WRF-Chem, CMAQ, CAMx can be used to quantify contributions from different sectors such as vehicles, industries, biomass burning and also to quantify the source contribution regions, such as how much is coming from within Delhi or outside Delhi by considering the movement of pollutants. However, this method depends on the accuracy of the emission inventories and is subject to model uncertainties.

While an Emission Inventory (EI) provides the quantification and location of pollutant emissions from different sources, such as transport, industry, power plants, biomass burning, and natural dust, it does not really provide the actual contribution of the source to the ambient air pollution. EI needs to be combined with Chemical Transport Models for source apportionment studies. CTMs can give us the relationship between emissions and concentrations and tell us which sources are contributing to the pollutant concentrations. They can also be used to identify the impact of reducing emissions from one or more sources on concentrations. Both methods have their own limitations and uncertainties. Therefore, both methods should be used together to obtain a holistic picture of what is polluting.

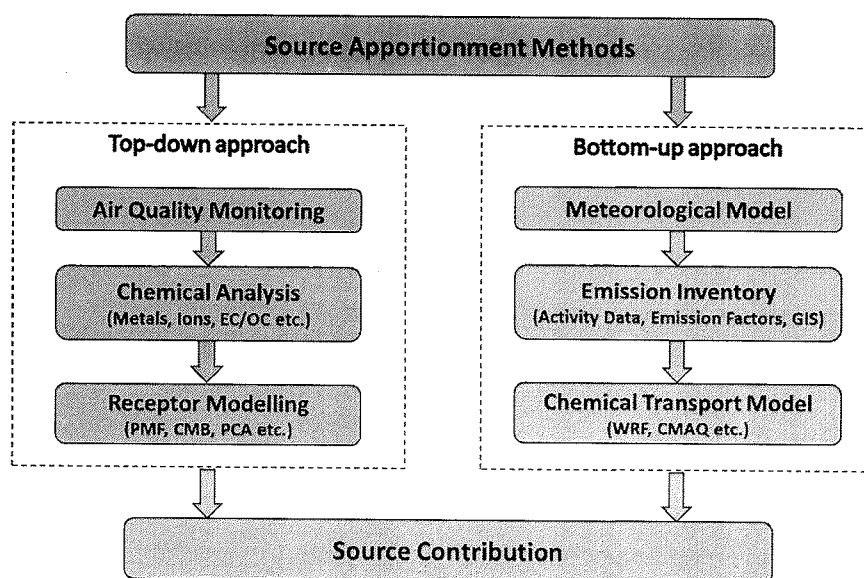


Figure 5: Source Apportionment Methods

Pollution source attribution often differs across studies due to several scientific and operational factors such as location and time period of study, recent interventions, data resolution, differences in the number of chemical constituents analysed, methodological differences and underlying assumptions, including the scope of the study (see box: **Why do different studies show different results?**). Because of these inherent variations, a meta-analysis, combining results from multiple studies, is often required to estimate source contributions with high confidence.

Why do different studies show different results?

Air pollution is inherently dynamic and is complex in nature because of multi-pollutant and multi-sectoral contributions. This makes source apportionment studies highly sensitive to several factors: the location of monitoring sites, the time period of analysis, the methodology applied (whether receptor modelling or Chemical Transport Models), the input data used (such as emission inventories or chemical speciation), and the underlying assumptions built into the models. Seasonal influences, recent policy interventions like fuel standards or restrictions on certain activities, and differences in chemical constituents analysed further add to the variation. As a result, different studies often report different source contributions, reflecting the dynamic nature of air quality. It is generally not expected that all results will exactly match, but broadly should indicate the sources of pollution. Therefore, a meta-analysis integrating multiple studies provides source contribution estimates within a range but with greater confidence. The Source Apportionment results can further be analysed to develop strategies for the abatement of air pollution.

5. Identification of Dominant Sources of Air Pollution in Delhi NCR

It has been recognised that Delhi and NCR's air quality is influenced by both local sources as well as the transboundary effect of regional movement of pollution within the airshed. A meta-analysis of studies from 2015 to 2025 attributes $PM_{2.5}$ in Delhi to a mix of primary emissions and secondary particulate formation (**Table 2**) from sources within NCR and beyond. The most prominent primary contributors are Transport, Dust (Road + Construction and Demolition), Biomass Burning, Industry, including Thermal Power Plants (TPPs). A small share falls into "Other sources" that include diesel generator sets, crematorium, solvents, natural sources etc. A significant part of the overall particulate concentration in the air is contributed by the secondary particulates that are formed from gases emitted by the primary sources. Contributions shift markedly between seasons. Overall contribution of the combustion sources, including transport, biomass burning, and industry increase during

winter, while the share of dust, which is higher during summer, reduces. The secondary particulate matter rises in winter.

Table 2: Dominant pollution sources impacting air quality in Delhi from sources within NCR and beyond

Sector	Winter		Summer	
	Contribution (%)	Range (%)	Contribution (%)	Range (%)
Transport	23	19-24	19	18-21
Industry (includes TPPs)	9	8-10	14	9-15
Dust (Road+Soil+C&D)	15	10-18	27	25-31
Biomass Burning (includes MSW, residential, crop-residue burning)	20	17-23	12	11-14
Secondary Particulate (transformed from gaseous emissions from Transport, Industries, Biomass burning, etc.)	27	24-28	17	16-19
Other sources*	6	-	11	-

Percentage contribution to PM_{2.5} concentrations. Typical average PM_{2.5} Concentration in Summer (Mar-June): 73 µg/m³ and in Winter (Nov-Feb): 178 µg/m³

*Other sources refer to small dispersed and unclassified sources not typically categorized within the above mentioned major sectors

Types of studies conducted: These numbers have been derived from the meta-analysis of studies that are available for Delhi or data shared by the Experts. It may be noted that there are differences in the type of studies showing different results (Box: **Why do different studies show different results?**). As the pollutants level varies across NCR, the sources impacting air quality also varies. The mitigation of sources in the entire NCR airshed will result in improvement of AQI in Delhi as well as in NCR. The experts deliberated to identify and validate the specific causes leading to the worsening of the Air Quality Index (AQI), and reach a consensus on the proportional contribution of various pollution sources as shown in Table 2.

6. Understanding the Sector-specific Causes of Pollution

6.1 Transport

Transport repeatedly emerges as the most prominent pollution source within Delhi. The transport source category includes off & on-road vehicles; petrol, diesel and CNG-powered vehicles. Tailpipe emissions from vehicles constitute a major source of urban air pollution. The magnitude of vehicular emissions varies primarily by vehicle type, vehicle age and mileage, fuel type, fuel standard, and maintenance condition. Vehicles compliant with newer emission standards, such as Bharat Stage VI (BS-VI), emit significantly lower pollutants compared to vehicles certified under earlier standards, including BS-IV, BS-III, II, I, and pre-BS regimes. Older vehicles, particularly those operating beyond their regulatory life, exhibit higher emission intensity due to engine deterioration and compromised emission control performance. The nature of vehicular pollutants differs by fuel type. Diesel vehicles are a major source of particulate matter and oxides of nitrogen and sulphur, whereas CNG vehicles predominantly emit oxides of nitrogen, with comparatively lower particulate emissions.

Although the large-scale substitution of diesel-based public and local commercial fleets with CNG vehicles has been achieved and the phase-out of older vehicles is underway, the sector's impact remains high. Vehicular emissions are also strongly influenced by traffic conditions. Under congested and slow-moving traffic, inefficient combustion results in higher emissions per vehicle, whereas operation at optimal speeds enables more efficient combustion and lower emission rates. These factors underscore that emission outcomes are shaped not only by vehicle technology but also by traffic flow and road network conditions.

Travel activity levels are rising due to growing demand, leading to increased total vehicle-kilometres travelled. Lack of adequate, integrated public transport and safe pedestrian or cycling infrastructure has increased dependence on personal vehicles. This high travel intensity is further aggravated by the daily influx of vehicles from outside the city, contributing to Delhi's air quality. In this context, the expansion and strengthening of mass public transport systems assumes critical importance.

Further, maintenance of a vehicle also impacts the emissions heavily. The current PUC system does not monitor PM from the tailpipe, so it is not a true representative of emissions.

Many vehicles run without PUC and are not maintained properly, emitting higher amounts of pollutants than the norms.

Urban and long-distance freight movement is also increasing alongside regional economic growth. Beyond tailpipe exhaust, vehicles are responsible for significant non-exhaust emissions from brake wear, tyre abrasion, and resuspended road dust. Transport sector emissions are further compounded by off-road sources, including construction machinery and agricultural tractors. Consequently, the region requires a rapid and comprehensive transition toward zero-emission pathways.

6.2 Industries and TPPs

The industrial source category includes furnaces and boilers, metal casting and refining operations, coal combustion, dry fly ash ponds, the burning of heavy oils, etc. All coal-fired power plants in Delhi have been decommissioned, and major polluting industrial units have been relocated outside the city limits. Following the implementation of the amended Approved Fuel List in 2022, industrial areas have transitioned to Piped Natural Gas (PNG). However, the higher PNG cost discourages PNG adaptation.

Despite these systemic changes, significant challenges remain due to a large number of small, unorganised units—including plastic recycling and small-scale manufacturing—operating in unauthorised or peripheral areas. Industrial pollution is also exacerbated by the illegal burning of non-hazardous industrial waste, such as plastic and rubber, along with fugitive emissions. In the broader NCR, there are numerous industrial clusters characterised by a heavy presence of small-scale units. These units often utilise small boilers and furnaces that urgently require a transition to clean fuels and modern technologies.

6.3 Biomass Burning (MSW, Residential & Crop Residue)

This source category comprises a diverse group of open burning activities, including the use of solid fuels in households such as wood and dung, burning of agricultural crop residues, plant branches and leaves, as well as open burning of municipal solid waste (MSW), including plastics, paper boards, used tyres, and wires. Altogether, this sector contributes to 17-23% in winter and 11-14% in summer. The problem intensifies severely during the winter months due to several overlapping factors highlighted as follows:

6.3.1 Open MSW Burning

Open burning of MSW is largely driven by inadequate waste management infrastructure. This wide gap between waste generation and processing capacity leads to major leakages, often resulting in open burning. There is a need for augmentation of waste processing facilities, such as Waste to Energy, CBG plants, and Recycling plants. While biomining of the landfill/dumpsites is underway, they are prone to fire risks from external triggers or methane-induced spontaneous combustion, especially during summer. Additionally, the open burning of horticulture waste such as dry leaves, twigs, and garden trimmings, particularly during seasonal pruning and leaf-fall periods, further adds to the emissions. Due to lack of awareness, MSW burning is often perceived as a convenient disposal method, especially where collection is irregular. During winter, MSW mixed with biomass is widely burned for warmth by low-income/homeless populations and outdoor workers, often involving plastics and rubber. This significantly worsens air quality across the Delhi-NCR region.

6.3.2 Residential Biomass Burning

The use of unclean cooking and heating fuels such as crop residue, firewood, cardboard, and cow dung remains one of the sources of air pollution across the NCR, particularly in rural, semi-urban areas and urban slums. While LPG penetration is fairly high in the NCT region, the use of solid fuels is prevalent in urban slums. Further, burning of solid fuels is highly prevalent in the semi-urban areas of NCR districts for both cooking and heating needs. Emissions from household activities, primarily cooking and space heating, contribute substantially to ambient particulate pollution. Biomass burning, which continues year-round among low-income households, intensifies significantly in winter due to increased heating demand.

6.3.3 Crop Residue Burning

Around 28 Million Tonnes of paddy stubble are generated within a short 30-day harvest window in Punjab, Haryana, and Uttar Pradesh-NCR, leaving farmers with limited time to prepare fields for the next crop. Despite various initiatives to manage stubble, such as subsidies for CRMs for in-situ management, promotion of ex-situ utilization and public awareness, many farmers still resort to the practice of stubble burning as the cheapest and quickest method to clear residue to prepare the field for the next crop. The practice of burning

releases large amounts of fine particulate matter and other gaseous pollutants, contributing to deteriorating air quality in the region through prevailing meteorological conditions, transporting pollutants from the north west towards Delhi. While its annual contribution to ambient PM_{2.5} is low, various studies have shown that the stubble burning impact can go up to 40% of Delhi's air pollution load during peak harvesting season, adding to the pollution load in Delhi-NCR in the months of October-November.

6.4 Soil and Road Dust

Road dust, managed by ULBs and road owning agencies, continues to be one of the major contributors to air pollution in Delhi-NCR because it functions as both a primary emission and a persistent source. This source category includes air-borne dust particles from roads & shoulders, vehicle movement, dry soil, road wear, etc. Strong winds lift loose soil from open areas and roads, worsening air quality. The poor road surfaces, potholes, broken edges, unpaved roads, road, tyre, brake wear, debris falling from C&D material transportation, etc., become the major source of road dust. The road dust is repeatedly resuspended by vehicular traffic, particularly during dry meteorological conditions. This cycle ensures that emissions persist in the atmosphere even in the absence of new dust-generating activities. The dust resuspension due to manual sweeping also contributes to air pollution requiring removal of dust through mechanised sweeping. There is a need for proper road dust management measures along with long-term interventions. These include the comprehensive redevelopment of road infrastructure with fully paved shoulders and integrated footpaths, alongside aggressive greening initiatives.

6.5 C&D Dust

This source category includes particles arising from Construction & Demolition activities, raw material storage, ready mix concrete plant, and loading & unloading operations. Delhi-NCR is going through massive infrastructure development involving construction, demolition, renovation, and large infrastructure projects such as buildings, roads, flyovers, and metro systems. These construction activities release large amounts of dust from excavation, cutting, drilling, mixing of concrete, and movement of materials, which contribute to air pollution. The C&D activities generate large amounts of C&D waste every day, which is dumped illegally near roads and open areas, making it one of the prominent

sources of PM pollution. The existing construction practices and limited awareness among builders, contractors, and citizens are also among the causes of not following the dust mitigation measures during construction.

Secondary pollutants: formation and control challenges

Secondary pollutants are not emitted directly from sources like exhaust pipes or industrial stacks; instead, they are formed in the atmosphere when specific gases emitted from combustion undergo chemical transformations in the air, often influenced by sunlight, moisture, and temperature. In Delhi and the NCR, these pollutants represent a major portion of the total particulate burden, significantly intensifying during the winter months. The key precursor gases are Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x), Ammonia (NH_3), and Volatile Organic Compounds (VOCs). For example, SO_2 from power plants and industry oxidises to form H_2SO_4 , which then reacts with NH_3 (from agriculture, livestock and waste) to create ammonium sulphate particles. NO_x (primarily from vehicles) transforms into nitric acid, which combines with NH_3 to form ammonium nitrate particles. The atmospheric formed ammonium sulphates and ammonium nitrates etc. are referred to as Secondary Inorganic Aerosols (SIA). VOCs from trees/plants, fuels and solvents react with atmospheric oxidants to form complex organic particles like Secondary Organic Aerosols (SOA).

Winter in Delhi is characterised by high moisture and frequent fog. This moisture can accelerate the conversion of gases into particles several times faster than usual. Colder conditions also promote the "gas-to-particle" conversion, particularly for ammonium nitrate, which is more stable in cold weather. In winter, the Planetary Boundary Layer Height drops significantly and creates a "lid" that traps precursor gases in a smaller volume of air, leading to higher concentrations and more frequent collisions between gas molecules, which speed up secondary formation. Calm winds prevent these newly formed particles from dispersing, leading to massive regional accumulation.

Secondary particles are microscopic in size and can remain airborne for days, travelling long distances. Secondary pollutants do not originate from a single, controllable source, complicating mitigation strategies. They are often more toxic, reactive, or persistent than their precursor pollutants. They have substantial adverse impacts on human health—particularly respiratory and cardiovascular systems—as well as on vegetation, materials, and ecosystems.

Because secondary pollutants do not originate from a single, controllable point source, developing effective mitigation strategies needs to address a diverse set of combustion sources like vehicles, industry, power plants and biomass burning, etc. Controlling these combustion sources will not only result in a reduction in primary pollutants but also in secondary pollutants.

6.6 Secondary Particulate

Secondary particulate matter accounts for 27% in winter and 17% in summer. The secondary particulates are formed from chemical reactions of gases emitted by the primary anthropogenic combustion sectors, such as TPPs, industries, vehicles, biomass, etc. The natural biogenic sources also contribute to the secondary particle formation. The growing

evidence highlights the importance of controlling precursor gases responsible for secondary particulate formation. However, because of limited understanding and underlying complexity, it is challenging to pinpoint the primary sources of pollution. (see box: **Secondary pollutants: formation and control challenges**)

6.7 Other sources (DG sets, crematoria, brick kilns, etc.)

"Other sources" remain a significant challenge because they are geographically dispersed and highly sensitive to enforcement. These sources often operate in close proximity to residential areas, creating local hotspots that increase regional background pollution during periods of poor atmospheric dispersion. The use of Diesel Generator (DG) sets has increased substantially across the NCR due to unreliable grid electricity. Moreover, older or poorly maintained DG sets act as super-emitters in the absence of Emission Control Devices (ECDs). These units are a major concern because they result in direct, ground-level exposure to emissions. Cremation without modern filtration and efficient technology remains a source of air pollution. Hotels and restaurants are identified as consistent area sources due to their continued reliance on solid fuels and a widespread lack of adequate emission control systems. Operations at regional airports also contribute to the pollution burden, primarily through the release of gaseous pollutants during flight activities. Airports contribute to air pollution through aircraft emissions during taxing, landing and takeoff. Brick kilns in and around NCR also contribute to the air quality in Delhi-NCR. In addition to anthropogenic sources, the natural sources such as dust storms, forest fires and natural biogenic emissions contribute to the PM levels.

These broad sources were acknowledged and identified by the Commission in its Policy to Curb Air Pollution in National Capital Regional formulated in 2022, which also outlines the broad actions to be initiated against such identified sectors to address the issue.

7. New Source Apportionment Study for Delhi-NCR

The assessment of existing emission inventory and source apportionment studies for Delhi NCR indicates several limitations arising from different methodologies, assumptions, geographical boundaries, source sectors and activities, data collection methods, temporal variations, emission factors and partial consideration of subsequent policy and regulatory interventions. In addition to the precision of emission factors, the accuracy and frequency of

data collection methods play a critical role in emission estimation. (Box: **Why do different studies show different results?**). While these studies provide valuable insights into emission sources and sectoral contributions, they may not fully represent current emission scenarios.

The Commission noted differences in existing approaches for emission inventory and source apportionment. It was further recognised that a unified, data-driven approach is essential to reduce emission uncertainty for developing effective air quality management in Delhi NCR. Accordingly, the Commission constituted a Steering Committee under the Chairmanship of a full-time Technical Member of the Commission, comprising Members from NEERI, CPCB, HSPCB, RSPCB, UPPCB, DPCC, IIT Kanpur, IITM Pune, UNEP Delhi, ARAI Pune, IIT Delhi and TERI. Based on the deliberations, CAQM developed a Framework for Emission Inventory and Source Apportionment for Delhi-NCR in April, 2025, which outlines high-resolution emission mapping (500 m × 500 m grid) across major polluting sectors like transport, industry, households, crop residue burning, road dust, and waste burning as outlined in this report.

The Commission entrusted CPCB with the task to implement the framework, and a consortium of four institutes led by ARAI, Pune and partners from IIT Delhi, TERI and IITM Pune has been awarded with the work of developing a new emission inventory and source apportionment study for Delhi NCR with 2026 as the base year. The updated inventory will incorporate recent activity data, improved methodologies, and ongoing policy measures to provide a more accurate assessment of emissions. The emissions will be used for predictive modelling using Chemical Transport Models for emission-based Source Apportionment, to further strengthen source apportionment and improve real-time assessment of pollution sources.

The developed emission inventory will be utilised in the Air Quality Early Warning System (AQEWS) and the Decision Support System (DSS) developed by IITM Pune, which provides air quality forecasts and near real-time source contribution analysis, offering temporal-spatial information and enabling policy interventions and targeted actions. It will also be useful for scientists and researchers to conduct advanced studies on source attribution, scenario modelling, and the development of mitigation strategies for Delhi-NCR.

8. Annexure I - Bio-Sketch of the Experts

Dr. S. D. Attri

Member Technical, Commission for Air Quality Management (CAQM), New Delhi

Dr. S. D. Attri holds a PhD in Environmental Sciences and Engineering, with over 36 years of experience in meteorological services, environmental and air quality monitoring networks, air quality modelling and management, climate change, urban meteorology and agrometeorology. He has more than 120 publications to his credit with research papers in national and international journals, Met. Monographs and books. He has provided guidance to Global Atmospheric Programmes as Member of Commission for Atmospheric Sciences Management Group, Expert Member, Task forces of Global Framework for Climate Services, and Primary Country Contact of Global Atmosphere Watch of WMO, Geneva, United Nations. He has served as Member of the Environmental Appraisal Committees (Thermal Power, Industries Mining & Coal Mining) of the MoEFCC. He has been awarded Commendation Certificate by the Hon'ble Prime Minister of India, for his contribution to the work of the IPCC, which is the Joint Winner of the Nobel Peace Prize 2007.

Prof. Mukesh Sharma

Professor-Emeritus, Department of Civil Engineering, Indian Institute of Technology Kanpur, Kanpur

Prof. Mukesh Sharma is a leading air quality expert and a Fellow of the Indian National Academy of Engineering and serves on the WHO advisory group for air pollution and UN Sustainable Development Goals. With a PhD from the University of Waterloo, Canada, he has contributed extensively to air quality monitoring, modeling, and management. He led the CPCB sponsored National AQI project which has been implemented to report daily AQI. He headed the project on Air Quality Standards which were notified in 2009 and currently he is the Principal Investigator of the project Review of National Ambient Air Quality Standards. He has published over 130 papers and advised national and international bodies on environmental health and risk assessment.

Prof. Chandra Venkataraman

Professor, Chemical Engineering and Climate Studies, Indian Institute of Technology Bombay, Mumbai

Prof. Chandra Venkataraman's research lies at the intersection of technology, emissions, air pollution and climate. She has pioneered the SMOG-India emissions inventory and the PAVITRA model for air quality and climate assessment. She has co-authored over 155 papers, a book and 4 patents. She is a fellow of the INAE (2016), IASc (2018), INSA (2022) and The World Academy of Science (TWAS, 2025) and received a Distinguished Alumni award (2024) from her alma mater, IIT Delhi. She advises the CCAC of UNEP.

Prof. Bhola Ram Gurjar

Director, National Institute of Technical Teachers Training & Research (NITTTR), Chandigarh (On-lien from Indian Institute of Technology Roorkee, Roorkee)

Prof. Bhola Ram Gurjar has extensively worked in the areas of urban emissions, air quality, health risk, and environmental sustainability. He has (co)authored more than 200 publications including 12 books and one patent. He has developed two popular NPTEL online courses, namely "Sustainable Transportation Systems" and "Air Pollution and Control". He is serving on several national committees, e.g., (i) National Knowledge Network, National Clean Air Program (NCAP), (ii) Environmental Services Sectional Committee of Bureau of Indian Standards (BIS), and (iii) National Working Group (NWG)-5 on Environment and Circular Economy of the International Telecommunications Union – Telecommunications Sector (ITU-T). Prof. Gurjar is currently on lien from IIT Roorkee to lead NITTTR, Chandigarh, as its Director.

Prof. Shiva Nagendra S. M.

Professor, Department of Civil Engineering, Indian Institute of Technology Madras, Chennai

Dr. Shiva Nagendra SM holds over 24 years of experience in research, teaching, and technology in air quality management. He was the former Chairman of GATE and JAM 2025, IIT Madras. He has published 150+ journal papers and 120+ conference papers, authored two Springer reference books, and holds five patents. He serves as Associate Editor for *Frontiers in Sustainable Cities* and *Journal of the Institution of Engineers (India): Series A*. He is the Founder-Chairman of Indian International Conference on Air Quality Management Series, Founder-President of Air Quality Management Association, Director of the CEPHA Network (UKRI-supported), and a WHO subject-matter expert.

Prof. Sagnik Dey

Professor, Centre for Atmospheric Sciences, Indian Institute of Technology Delhi, New Delhi

Prof. Sagnik Dey is the Head and Vipul and Mahesh Chaturvedi Chair Professor in Policy Studies at the Centre for Atmospheric Sciences, IIT Delhi, and Adjunct Professor at the Department of Health, Policy and Management, Korea University, Seoul. He received his PhD and M.Tech. from IIT Kanpur and worked as a Postdoctoral Scientist at the University of Illinois at Urbana-Champaign, USA. His research focuses on the air quality-climate change-health nexus and remote sensing of the Earth's climate system. He is an international collaborator of NASA's MAIA mission and the Global Burden of Disease Study and serves on several WHO and national expert committees.

Prof. Suresh Jain

Professor, Department of Civil & Environmental Engineering, Indian Institute of Technology Tirupati, Tirupati

Prof. Suresh Jain is a leading expert in air pollution and environmental health, currently serving as Professor and Head, Department of Civil & Environmental Engineering at the Indian Institute of Technology Tirupati, and formerly as Dean (Academic Affairs). With over 20 years of experience in research, teaching, and policy-oriented consultancy, his expertise spans air quality modelling, urban transport emissions, exposure assessment, and air quality management. He holds a PhD from IIT Delhi and an M.Tech. from IIT Kanpur. Prof. Jain has played key roles in NCAP implementation, state environmental governance, and international academic collaborations, contributing significantly to evidence-based air quality policy and environmental health assessment.

Prof. Umesh Chandra Kulshrestha

Professor, School of Environmental Sciences, Jawaharlal Nehru University, New Delhi

Prof. Umesh Chandra Kulshrestha has served as a member of the Environmental Pollution Control Authority (EPCA) and the EIA-AC of QCI-NABET. Currently, he chairs the Air Pollution Working Group of the RAC of the Asia Oceania Geosciences Society. He is also the Deputy Director at the South Asian Nitrogen Centre and serves on the Steering Committee of the International Nitrogen Initiative (INI). His engagement with air pollution and acid rain research dates back to the 1990s during the Taj Mahal pollution issue. He is a Fellow of the Indian Geophysical Union and has received several prestigious honors. He is the author of five books, has more than 200 publications and has guided 19 PhD students.

Dr. Manish K Naja

Director, Aryabhata Research Institute of Observational Sciences (ARIES), Nainital

Dr. Manish Naja's primary area of research covers various subfields of the lower atmosphere such as trace gases, aerosols, meteorology, wind dynamics, air pollution and climate change. He has co-authored more than 100 research papers and has supervised 8 students for their PhD. He is a member of the expert committee on Atmospheric Sciences of the Ministry of Earth Sciences, Govt. of India. Dr. Naja has played a key role in establishing the ASTRAD facility at ARIES and many other collaborative projects in the field of atmospheric research.

Prof. Neeraj Rastogi

Professor, Geosciences Division, Physical Research Laboratory, Ahmedabad

With 25+ years of research experience, Prof. Neeraj Rastogi is known to initiate new aerosol research fields in India such as 'Aerosol Oxidative Potential', online brown carbon, 'Applications of Isotopes' in aerosol studies, etc., and has published >100 peer-reviewed articles. Using chemical and isotopic compositions as tools, he investigates sources and processes affecting the abundances and characteristics of ambient aerosols over India and surrounding oceans. He has received three 'Group Achievement Award' from NASA. He is serving as a Vice-President of IASTA, and knowledge partner in NCAP.

Prof. Ravindra Khaiwal

Professor, Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh

Prof. Ravindra Khaiwal is a leading environmental health expert at PGIMER, Chandigarh, with over 25 years of research experience in air pollution, climate change, and public health. He obtained a D.Sc. from the University of Antwerp, Belgium, and served as a scientist in the UK with visiting professorships in Europe. He has contributed extensively to air pollution research. He has authored over 200 peer-reviewed publications with around 20,000 citations and an h-index of 65. He is ranked among the top 0.05% of researchers worldwide in air pollution science and leads national initiatives on health impacts of air pollution and climate change. Dr Khaiwal is globally recognized for translating complex science into effective policy and public communication.

Prof. Anant Mohan

Professor and Head, Dept. of Pulmonary, Critical Care and Sleep Medicine, All India Institute of Medical Sciences (AIIMS), New Delhi

Dr. Anant Mohan is an expert in respiratory and critical care medicine, with clinical and research interests including lung cancer, chronic obstructive pulmonary disease, and interventional pulmonology. He was awarded UK Commonwealth Fellowship in Chest Medicine and Interventional Pulmonology (2008–2009) and Honorary Professorship in University College London. Dr. Mohan is a Fellow of the Royal College of Physicians (London) and the American College of Chest Physicians and has played a key role in advanced clinical services such as lung transplantation at AIIMS.

Dr. B. Sengupta

Ex-Member Secretary, Central Pollution Control Board, New Delhi

Dr. B. Sengupta is a distinguished environmental scientist with over 34 years of service in the Government of India. He has extensive expertise in air and water quality management, industrial pollution control, environmental standards, EIA, hazardous and solid waste management, clean technologies, climate change, and remediation of contaminated sites. He has represented India in several international forums organised by UNEP, WHO, World Bank and others. Post-VRS, he continues to contribute as Chairman/member of several national technical committees and as consultant to organisations such as the World Bank, ICCT and Heinrich Böll Stiftung.

Dr. V. K. Soni

Scientist-G, India Meteorological Department (IMD), New Delhi

Dr Vijay Kumar Soni is M.Sc in Physics from IIT, Roorkee and PhD in Atmospheric Science from University of Pune. He joined the IMD in 1999 as Meteorologist. Since then, he has served the IMD in various capacities. At present, he is working as Scientist-G and Head, Environmental Monitoring and Research Centre, IMD, New Delhi. He is Executive Editor of Mausam journal and Editorial Board Member of Discover Atmosphere journal. He is also a faculty in the Meteorological Training Institute of IMD. He has published 86 research papers in peer reviewed journals, 7 Meteorological Monographs on various subjects and 4 chapters in books.

Dr. S. K. Goyal

Chief Scientist & Head, CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), New Delhi

Dr. S. K. Goyal is an air pollution expert with over 35 years of research and professional experience at CSIR-NEERI, Nagpur. He is currently Chief Scientist and Head of the NEERI Delhi Zonal Centre. His core expertise includes ambient and stack air quality monitoring, emission inventory development, vehicular emission modeling, source apportionment, air quality management planning, and carrying capacity-based sustainable development studies. In recent years, he has led and contributed to important air pollution studies pertaining to stubble burning contribution assessment, airshed delineation, vehicular & road dust re-suspension. He has contributed more than 100 peer reviewed publications.

Dr. Tuhin Kumar Mandal

Chief Scientist, CSIR-National Physical Laboratory (NPL), New Delhi

Dr. Tuhin Kumar Mandal is a Chief Scientist at CSIR-NPL, New Delhi, with over 25 years of experience in atmospheric physics, air pollution, and climate science. He earned his PhD from the University of Delhi and has received the BOYSCAST Fellowship (DST, Germany) and the START Young Scientist Award (USA). He has contributed to major programs including INDOEX, ICARB, CAWSES, APHH, SANH, and national CSIR-NPL air quality monitoring initiatives. His expertise includes atmospheric chemistry, aerosol characterization, source apportionment, emission inventories, trace gases, isotopic analysis, health risk assessment, and policy-relevant air pollution mitigation.

Dr. Sumit Sharma

Deputy Head, United Nations Environment Programme (UNEP), New Delhi

Dr. Sumit Sharma's expertise includes emission inventories, air quality monitoring, source apportionment, urban and regional air quality modelling and development of air quality management plans. With over 23 years of professional experience across nearly 100 projects, his work spans scientific research, policy advocacy, capacity building and outreach in environment and air quality management. He has also contributed to the formulation of India's National Clean Air Programme in 2019.

Prof. Vinayak Sinha

Professor, Department of Earth and Environmental Sciences, Indian Institute of Science Education and Research (IISER) Mohali, Mohali

Prof. Vinayak Sinha is currently an expert member of the United Nation's World Meteorological Organization (WMO) Environmental Pollution and Atmospheric Chemistry Scientific Steering Committee (EPAC SSC), the International Commission on Atmospheric Chemistry and Global Pollution, and the International Global Atmospheric Chemistry (IGAC), a Global Research Project under Future Earth. He has previously served as the first Indian Co-chair (2017-2020) and a Scientific Steering Committee (SSC) Member (2015-2020) of the Integrated Land Ecosystem-Atmosphere Processes Study, another Global Research Project under Future Earth.

Dr. Arunabha Ghosh

CEO, Council on Energy, Environment and Water (CEEW), New Delhi

Dr Arunabha Ghosh is an internationally recognised public policy expert, author, columnist, and institution builder. He advises governments, industry, civil society, and international organisations around the world. Last year, the Government of India appointed him to the Commission for Air Quality Management. In May 2025, the Government of Brazil appointed him as a Special Envoy for COP30 climate negotiations. He currently co-chairs the World Economic Forum's Global Future Council on the Energy Nexus. He served on the Government of India's G20 Finance Track Advisory Group and advised the Sherpa Track for India's G20 Presidency in 2022-23. In 2022, the UN Secretary-General appointed him to the High-level Expert Group on the Credibility and Accountability of Net-Zero Announcements by Non-State Actors. Dr Ghosh has been a member of the UN Committee for Development Policy since 2019 (nominated by the UN Secretary-General; Vice-Chair 2023-25).

Sh. Bharat Kumar Sharma

Member Secretary, Central Pollution Control Board, New Delhi

With decades of experience in environmental regulation and pollution control, he has previously led the Hazardous Waste Management Division in CPCB and later as Regional Director of CPCB Regional Directorate Pune. He possesses strong technical expertise in waste management and industrial pollution control, along with extensive experience in regulatory enforcement and institutional capacity building. Presently, as Member Secretary CPCB, he is strengthening India's environmental enforcement by enhancing coordination with key stakeholders, improving compliance monitoring mechanisms, and driving effective implementation measures for air, water, and waste management.

Ms. Anumita Roychoudhury

Executive Director, Research and Advocacy, Centre for Science and Environment (CSE), New Delhi

Ms. Anumita Roychowdhury has led major policy research and advocacy on air pollution, clean and low-carbon transportation, sustainable built structures, and resilient urban habitats. She has helped to build and guide some of the key policy campaigns on air pollution, transport and mobility strategies, and frame multi-sector climate and clean air strategies for cities and states. She has played an active role in several national and global environmental forums and platforms on clean air and climate change. Currently, she is also the contributory author to the report on cities and climate change of the International Panel on Climate Change.

Dr. Sachin Ghude

Scientist-F, Indian Institute of Tropical Meteorology (IITM), Pune

Dr. Sachin D. Ghude is an expert on atmospheric chemistry, urban air quality and fog modelling, and chemical data assimilation. He heads MAQWS (Metropolitan air quality and Weather Services) WIFEX and Thunderstorms Dynamics at IITM. He leads India's Winter Fog Experiment (WiFEX) and heads a research group on atmospheric chemistry and modelling. He earned his PhD from the National Physical Laboratory, based on greenhouse gas measurements at Maitri, Antarctica. His research supports socio-economic applications related to air quality, fog, health and climate, and he serves in key international scientific bodies including iLEAPS, iCACGP and MAP-AQ.

Sh. Moqtik Bawase

Sr. General Manager, Automotive Research Association of India (ARAI), Pune

Sh. Moqtik Bawase holds more than 25 years of experience in the field of air quality management, alternate fuels, sustainable transport, environmental life cycle assessment, and vehicle-exhaust emissions measurement & control. He has led many multi-disciplinary projects of national significance, which included development of emission factors and source profiles of the vehicle tailpipe emissions. Since 2005, he is actively involved in the studies involving source apportionment of particulate matter using scientific tools & techniques. He and his team have made significant contributions to understanding the effects of alternative fuels on materials used in fuel systems of vehicles. He was recently honoured by the Pune Municipal Corporation as a Paryavaran-Doot in recognition of his active contribution to Air Quality Management.

Dr. Sri Harsha Kota

Associate Professor, Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi

Dr. Sri Harsha Kota is CERCA Chair Professor at the IIT Delhi. He was honored with the prestigious Young Engineer Award for 2021 by the Indian National Academy of Engineering (INAE). With over 15 years of research experience in air quality management, Dr. Kota holds Master's and PhD degrees in Civil Engineering, with a specialization in air quality, from Texas A&M University, USA. His research interests encompass regional and urban air quality management, the development of air purifiers, the relationship between air pollution and human health, indoor air pollution, and the creation of emission inventories for air pollutants and greenhouse gases in India. Dr. Kota is actively engaged in collaborative research with scientists from India, the USA, the UK, the European Union, and China. He is currently involved in leading several nationally significant funded projects, amounting to 15 crores INR. These projects include revising the Indian national ambient air quality standards, developing clean air action plans for approximately 10% of non-attainment cities in India, forecasting air quality in Indian metropolitan areas, and assessing the impact of climate change on vector-borne diseases in India.

Dr. Anju Goel

Associate Director, Air Quality Research, The Energy and Resources Institute, New Delhi

Dr. Anju Goel leads the Air Quality Research Division at TERI. She holds an M.Tech from IIT Delhi and a PhD from the University of Surrey, UK, where she was a Commonwealth Scholar. With over 17 years of experience, Dr. Goel has been closely involved in the development of air quality management plans at city, state, and national scales. Her expertise includes sectoral emissions inventories, pollution load estimation, and carrying capacity studies. She has authored several policy briefs and technical reports and has published widely in peer-reviewed journals, with a particular focus on airborne ultrafine particles at traffic intersections.

Dr. Sarath Guttikunda

Founder/Director, UrbanEmissions

Dr. Sarath Guttikunda is recipient of the International Award by the American Geophysical Union in 2022, given annually in recognition of furthering the Earth and space sciences for the benefit of society in developing nations. He conducts research in an independent capacity at UrbanEmissions to support science, policy, and public dialogue on air pollution in India and cities across Asia, Africa, and Latin America. He received his Bachelors in Chemical Engineering at the Indian Institute of Technology (Kharagpur, India, 1997) and Doctorate from the University of Iowa (USA, 2002).

Ms. Swagata Dey

Policy Specialist, Group Head, Policy Development and Outreach, Center for Study of Science, Technology and Policy (CSTEP), Noida

Ms. Swagata holds over 10 years of experience in developing sectoral inventories, pollution load estimation, carrying capacity studies and developing city level and ward level action plans for NCAP cities. She has also worked on testing air quality sensors for complementing regulatory monitors across India. Core areas of interest are vehicular emissions, DG sets, and agriculture waste burning. Has published book chapters, reports and peer reviewed papers on air quality, liveable cities and sustainability. Ms. Swagata holds Masters from TERI University and Ohio State University, USA.

Dr. Mohammad Rafiuddin

Programme Lead, Council on Energy, Environment and Water (CEEW), Delhi

Dr. Mohammad Rafiuddin's work involves air quality data analysis and modelling, developing decision support systems for various stakeholders and supporting NCAP implementation through technical and policy assistance to urban local bodies. He has a PhD in atmospheric sciences from the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), a post graduate diploma in urban environmental management and law from the National Law University (NLU) and a bachelor's in mechanical engineering from JNTU, Hyderabad.

Dr. Manoj Khare

Senior Director & HoD ES&EG Group, Centre for Development of Advanced Computing (C-DAC), Pune

Dr. Manoj Khare is Scientist G and head of HPC - Earth Science, Engineering & Geospatial Application Group at C-DAC Pune. He has 30 years' experience in Remote Sensing and GIS. His research areas involved mainly the development of scientific applications for weather and urban air quality management, Disaster management and natural resource management. Currently he is leading the urban modelling project for the development of an automated modelling framework and decision support system for weather, air quality, and urban flood forecasting under National Supercomputing Mission of MeitY and DST.

Ms. Sakshi Batra

Scientist C, Central Pollution Control Board (CPCB), New Delhi

Ms. Sakshi Batra has over 20 years of experience in environmental governance, air quality policy, and urban air quality management. She has played a key role in formulating, reviewing, and implementing national air quality policies in India. Currently, she oversees execution and monitoring of the National Clean Air Programme (NCAP) and contributes to the review and upgradation of National Ambient Air Quality Standards (NAAQS). She led the development of the PRANA National Dashboard to track city action plans and NCAP targets, and conceptualized the micro-planning framework for quantifiable, source-specific strategies.

Dr. Rajeev Kumar Mishra

Associate Professor and Scientist, Department of Environmental Science and Engineering, Delhi Technological University (DTU), New Delhi

Dr. Rajeev Kumar Mishra has extensively contributed in the fields of Urban Air and Noise Pollution Management, Ultrafine Particles, Indoor Air Pollution, Health Risk Assessment and Sustainable Development. He has more than 14 Years of experience involving government-funded projects, interdisciplinary collaborations, and expert advisory roles. He has successfully led major research initiatives funded by prestigious government bodies like CPCB. Dr. Mishra has also made a remarkable impact on public understanding of environmental issues. He has published over 80 research papers and 93 newspaper articles in prominent regional, national and international newspapers, simplifying complex environmental science topics for the general public. His consistent engagement with the public underscores the societal value and real-world relevance of his research.

Dr. Saroj Kumar Sahu

UGC Faculty, Department of Environmental Science, Berhampur University, Berhampur

Prof. Saroj Kumar Sahu has more than two decades of experience in the development of national and megacity emission inventories, urban air quality management, climate and atmospheric chemistry modelling, pollutant and meteorological measurements, and health impact studies. He completed his PhD at the Indian Institute of Tropical Meteorology (IITM), Pune, followed by postdoctoral research at Forschungszentrum Jülich, Germany, and the National Institute for Environmental Studies (NIES), Japan. He was also a scientific member of the 28th Indian Expedition to Antarctica during 2008–09. To date, he has published more than 70 peer-reviewed research papers and 10 book chapters. He has supervised four PhD scholars and is currently leading and contributing to several national and international research projects, including ANRF-PAIR, MoES, and UGC initiatives.

Dr. Vikas Singh

Scientist E, Commission for Air Quality Management, New Delhi

Dr. Vikas Singh has over two decades of research experience in the field of air quality. He earned his PhD in air quality modelling from the University of Brescia, Italy, followed by post-doctoral work in UK/EU air pollution projects. As former scientist at the National Atmospheric Research Laboratory, Gadanki, under the Department of Space, his research contributed to the improved understanding of air pollution by integrating surface, satellite and air quality modelling data sets. He has published over 50 research papers in high-impact, peer-reviewed international journals and has worked on a number of national and international projects on air pollution.

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Annexure A-1/3

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ITEM NO.302

COURT NO.1

SECTION PIL-W

S U P R E M E C O U R T O F I N D I A
R E C O R D O F P R O C E E D I N G S

Writ Petition(s) (Civil) No(s). 13029/1985

M.C. MEHTA

Petitioner(s)

VERSUS

UNION OF INDIA & ORS.

Respondent(s)

ISSUE REGARDING AIR QUALITY IN DELHI NAME OF THE FOLLOWING ADVOCATES MAY BE TREATED TO HAVE BEEN SHOWN IN THE LIST: MR. HARISH N. SALVE, SR. ADVOCATE (A.C.) MS. APARAJITA SINGH, SR. ADVOCATE (A.C.) MS. UTTARA BABBAR, SR. ADVOCATE (A.C.) MR. A.D.N. RAO, SR. ADVOCATE (A.C.) MS. SHIBANI GHOSH, ADVOCATE (A.C.) MR. SIDDHARTHA CHOWDHURY, ADVOCATE (A.C.) MR. G.S. MAKKER, MR. AMRISH KUMAR, MR. M.K. MARORIA, MR. SANJAY KR. VISEN, MR. SUDEEP KUMAR, MR. KARAN SHARMA, MR. SANDEEP KR. JHA, MS. JYOTI MENDIRATTA, MR. RAHUL KHURANA, ADVOCATES

WITH

C.A. No. 8564/2022 (XVII)

T.C.(C) No. 148/2025 (XVI-A)

Date : 23-02-2026 This petition was called on for hearing today.

CORAM : HON'BLE THE CHIEF JUSTICE
HON'BLE MR. JUSTICE JOYMALYA BAGCHI
HON'BLE MR. JUSTICE VIPUL M. PANCHOLI

For Amicus Curiae: MS. APARAJITA SINGH, SR. ADVOCATE (A.C.)
MS. UTTARA BABBAR, SR. ADVOCATE (A.C.)
MS. SHIBANI GHOSH, ADVOCATE (A.C.)

For Petitioner(s) : By Courts Motion, AOR
Applicant-in-person, AOR
Petitioner-in-person

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Mr. Ramesh Babu M. R., AOR
Mr. Rajesh Kumar Chaurasia, AOR
Ms. Shalini Kaul, AOR

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UPON hearing the counsel the Court made the following

O R D E R

Issue Regarding Air Quality in Delhi

1. Although, in terms of our order dated 21.01.2026, the main case is slated for hearing on 12.03.2026, and as such, status reports with reference to the issues flagged in paragraphs 1 and 5 of that order are expected to be filed by the different stakeholders on or before the date fixed, the instant matters have been listed today pursuant to mentioning of some connected matters.
2. Taking an opportunity therefrom and having noticed that the long-term measures mentioned in paragraph 1 of our order dated 21.01.2026 pertain only to vehicular traffic, we deem it appropriate to highlight the other long-term solutions recommended by the Commission for Air Quality Management (CAQM) and which are to be introduced in a phased manner.
3. On the issue of abatement of dust pollution from construction of demolition activities, the CAQM has recommended as follows:

S. No.	Long term measures	Concerned Agencies
1.	Technology driven monitoring of construction sites throughout the year for enforcement of dust control measures, particularly through establishment of Integrated Command and Control Centre and compulsory registration of sites on the web portals of SPCBs/ DPCC or ULBs.	SPCBs/ DPCC & ULBs
2.	Collection, transportation and storage arrangements for the entire C&D waste generated.	GNCTD/ NCR State Govts. & ULBs
3.	Augmentation of infrastructure for C&D waste processing.	GNCTD/ NCR State Govts. & ULBs
4.	Complete offtake of recycled C&D waste materials.	GNCTD/ NCR State Govts. & ULBs

4. For management of dust from roads and right of ways, the recommendations are to the following effect:

S. No.	Long term measures	Concerned Agencies
1.	Development and redevelopment of roads in all major urban and industrial areas in Delhi-NCR to be carried out in accordance with Indian Road Congress (IRC) Guidelines and the Standard Framework issued by the Commission including establishment of Road Asset Management System (RAMS) and other techniques for monitoring road quality.	NCR State Governments/ GNCTD, Road Owning Agencies in NCR
2.	Effective cleaning of all the roads by Mechanized Road Sweeping Machines (MRSMs), suitable for roads of different width, ensuring dust free roads in all major urban and industrial areas in Delhi-NCR.	Road Owning/ Maintenance Agencies in NCR
3.	Identification of potholes on regular basis and repairing on priority within a short time, using advanced and durable technologies.	Road Owning/ Maintenance Agencies in NCR
4.	Periodic silt-load analysis (of dust on roads) to identify high-dust corridors, prioritize cleaning operations, and ensure evidence-based, sustained reduction of road-dust pollution.	Road Owning/ Maintenance Agencies in NCR

5. On the issue of abatement of industrial pollution, the CAQM has suggested the following long-term measures:

S. No.	Long term measures	Concerned Agencies
1.	Formulate a plan for Common Boilers for Industrial Clusters.	CPCB, NCR State Governments/ GNCTD, SPCBs/ DPCC & ULBs

S. No.	Long term measures	Concerned Agencies
2.	Develop a comprehensive plan for industrial waste management and ensure zero burning.	NCR State Govts./ GNCTD, SPCBs/ DPCC, ULBs and Industry Associations
3.	Develop PNG infrastructure in all Industrial Areas and evolve a uniform and affordable pricing structure for PNG to make industrial consumption economically viable.	MoPNG, MoF, NCR State Govts./ GNCTD.
4.	State Governments to prepare an implementation plan for replacing cupola and other furnaces with electric furnaces through suitable incentives etc.	All NCR State Govts.
5.	Elimination of all air polluting industries in non-confirming areas of NCR or bringing them within the fold of CTE/ CTO regime.	SPCBs/ DPCC, NCR State Govts./ GNCTD
6.	All air polluting industries to install OCEMS as per guidelines of CPCB.	SPCBs/ DPCC
7.	Stricter emission norms to be examined and considered by CPCB for critical air polluting industries particularly metal, textile and food processing.	CPCB
8.	Action Plan to be prepared for elimination of coal as fuel in industries in non-NCR areas in the States of Haryana, Uttar Pradesh, Rajasthan and Punjab.	NCR State Govts. and Govt. of Punjab

6. The CAQM has further recommended that, considering the emissions from coal based thermal power plants, no new coal based thermal power may be henceforth established within a 300 km radius from Delhi.

7. In respect of Open Bio-Mass/MSW burning and fires at sanitary landfill sites, the CAQM is of the view that the following measures may be implemented:

S. No.	Long term measures	Concerned Agencies
1.	Complete processing of legacy waste at the Dumpsites/ Sanitary Landfill (SLF) sites within set timelines	ULBs of NCR
2.	Augmentation of Municipal Solid Waste (MSW) processing capacity to cater to the requirement of fresh MSW expected to be generated	MoHUA, ULBs of NCR

S. No.	Long term measures	Concerned Agencies
3.	Strengthening of waste collection, particularly in unauthorized colonies and slum areas and 100% waste segregation at source, ensuring no MSW waste in public place.	ULBs of NCR
4.	Integration of the informal waste-picking community into the formal municipal solid waste management system.	ULBs of NCR
5.	Intensive IEC campaigns for sensitizing Citizens, RWAs, Educational Institutions etc. to enlist their participation	ULBs of NCR, SPCBs/ DPCC
6.	Making provisions for electric heaters, community warming centers, community kitchens during winter season.	GNCTD/State Govts. and ULBs of NCR

8. To prevention and control paddy stubble burning, the CAQM has sought the following action:

S. No.	Long terms measures	Concerned Agencies
1.	Purchasing of new CRM machines to cater to the need of farmers during peak harvesting season as per the assessment of the States and making these machines available to small and marginal farmers free of charge.	MoA&FW and State Govts. of Punjab, Haryana, Uttar Pradesh
2.	Strengthening the supply chain for ex-situ management of stubble to ensure year-round feedstock availability for industries and energy plants through balers and aggregators.	MoA&FW, MNRE, State Govts. of Punjab, Haryana, Uttar Pradesh
3.	Promoting establishment of Plants for ex-situ utilization of stubble (Pellet/ Briquette manufacturing units, CBG/ 2G ethanol plants, Biomass power generation plants, industrial boilers etc.)	MNRE, MoPNG, CPCB, State Govts. of Punjab, Haryana, Uttar Pradesh
4.	Improving detection and monitoring of paddy stubble burning through satellites and other means of surveillance and strengthening enforcement at field level	NRSC (ISRO), IARI, State Govts. of Punjab, Haryana, Uttar Pradesh

9. On greening and plantation in NCR for abatement of air pollution, the CAQM has recommended as follows:

S. No.	Long terms measures	Concerned Agencies
1.	Plantation in Avenues, Parks, Gardens, open spaces, degraded forest lands etc.	NCR State Govts.
2.	Development and strengthening of green belts around industrial clusters, highways, major pollution hotspots and greening of central verges and sidewalks	SPCBs/ DPCC, Industries Department and Road Owning Agencies in NCR

10. On strengthening air quality governance, according to the CAQM, the following measures are required to be taken:

S. No.	Long term measures	Concerned Agency
1.	Augmentation of CAQMS in a phased manner ensuring uniform geographical representation.	SPCBs / DPCC
2.	Set up technology driven "Integrated Command and Control Centres" for stringent monitoring and enforcement to control air pollution from all sectors	NCR SPCBs, PPCB/ DPCC and ULBs in NCR
3.	Strict implementation of the recommendations of the Expert Committee constituted by the CAQM for improving the functioning of the SPCBs / DPCC in Delhi-NCR, in terms of the Order dated 08.05.2025 of the Hon'ble Supreme Court in WP(C) No. 13029 of 1985.	CPCB, NCR SPCBs/ DPCC and NCR State Governments/ GNCTD

11. It may be seen that while making multifarious recommendations, the CAQM has also identified the concerned agencies that are expected to take necessary action to give effect to these recommendations. We, consequently, direct the Government of NCT of Delhi, along with the other identified agencies to submit a proposed action plan for giving effect to the above reproduced long-term solutions suggested by the CAQM.

12. With respect to the recommendations of the CAQM recorded in paragraph 5 above, as well as in line with the suggestion recorded thereafter in paragraph 6 in the context of thermal power plants,

we direct the Government of NCT of Delhi and the Union Ministries of Environment, Forest, and Climate Change, of Petroleum and Natural Gas, and of Commerce and Industry to submit a joint proposal for shifting of all coal-based industries out of Delhi-NCR. The proposal to be submitted shall first identify the industries (small, medium, or heavy) that are partially or fully coal-based, and then suggest alternative fuel/energy sources that may be used, such as natural gas (CNG/LNG/RLNG), Bio Gas, renewable energy sources, and electricity.

13. We may hasten to add that the neighbouring states of Uttar Pradesh, Haryana, and Rajasthan may issue and publish public notices inviting suggestions, proposals, and recommendations from all the stakeholders, including the coal-based industries, regarding the said movement of coal-based industries. Such notices shall be deemed to be notices served on these industries by this Court. It will be appropriate to mention in the notices that the same have been issued under the directions of this Court, and if any coal-based industry has any objection against the proposed replacement of coal-based fuel with any better alternative, they may submit their objections within a period that may be fixed by this Court on the next date of hearing.

14. Meanwhile, an action-taken report shall be submitted by all the States, giving a full description of the public notices issued by them.

15. Meanwhile, the State of Haryana, Government of NCT of Delhi, and other concerned authorities will also consider the feasibility of barrier-less toll plazas being operated throughout the year in

key locations in Delhi-NCR. The locations, logistical support, the manner of operation, etc. ought to be deliberated upon. The various parties shall ensure that a response to this issue is also included in the action-taken report to be filed by the States.

16. Post this matter on the date fixed i.e., 12.03.2026, at 02:00 p.m. to consider the first issue of vehicular traffic.

Main Writ Petition

17. For the reasons identified in an even-dated order passed by us in Writ Petition (Civil) No. 13381/1984, we direct the *amicus curiae*, in coordination with the offices of learned ASG, Ms. Aishwarya Bhati, as well as the officer of the Advocates General of the States of Haryana, Rajasthan, and Uttar Pradesh, as well as of the NCT of Delhi, to prepare an proposed plan for identification of pending Interlocutory Applications filed in the instant Writ Petition and their subsequent effective adjudication. The learned *amicus* shall also appropriately identify those IAs that have been rendered infructuous due to the passage of time or through orders of this Court, or those applications which it may be more suitable to be transferred to the respective High Court having territorial jurisdiction. Similarly, such a proposal shall also include the measures that may be undertaken to properly close the proceedings in the instant Writ Petition filed in 1985 and, instead, address this issue of Air Pollution in Delhi-NCR through a more contemporary and representative case management framework.

18. List this matter for this purpose also on 12.03.2026.

(NITIN TALREJA)
ASTT. REGISTRAR-cum-PS

(PREETHI T.C.)
ASSISTANT REGISTRAR



Press release

India's highest ammonium sulfate contribution comes from power plant dominant state, reinforcing need to reinstate desulfurisation norms

New Delhi, 24 December 2025 – A new analysis by the Centre for Research on Energy and Clean Air (CREA) shows that up to 42% of India's PM_{2.5} burden is chemically formed in the atmosphere from precursor gases, particularly sulfur dioxide (SO₂) from coal-fired power plants (CFPPs), reinforcing the central role of SO₂ control in PM_{2.5} mitigation. Despite this evidence, the current regulatory framework has exempted approximately 78% of these CFPPs from installing flue gas desulfurisation (FGD) systems, weakening SO₂ control at the source.

The highest annual ammonium sulfate contribution is observed in **Chhattisgarh (42%), a coal-fired power plant-dominant state**, followed closely by Odisha (41%). This shows that reinstating mandatory FGD requirements across all coal-fired thermal power plants is critical to reducing secondary ammonium sulfate formation and PM_{2.5} under the National Clean Air Programme (NCAP).

CREA's analysis finds that secondary particulate matter, particularly ammonium sulfate, is a dominant component of PM_{2.5} pollution across India, **challenging the long-standing policy focus on dust and primary pollution sources** in air quality management. The findings show that a large share of India's PM_{2.5} pollution is not directly emitted but forms in the air through chemical reactions, a reality that has major implications for the ongoing revision of the NCAP.

The assessment, using NASA's MERRA-2 reanalysis data for 2024, finds that ammonium sulfate contributes between **17% and 42% of PM_{2.5} mass across Indian states**, with most states clustering between 30 and 40% annually. This establishes **secondary particulate matter as a core driver of India's PM_{2.5} burden**, rather than a marginal or seasonal concern.

Aside from Chhattisgarh, several other states across India also recorded high contributions, indicating that **secondary sulfate formation is widespread and national in scale, not limited to a few hotspots.**



Seasonal contributions across Indian states show that ammonium sulfate remains a substantial component of PM_{2.5} year-round, peaking in winter (31-52% of PM_{2.5} mass) and post-monsoon (27-53%), and remaining significant even in summer (11-36%) and monsoon season (4-26%). These patterns demonstrate that **secondary particulate matter dominates PM_{2.5} composition during India's most polluted months.**

The findings also highlight major gaps in current air quality strategies, which continue to prioritise PM₁₀, road dust, and other visible pollution sources, while largely overlooking the role of precursor gases such as sulfur dioxide and ammonia. Without addressing secondary particulate matter, improvements in air quality are likely to remain limited and short-lived.

'As the NCAP is revised, India must focus not only on PM_{2.5} concentrations but also on what the pollution is made of. With secondary ammonium sulfate accounting for up to 42 percent of PM_{2.5}, largely driven by SO₂ from coal-based power plants, precursor controls and composition monitoring are essential for air quality improvement', said Manoj Kumar, India Analyst at CREA.

-End-

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Notes to editors

- India monthly air quality snapshots can be found [here](#).
- Daily Air Quality Dashboard: <https://ncap.energyandcleanair.org/>

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. We use scientific data, research and evidence to support the efforts of governments, companies and campaigning organisations worldwide in their efforts to move towards clean energy and clean air. www.energyandcleanair.org.

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Health

PM 2.5 not only killed 1.7 million people in India during 2022, but also caused financial losses to the tune of 9.5% of country's GDP: Lancet


Heat waves on the rise triggered by climate change; urban greenness falling



Air pollution over Delhi. Photo by Vikas Choudhary/CSE

 Jayanta Basu

Published on: 29 Oct 2025, 6:00 am

 tion is not only the biggest killer in India but also significantly impacts its economy, a new global report has confirmed.

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More than 1.7 million people died in India during 2022 from exposure to PM 2.5, the ultra-fine particulate pollutant, according to The Lancet Countdown on Health and Climate Change that works in close coordination with the World Health Organization (WHO).

The figure shows a sharp increase compared to the values registered twelve years back.

The Union environment, forest and climate change ministry had rebutted the high air pollution-linked figure in an October 26 social media post in the context of another global report released a few days back: "...The reported figure of 2 million deaths linked to air pollution... is not based on actual records but derived using statistical modeling techniques (that) had its own limitations...". The State of Global Air 2025 reported 2 million air pollution related deaths in India during 2023.


The Lancet report, a document prepared by 128 experts from 71 academic institutions and UN agencies, has also found that every Indian, on average, had faced nearly 20 days of heat waves during 2024. About one-third of these could be attributed directly to climate change.

"We have prepared a separate sheet for India, which is significantly affected," responded Mariana Romanello, an executive director of Lancet Countdown and a lead author of the report, to this correspondent when asked about the situation in India.

The villains

The India-specific report of Lancet highlights the impact of fossil fuel burning in India. "There were over 1,718,000 deaths attributable to anthropogenic air pollution (PM 2.5) in 2022 in India, an increase of 38% since 2010," read the report, a copy of which is with this correspondent.

It further pointed out that "...Fossil fuels (coal and liquid gas) contributed to 752,000 (44%) of these deaths in 2022, while coal accounted for 394,000 deaths, primarily from its use in power plants (298,000 deaths)," adding that "...use of petrol for road transportation contributed to 269,000".

 The report found that burning of fossil fuels, particularly in thermal power plants and running of millions of vehicles in the country, played a key role in triggering the death march from air pollution.

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 pulmonologist.

Rs 30 lakh crore lost in a year

The report also pointed out that "... In 2022, the monetised value of premature mortality due to outdoor air pollution in India amounted to USD 339.4 billion (nearly Rs 30 lakh crore), the equivalent of 9.5 percent of gross domestic product".

Incidentally, while the climate change-linked threat is on the rise, India's preparedness for the low-carbon transition got decreased marginally in 2024 compared to the year before.

Indoor air pollution also contributes significantly to the death scare from fossil fuel burning, the report showed. "In 2022, household air pollution due to the use of polluting fuels in India was associated with 113 deaths per 100,000. Mortality rates associated with household air pollution were higher in rural than urban areas (125 per 100,000 in rural and 99 per 100,000 in urban)," added the report.

"Evidence is growing stronger indicating diverse and multiple health impacts of air pollution. Most of the deaths are associated with non-communicable diseases like heart disease, lung cancer, diabetes, and even dementia. This suggests growing risk for India's ageing population and calls for urgent integration of clean air strategies with health and development planning," observed Anumita Roychowdhury, an executive director with the Centre for Science and Environment (CSE) and a frontline air pollution expert.

Agriculture and construction sectors most affected by heat

In 2024, people in India were exposed to 19.8 heatwave days each, on average. Of these, 6.6 days of exposure would not have been expected to occur without climate change, according to the report.

"Compared to 1990-1999, in 2024, people were exposed on average to 366 more hours during which ambient heat would have posed a moderate or higher risk of heat stress if undertaking moderate outdoor physical activity," stated the report.

It added that "for 2024, heat exposure resulted in a loss of 247 billion potential labour hours per year, a record high (of) 419 h per person, and 124% more than in 1990-1999. The agriculture sector accounted for 66 per cent, and the construction sector accounted for 20 per cent of losses in 2024. The associated potential income lost from labour capacity reduction due to extreme heat was \$373 million in 2024.

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over 10 million people were living less than 1 m above sea level in India, and therefore at risk from sea level rise”.

The Lancet study also found that “between 2001 and 2023, India lost a cumulative total of 2.33 million hectares of tree cover, of which 143,000 were lost only in 2023.” Urban greenness in the country has decreased 3.6 per cent during the last decade, it added.

Of the 189 most populous cities in India, having more than 500,000 inhabitants, 14 had exceptionally low levels of urban greenness, 110 had very low levels, 42 had low levels, and 22 had moderate levels. Only Tamluk in West Bengal was classified as having high levels of urban greenness.

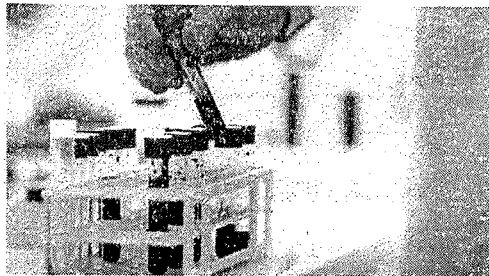
The World Health Organization (WHO)

Air Pollution

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Item No. 02

(Pune Bench)

**BEFORE THE NATIONAL GREEN TRIBUNAL
PUNE BENCH**

(By Video Conferencing)

Original Application No. 74/2020(WZ)

Madhusudan Roongta

Applicant

Versus

State of Maharashtra & Ors.

Respondent(s)

Date of hearing: 19.01.2022

**CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON'BLE MR. JUSTICE BRIJESH SETHI, JUDICIAL MEMBER
HON'BLE PROF. A. SENTHIL VEL, EXPERT MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER**

Applicant: Mr. Navin Maheshwari, Advocate

Respondent(s): Mr. Rahul Garg, Advocate for R-3 (MoEF&CC)
Mr. Mukesh Verma, Advocate for R-4(MPCB)
Mr. Raghunath Mahabal, Advocate for R-5 & 6
Mr. Kartik Shukul, Advocate for R-7

ORDER

1. This application has been registered on transfer of proceedings from the High Court of Bombay at Nagpur in *PIL No. 3/2018*. The petition is against violation of environmental norms by Maharashtra State Power Generation Co. Ltd., Mumbai, Chandrapur Super Thermal Power Station (CSTPS), Chandrapur and Western Coalfields Limited, Chandrapur. It is stated that the emissions are beyond the norms prescribed under clause 25 of Schedule-I to the Environment (Protection) Rules, 1986. There is also non-compliance of Notification dated 25.01.2016 issued by the MoEF&CC requiring fly ash disposal by

31.12.2017. There are also allegations of water and air pollution in the operation of the said power plants.

2. The writ petition was filed before the High Court on 05.10.2017 to which response was filed by the State PCB as well as by the power plants denying the violation of environmental norms and also raising an objection that the matter should be transferred to this Tribunal. Accordingly, vide order dated 29.01.2020, a Division Bench of the High Court transferred the matter to this Tribunal. Thereafter, no one has entered appearance on behalf of the applicant and the matter has been referred by the Pune Bench to this Bench.

3. The matter was considered on 29.10.2020. The Tribunal directed filing of latest status of compliance of environmental norms by the PP in question – CSTPS, by a joint Committee of CPCB and State PCB.

4. Accordingly, the joint Committee visited the power plant on 06.01.2021 and reported as follows:-

“• CSTPS has commissioned total 09 units from time to time since 1983. Presently two units are decommissioned and remaining units are in operational conditions. However, unit 8 was nonoperational during visit due to annual maintenance. CSTPS has provided CAAQMA stations at four locations in its periphery and OCEMS analyzers at all the operational stacks and ETPs. In addition CSTPS also carried out manual monitoring of stacks and ambient air quality monitoring periodically through third party.

*• During visit Source emission monitoring of stacks attached to all the operational units were carried out. It was found that **all monitored stacks exceed for concentration of sulphur dioxide. In addition, it was found that concentration of PM exceeds for unit no. 06 and centration of NOx for unit no. 09 as per the conditions mentioned in the CCA. It was also observed that the CSTPS uses coal having higher sulphur content than that mentioned in the CCA. It was informed that tender for installation of flue gas desulphurization (FGD) unit is under process. CSTPS need to expedite the process of***

installation of FGD and also take further steps to meet the emission norms.

• The joint committee has collected samples of water from all 04 ETPs. It was found that all the ETPs meet the MPCB standards mentioned in the CCA. Proper collection and treatment of runoff water from reject coal storage area need to be provided so that runoff water if any will get treated and recycled back. In addition discharge/drainage of ash slurry during ash slurry pipeline maintenance was observed during visit. It is understood that such discharge occurs in case of maintenance in pipeline. Therefore proper arrangements need to be provided by CSTPS to collect and transfer ash slurry-CSTPS also need to collect the accumulated fly ash observed on the side of natural trench during visit.

• The ambient air quality found exceeding the NAAQS for PM 10 at all three monitoring locations and PM 2.5 for two locations. CSTPS need to take more efforts to mitigate the dust emission form various activities. It was observed that coal transfer pipeline work from Bhatadi Open Cast Mine to CSTPS was under progress and it will help in reducing the truck movement for transfer of coal from the said mines to CSTPS.

• CSTPS has not achieved 100 % fly ash utilization as per the condition of CCA. Huge quantum of fly ash found dumped in the ash bund. CSTPS need to prepare action plan for 100% utilization of present fly ash generation and plan for legacy ash dumped in the ash bund.”

5. On 12.08.2021 and 23.09.2021, the Tribunal considered the above and adjourned the matter on request of the parties.

6. The applicant has filed his response to the report of the joint Committee on 19.03.2021 and pointed out the violations of air quality norms and contamination of water downstream on account of ash slurry as follows:-

“8. During visit Source emission monitoring of stacks attached to all operational units were carried out. It was found that all monitored exceed for concentration of Sulphur di-oxide (SO₂). The unit no. 08 was not in operation due to annual maintenance. The remaining units were operational. The analysis result of stack attached to remaining units i.e, 03, 04,05,06,07 and 09 reveals that

the concentration of Nox and PM were found within the standard limit but the SO₂ was above the permissible limit.

9. *I state and submit that in Joint Committee report team mentioned that the coal analysis data collected from SIPS shows that the Sulphur content in the coal is 0.58%. However, as per CCA the sulphur content of the coal to be used in the project shall not exceed 0.5. **Standard limit of Sulphur dioxide as per MOEF notification dated 07.11.2015 and MPCB CCA with or within 600 but in Joint Committee report team mentioned stack attached to Boiler unit no 3 & 4 is 1067.38 mg/Nm³ and 1287.72 mg/Nm³ respectively exceeding the standard limit of 600 mg/Nm³. In Boiler unit no 5,6,7 and 9 Standard limit Sulphur dioxide is 200 but committee observed it is 124630 mg/Nm³, 113.70 mg/Nm³, 1141.81 mg/Nm³ and 1578.36 respectively exceeding the standard limit of 200 mg/Nm³.***

10. *I state and submit that the fly ash contains sulphur dioxide (SO₂) carbon monoxide (CO) as well as Nitrous Oxide (N₂) which contributes to air pollution the fine particles of fly ash are carcinogenic in nature.*

11. *I state and submit that in report committee mentioned itself that monitoring of stacks attached to all the operational units exceed for concentration of Sulphur di-oxide (SO₂) within, the standard limit and it was also mentioned that CSTPS uses coal having higher sulphur content than that mentioned in the CCA and there was not installed flue gas desulphurization (FOD) unit is under process and it means the air is polluted.*

12. *I state and submit that joint committee report observed that ash from the ash slurry water gets settled in the downstream and the quality of water so found decreasing may be due to partial percolation and evaporation or absorbed by vegetation in the downstream.*

13. *I state and submit that mine water generated from the Bhatadi mine is utilized for various purposes such as water sprinkling, firefighting etc. and also provided to a pond in Tirwanja village, excess mine water is discharged into the natural nallah. Mine water generated is pumped out from the dip most point and after sedimentation it is used for the various purpose & and remaining excess mine water is discharged into the natural drain. Same as in Durgapun Rayatwan Colliery underground mine, Hindustan Lalpeth Coliery No.1 underground mine, Hindustan Lalpeth Opencast Mine, Manna Incline UG Mine, Nandgaon Incline UG Mine, Mahakali Colliery underground Mine and Padmapur -Opencast Mine excess mine water is discharged into the natural drain."*

7. Response has also been filed by the Project Proponent (PP) on 14.06.2021 and 15.11.2021 mentioning the action taken. Affidavit dated 14.06.2021 to the extent relevant is extracted below:-

Allegation	Allowing emission or discharge of environment pollutants in excess of the standards laid down in the 'consent to operate
CPCB Report	<p>1. Unit No. 8 was not in operation during Committee visit.</p> <p>2. PM concentration of Unit No, 6 was 113.70 mg/Nm³ (Limit -100 mg-Nm³).</p> <p>3. Sox concentration in all unit exceed limit (Limits: for unit 3 and 4 600 mg/Nm³ For Unit 5, 6,7 and 9 is 200 mg/Nm³)</p> <p>4. NOx Concentration in unit 9 was 464.59 mg/Nm³ (Limit: 450 mg/Nm³ as per CCA)</p>
Action Taken by R-5&6	<p>CSTPS have MOEF&CC recognized laboratory reports which show that the emission is within the statutory limit.</p> <p>CSTPS most respectfully submit that, the mentioned units 8 and 9 are newly commissioned units and they were in the stablizatoin phase at the time the results were produced by the Petitioner (in year 2017-2018). Now both the units are working well within the statutory limit.</p>
Allegation 2	Out of total generation of Fly Ash, only 45% of the fly ash is utilized and remaining about 55 % of the fly ash is stored in ash bund.
CPCB Report	CSTPS has not achieved 100% fly ash utilization as per the condition of CCA. Huge quantum of fly ash found dumped

	<p>in the ash bund.</p> <p>CSTPS need to prepare action plan for 100% utilization of present fly ash generation and plan for legacy ash dumped in the ash bund.</p>
Action Taken by R-5&6	<p>45% of the total Fly Ash generated is used. The remaining 55% is stored in ash bunds.</p> <p>1. Considering the complexities in utilization of fly ash, Mahagenco has taken initiative to form a company.</p> <p>The main object of the company is to utilization of fly ash.</p> <p>2. CSTPS, Chandrapur is taking all efforts to achieve 100% ash utilization as per Notification.</p> <p>3. Also made correspondence & held meetings with Western Coalfields Ltd. (WCL) for filling the abandoned mines Telwasa Open Cast, Dhorwasa Open Cast & Navin Kunada Open Cast identified by Task Force Committee of Ministry of Power.</p> <p>4. CSTPS (MAHAGENCO / has engaged M/s Ashtech (India) Pvt. Ltd. to manage the ash utilization activity and initiated the process of loading of Railway rake of Fly Ash to improve the fly ash utilization from CSTPS Chandrapur to various destinations across the country (copy submitted to railway dated 11.06.2021 is enclosed).</p>
Allegation 3	Open fly ash bund situated within a range of 4 km from flowing Erai river.
CPCB Report	1. The ash generated in the power station is disposed off in dry form to Cement Industries and rest is deposited in the

	<p>form of slurry to ash bund.</p> <p>2. It is found that ash from the ash slurry water gets settled in the downstream and the quantity of water also found decreasing may be due to partial percolation and evaporation or absorbed by vegetation in the down-stream.</p> <p>3. This natural flow ultimately meets the River Erai which is about 6 Km from the discharge location.</p>
Action Taken by R 5 and 6	<p>1. Water utilized for disposal of ash slurry remains stored in huge ash bund area.</p> <p>2. This stored waste ash bund is recycled through as bund water recycling system having capacity of 1200M³/hr.</p> <p>3. The recycled water again utilized for ash disposal.</p> <p>4. Moreover, preventive maintenance schedule for prepared and rigorously implemented for replacement of expansion joints, gasket of expansion joints, pipe rotation & replacement.</p> <p>5. Trench pits are provided along ash pipelines on both side so that ash shall not ingress in any natural water body agriculture field in case of leakage.</p>
Allegation 4	CTPS is using unwashed coal at its thermal power station.
CPCB Report	It was also observed that the CSTPS uses coal having higher sulphur content than that mentioned in the CCA.
Action Taken by R 5 and 6	<p>1. The coal, which is sent from mines at time, is of inferior quality than the declared grade and has higher ash %.</p> <p>2. CSTPS made several presentations and complaints for good quality coal. Respondent does not submit correct receipt of coal which is generated on a regular/average basis.</p>

FAVOURABLE FINDINGS IN CPCB REPORT

8. Respondents state that Joint Committee Report has also noted the compliance in response of the following points.:

- a) Dust Suppression system is installed at Wagon Tippler, all Transfer Point of conveyor system and each discharge chute of conveyor system.
- b) The rain guns are provided at Stack yard of Stacker Reclaimer and other
- c) The cement industries have constructed and commissioned their plants in CSTPS premises to collect and transport dry fly ash directly in closed bulkers to respective cement industries.
- d) The fly ash generated is also utilized for Brick manufacturing, Construction of roads, Agriculture, Land filling and SSI units etc.
- e) CSTPS installed meteorological and 04 Continuous Ambient Air Quality Monitoring Stations (CAAQMS) to monitor continuously the Ambient Air Quality in the CSCTPS premises & all the CAAQMS are connected to MPCB server. Online Continuous Emission Monitoring Systems (OCEMS) is installed at each unit & are connected to CPCB & MPCB server. During the visit CCAQMS at all the locations were found operational.
- f) Electrostatic Precipitators (ESP's) have been provided to all units. ESP of Unit No. 3 to 7 has provided Permanent Flue Gas Conditioning System (FGCS) by Ammonia for improving the surface charge and cohesiveness in fly ash particles.
- g) Over Fire Air (OFA) to unit No. 3 to 9 is provided to control NOx emission.
- h) Provided four Effluent Treatment Plants with capacity 68400 m³/day.
- i) CSTPS has reject coal storage area and run-off water from reject coal storage entering into natural drain namely Ranvendli Nallah in the past was informed by MPCB.
- j) As per CCA, CSCTPS has to provide flue gas desulphurization (FGD) system on or before 31.03.2021. In this regard, it was informed that tender for installation of FGD is in process at MSPGCL Corporate Office. Also, as per Govt. notification dated 31.03.2021, the time line extended for FGD installation.**
- k) MAHAGENCO Has acquired 2658 Hectare of total land of low-lying area for its use as ash bund having catchment area of 96 km² and submergence of 2668 Hectare. Total

capacity of ash bund is 115.99 mm³. Proper arrangements need to be provided by CSTPS to collect and transfer ash slurry.

- l) Huge area is provided for dumping of fly ash. Fly ash slurry disposed of at bunds gets settled and supernatant ash water through gravity reaches the dip point. Wells are provided to collect and recycle the ash water.
- m) Transportation of coal from Bhatadi opencast mine through tarpaulin covered trucks from mine to CSTPS.
- n) Installation of about 7.2 km pipe conveyor is under progress from Bhatadi mine to CSTPS.
- o) Transportation of coal from Durgapur opencast mine through a dedicated Aerial rope way.
- p) Transportation of coal from Durgapur Rayatwari Colliery through tarpaulin covered trucks to CSTPS.
- q) Transportation of coal from Manna incline and Nandgaon Incline Mine through tarpaulin covered truck to CSTPS.
- r) Transportation of coal from Mahakali Colliery underground mine through tarpaulin covered trucks to CSTPS.

ADDITIONAL ACTION BY RESPONDENTS

9. However, in view of the findings of the Joint Committee Reports, Respondents would be taking the following action, over and above what has been already directed in the 'Consent to Operate' and 'Environmental Clearance'.

a. **Providing of the Water Cannon Foggers (WCF):** These have been deployed in the coal handing plants, coal handling areas, unpaved roads, extensively so as to fully mystify the area and help settling the dust of any kind then and there. These Water Cannons Foggers (WCF) are operated in consortium with the automatic continuous hot-spot measurement of Suspended Particulate Matter (SPM). i.e., as soon as the levels of SPM go above the pre-set safe levels, the WCF are operated till the levels of SPM are brought down below the NAAQS.

b. **Mobile Micro-Monitoring Stations:** Measurement of relevant parameters that are emitted from the Thermal Power Plants and resultant Ambient Air Quality around the TPS in the surrounding area of up to 30km radius, so as to determine the incremental impact of pollution over and above the baseline background pollution. This monitoring shall cover the nearest residential areas, environmentally sensitive areas, water bodies, green forest areas, bird-habitats, holy places, schools, hospitals, with a view to **carefully determine the increased pollution due to impact of TPS**, at the points of possible impact as forecasted from ISCST3

modelling given at the time of μ Environmental Clearance'.

c. **Fly-Ash utilization:** CSTPS, Chandrapur is taking all out efforts to achieve 100% ash utilization as per notification. Also made correspondence & held meetings with WCL for filling the abandoned mines Telwasa Open Cast, Dhorwasa Open Cast & Navin Kunada Open Cast identified by Task Force Committee of Ministry of Power.

10. **The Application is of the year 2016 and after five years, substantial improvements and changes have happened in the site conditions.**

11. The CPCB Visit Report has already come. Respondent No. 5 and 6 have already taken all the actions against all the findings and deficiencies as explained in detail in the above Affidavit and Action taken Report.

12. MPCB has granted the 'Consent to Operate' and is monitoring the environmental compliance as per their strict schedule applicable for LSI / RED category industry."

8. In further affidavit dated 15.11.2021 in response to the issues raised during the hearing before this Tribunal on earlier occasion, clarification given is as follows:-

"4. That based on the last hearing, there are few questions raised that need clarification.

- a. Unit-wise year of installation, generation, consumption of coal, compliance of all emission parameters SPM, SO₂, NO_x (based on data from CEMS connected MPCB & CPCB website).
- b. Continuous Ambient Air Quality Monitoring Stations installed and levels of pollutants (based on the data from CAAQMD connected to MPCB website).
- c. S% in coal and the resultant SO₂ levels in Stack Emissions (based on Stoichiometric calculations).
- d. The dilution in emissions levels achieved with stack heights of 150m, 200m and 275m, before it reaches the ground and the point/area of impact from CSTPS distance in m and area in m² (plotted on Map).
- e. The areas that are in the air-shed and hence unaffected from the emissions of CSTPS.
- f. Requirement of FGD to achieve the levels, as stated in AAQ standards of SO₂. In Chandrapur area SO₂ in Ambient Air is already much lower than the NAAQS 2009. CEA has published a review paper on "Plant Location Specific Emission Standards" and already communicated the same to the MoEF&CC pointing out this fact.
- g. List of industrial units within 30km radius (the other power plants, steel, coal mining, sponge iron, cement).
- h. Study Report Thesis of IIT Delhi.

- i. *Study Report by NEERI which says that air pollution is mainly from other sources.*
- j. *AAQ Data from CPCB website for the period March to April 2020 when CSTPS was producing with full capacity but other industries and activities were closed due to lockdown. It shows substantial reduction in air pollution.*
- k. *Letter written to CPCB about their website data of 24.03.2020.*
- l. *Commitment/Agreement by industries to lift the 100% fly ash, as against the actual lifting due to poor demand for their production.”*

9. We have heard learned for the parties and considered the matter.

10. It is seen from the latest report of inspection conducted on 6.1.2021 by joint Committee of statutory regulators, which is not in any manner rebutted by the CSTPS except for simple self serving denial, that concentration of sulphur di-oxide and PM in the stacks and some of the units inspected exceeds the laid down parameters. CSTPS is using coal having higher sulphur content than allowed as per consent terms. Installation of flue gas desulphurization (FGD) is still pending. Run of water from reject coal storage area is not properly treated. Discharge of ash slurry is seen during the pipeline maintenance. Ambient air quality is exceeding in all the three monitoring locations. Dust emission has not been remedied. 100% of fly ash utilization has not been achieved in terms of consent conditions. Fly ash has been dumped in bund, causing pollution in violation of provision of Air (Prevention and Control of Pollution) Act, 1981 and the standards laid down under the Environment (Protection) Act, 1986. Accountability for such violations needs to be fixed and remedial action taken to prevent continuing pollution, in violation of law. Health impact of air pollution in the area needs to be studied and remedied. Similarly, impact of water pollution also needs to be studied and remedied.

11. Though learned counsel for the PP submitted that under Notification dated 13.12.2021 issued by the MoEF&CC on the subject of fly ash management, longer period for legacy fly ash disposal has been given, such Notification cannot be justification to unscientifically handle the fly ash in violation of the laid down air quality norms and the consent conditions. Even under the said Notification atleast 80% fly ash generated has to be disposed of in the year with further requirement of 100% average disposal in a period of three years. Similarly, it is stated that air pollution control requires installation of FGD for which time has been extended on 31.3.2021 but such extension does not control violation of air quality norms adversely affecting environment and public health. Learned counsel for the PP submitted that remedial steps will be taken to control air and water pollution by installing requisite equipments in near future and fly ash will be disposed of in future. But it is not explained as to how accountability is to be fixed for the past and current violations till compliance. Either the source of the pollution is to be closed till necessary equipments are installed or compensation for the period of past and current violations has to be paid, apart from restoration of health and environment. Principle of Sustainable Development includes Precautionary Principle and Polluter Pays Principle. The said principles are part of right to life under the Constitution and also statutory mandate under Section 20 of the National Green Tribunal Act, 2010. This requires direction to close the polluting activity till there are arrangements to prevent pollution and to make the polluter accountable. It may be noted that violation of laid down environmental norms is offence not only under the environmental laws including the EP Act, Air Act and the Water Acts, failing to take steps also amounts to an offence under Section 3 of the Prevention of

Money Laundering Act, 2002 as it amounts to using the proceeds of crime by running activity in violation of environmental law, which find mention in Schedule to the said Act. Thus, the violations cannot be ignored, much less where the polluting activity is by a public sector undertaking.

12. Chandrapur Industrial area has been identified as one of the critically polluted area in terms of Comprehensive Environmental Pollution Index (CEPI) prepared by CPCB. It has score of 74 which indicates the area is critically polluted. There is an action plan¹ prepared by the Maharashtra State PCB which inter-alia includes integrated action plan, identifying sources of pollution and remedial actions in a timebound manner for bringing down the CEPI score.

13. Though financial capacity of the project is not on record and even on being asked, learned Counsel for the PP, expressed inability to mention the financial capacity, as per information available in public domain, the project is biggest power generation plant in Maharashtra and its annual income is more than 20000 crores. There is thus no financial difficulty for the project to comply with the environmental norms, including disposal of fly ash in coordination with the projects consuming the same, including road construction, brick kilns, filling up of low-lying areas. The PP needs to take proactive initiatives in the matter and if necessary, utilise its financial capacity for the purpose. It must get compliance audit in respect of fly ash management in terms of notification dated 31.12.2021 or otherwise. Its CSR activities should involve welfare activities for the inhabitants of the area, adversely affected by its activities. It must contribute to mitigate huge pollution in

¹https://cpcb.nic.in/industrial_pollution/New_Action_Plans/CEPI_Action%20Plan_Chandrapur.pdf

the area as the Industrial Area where it is located is polluted in terms of comprehensive pollution index (CEPI) compiled by CPCB. As per order of this Tribunal in OA 1038/2018, remedial steps are required to bring down the air, water and soil pollution to uphold the rule of law and to comply with the principle of sustainable development. As already noted, in compliance with order of this Tribunal, there is action plan which needs to be executed to restore the laid down environmental parameters.

14. Accordingly, we direct a joint Committee of Regional Office, MoEF&CC, Regional Office, CPCB and the State PCB to assess compensation for the past violations considering the period of violations and financial capacity as laid down inter alia in MC Mehta, (1987) 1 SCC 395, Sterlite (2013) 4 SCC 575 and Goel Ganga, (2018) 18 SCC 257. The State PCB and CPCB will be the nodal agencies for coordination and compliance.

15. In view of clear violation of the air quality and other norms, we direct the PP to deposit interim compensation of 5 Crores within one month and take remedial measures within three months, to be overseen by the joint Committee. If necessary steps for preventing continuing pollution are not taken within three months, PP will pay further compensation of Rs. 1 Crore per month for next three months. If the non-compliance continues beyond six months, the joint Committee may increase the amount of compensation progressively and/or close operation of polluting activity till compliance, apart from prosecution. The interim compensation will be subject to final compensation being assessed by the joint Committee, after following due process. The amount of compensation be deposited with State PCB to be utilized for restoration of the environment and health of the area.

16. The Joint Committee may also get a health impact assessment study for Chandrapur conducted by coordinating with the Principal Secretary, Health Maharashtra or with the involvement of any other medical institutions/experts. In the light of such study, plan be prepared for relief to the victims and for improvement of the health in the area. Apart from the project in question, other projects in the polluted area be also required to contribute to the improvement of environment and public health in such proportion as may be found viable and reasonable.

17. The joint Committee may meet within one month. The Committee will be free to conduct proceedings online except for visit to the site and coordinate with any other authorities/expert/institution and interact with the stakeholders. The Committee may also monitor compliance, in accordance with law.

18. The joint Committee may file a report of compliance status inter-alia with regard to the air quality, installing of FGD, pollution due to dust from the mining area during movement of raw material to the plant, water pollution due to slurry of fly ash, fly ash utilisation and management as on 31.07.2022 by 15.08.2022 with the Registrar, Pune Bench who may, if necessary, place the matter before the Bench for any further direction.

Subject to above, the application is disposed of.

If any grievance survives, it will be open to any aggrieved party to take remedies in accordance with law.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

Brijesh Sethi, JM

Prof. A. Senthil Vel, EM

Dr. Afroz Ahmad, EM

January 19, 2022
Original Application No. 74/2020(WZ)
A

Direction No. 42

COMMISSION FOR AIR QUALITY MANAGEMENT
IN NATIONAL CAPITAL REGION AND ADJOINING AREAS
17th Floor, Jawahar Vyapar Bhawan (STC Building)
Tolstoy Marg, New Delhi-110001

F.No.-120015/25/TPP/2021/CAQM- / 948-955

Dated: 17.09.2021

Subject: Ex-Situ Paddy Straw Management through utilization in Coal Based Thermal Power Plants.

1. WHEREAS, Ministry of Environment, Forest and Climate Change, Government of India, in exercise of the powers conferred under Section 3 of the Commission for Air Quality Management in National Capital Region and Adjoining Areas Act 2021, has constituted the Commission for Air Quality Management in National Capital Region and Adjoining Areas (hereinafter referred to as the Commission):
2. WHEREAS, Section 30 of the Act, 2021 provides that anything done or any action taken under the erstwhile Ordinance 2020 shall be deemed to have been done or taken under the corresponding provisions of the Ordinance 2021;
3. WHEREAS, under Section 12 (1) of the Act, the Commission has powers to take all such measures, issue directions, etc., as it deems necessary or expedient for the purpose of protecting and improving the quality of the air in the National Capital Region and Adjoining Areas;
4. WHEREAS, Section 12 (2) (xi) of the Act, empowers the Commission to issue directions in writing to any person, officer, or any authority and such person, officer or authority shall be bound to comply with such directions;

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5. WHEREAS, the Commission has observed that Paddy stubble burning is a matter of grave concern for air quality in NCR and Ex-situ utilization of paddy straw is an important strategy to solve the problem, especially in the Coal based Thermal Power Plants, being one of the potential users;
6. WHEREAS, the Commission had taken up the matter regarding ex-situ stubble management with NCR States in the past and State Governments were impressed upon the urgency and criticality of ensuring supply chain of biomass for making the ex-situ options viable and successful;
7. WHEREAS, the Commission has issued advisory on 28.07.2021 to the State Governments of Punjab, Haryana and Uttar Pradesh regarding ex-situ stubble management for tackling the problem of Stubble burning.
8. WHEREAS, the matter of utilization of biomass pellets for co-firing in thermal power plants was discussed in the meetings held in the Commission on 09.12.2020, 13.07.2021 and also 5th Meeting of the Commission held on 19th August, 2021 and 24th August, 2021;
9. WHEREAS, NTPC, based on the trials and experimentation has confirmed that it is technically feasible and implementable to co-fire bio-mass pellets with coal in proportion upto 5-10% in Thermal Power Plants without any modifications in the boilers;
10. WHEREAS, NTPC has already started co-firing bio-mass pellets in its power plants and based on the success of the trials, is promoting the use of bio-pellets in its thermal power plants across the country;
11. WHEREAS, the Commission has advised State Governments of Punjab, Haryana and Uttar Pradesh in the 5th Meeting of the Commission dated 19th August, 2021 and 24th August, 2021, to use paddy straw towards

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co-firing as fuel in their respective state owned thermal power plants, NTPC power plants in the region and also make efforts to "on-board" private thermal power plant operators for this initiative;

12. WHEREAS, the matter was further deliberated in the meeting chaired by the Hon'ble Minister, EF&CC on 03.09.2021, in which the representatives from Thermal power plants in NCR and adjoining areas also participated, Wherein the need to use straw based biomass pellets in thermal power plants was reiterated;
13. WHEREAS, the matter was further deliberated in the meeting held in the Commission on 09.09.2021, in which the representatives of all the Thermal power plants in NCR and adjoining areas participated, wherein the need to co-fire paddy straw based pellets with coal was reiterated;
14. NOW THEREFORE, in view of the above position and the compelling need to control air pollution from burning of paddy straw and its effective utilization as a resource, the Commission constituted under the provisions of "Commission for Air Quality Management in National Capital Region and Adjoining Areas, Act, 2021", hereby directs the Coal based Thermal Power plants situated upto a radius of 300 Km of Delhi:
 - I. To initiate immediate steps to co-fire biomass based Pellets, Torrefied Pellets/Briquettes (with focus on paddy straw) with Coal (up to 5-10%) in the power plants through a continuous and uninterrupted supply chain and
 - II. To take all necessary steps to ensure that co-firing of biomass pellets in Thermal Power Plants begins without any delay.

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15. First Action taken report in compliance of the above direction be submitted to the Commission by 25.09.2021 and reports thereafter may be sent on a monthly basis.

(Arvind Nautiyal)

Member Secretary

Tel No.: 011-23701197

Email: arvind.nautiyal@gov.in

To:

1. Chairman and Managing Director, NTPC
2. MDs of Power Plants in NCR and adjoining areas:
 - I. Mahatma Gandhi TPS, CLP Jhajjar, Haryana
 - II. Panipat TPS, HPGCL, Haryana
 - III. Rajiv Gandhi TPS, Hisar, HPGCL, Haryana
 - IV. Deenbandhu Chhoturam TPS, Yamunanagar, HPGCL, Haryana
 - V. Guru Hargobind TPS, PSPCL, Punjab
 - VI. Nabha Power Ltd, Rajpura TPS, Punjab
 - VII. Talwandi Sabo TPS, Mansa, TSPL, Punjab
 - VIII. Guru Gobind Singh TPS, PSPCL, Punjab
 - IX. Harduaganj TPS, UPRVUNL, Uttar Pradesh

Copy forwarded to:

1. The Chief Secretary, Government of Punjab, 6th Floor, Punjab Civil Secretariat-1, Sector-1, Chandigarh -160 001
2. The Chief Secretary, Government of Haryana, 4th Floor, Civil Secretariat, Sector – 1, Chandigarh.
3. The Chief Secretary, Government of Uttar Pradesh, 101, Lok Bhawan, U. P. Civil Secretariat, Vidhan Sabha Marg, Lucknow – 226001.
4. Additional Secretary, Ministry of Power, Government of India.
5. Additional Chief Secretary, Power, Government of Punjab.

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6. Additional Chief Secretary, Power and New and Renewable Energy,
Government of Haryana.
7. Additional Chief Secretary, Department of Additional Sources of Energy,
Government of Uttar Pradesh.
8. Member Secretary, Central Pollution Control Board


(Arvind Nauffiyal)