

REPORT NO.

401



**PARLIAMENT OF INDIA
RAJYA SABHA**

**DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE
ON SCIENCE & TECHNOLOGY, ENVIRONMENT, FORESTS AND
CLIMATE CHANGE**

FOUR HUNDRED FIRST REPORT

Air Pollution in Delhi NCR and steps taken by various agencies for its mitigation

(Presented to the Rajya Sabha on 12th December, 2025)

(Laid on the Table of Lok Sabha on 12th December, 2025)

भारतीय संसद, राज्य सभा



Parliament of India, Rajya Sabha

**Rajya Sabha Secretariat, New Delhi
December, 2025/ Agrahayana, 1947 (Saka)**

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सत्यमेव जयते

**Rajya Sabha Secretariat, New Delhi
December, 2025/ Agrahayana, 1947 (Saka)**

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* To be appended later

**COMPOSITION OF THE COMMITTEE
(2025-26)**

(Constituted w.e.f. 26th September, 2025)

1. **Shri Bhubaneswar Kalita - Chairman**

RAJYA SABHA

2. Shri Narayanas K. Bhandage
3. Ms. Indu Bala Goswami
4. Shri I.S. Inbadurai
5. Shri Parimal Nathwani
6. Shri Sandosh Kumar P
7. Shri Sharad Pawar
8. Shri Jairam Ramesh
9. Shri K. R. Suresh Reddy
10. Shri Paka Venkata Satyanarayana

LOK SABHA

11. Shrimati Sajda Ahmed
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15. Shri Biplab Kumar Deb
16. Shri Vamsi Krishna Gaddam
17. Shri Tapir Gao
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19. Shri Eswarasamy K.
20. Shri Mahesh Kashyap
21. Dr. Anand Kumar
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23. Shri Jagdambika Pal
24. Shri Jashubhai Bhilubhai Rathva
25. Shri Trivendra Singh Rawat
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27. Shri Tejasvi Surya
28. Shri Durai Vaiko
29. Shri Yaduveer Wadiyar
30. Shri Balwant Baswant Wankhade
31. Shri Akhilesh Yadav

SECRETARIAT

Dr. K.S. Somashekhar, *Additional Secretary*

Shri Rakesh Naithani, *Joint Secretary*

Shri Arun Kumar, *Director*

Shri Rajiv Saxena, *Deputy Secretary*

Ms. I. V. Rajya Laxmi, *Under Secretary*

Shri Vaibhav Jain, *Committee Officer*

INTRODUCTION

I, the Chairman of the Department-related Parliamentary Standing Committee on Science and Technology, Environment, Forests and Climate Change, having been authorised by the Committee to present the Report on its behalf, present this Four Hundred First Report on “Air Pollution in Delhi NCR and steps taken by various agencies for its mitigation”.

2. In its meetings held on the 4th December, 2024, 15th July, 2025 and 31st October, 2025, the Committee heard the views of the representatives of the Ministry of Environment, Forest and Climate Change, Central Pollution Control Board, Centre for Science and Environment, Confederation of Indian Industry, Ministry of Housing and Urban Affairs, Ministry of Health and Family Welfare and Road Transport and Highways and Department of Agriculture and Farmer’s Welfare. During its study visits, the Committee also visited the Okhla Sewage Treatment Plant, New Delhi on 13th August, 2025 and Chandigarh on 19th September, 2025 and held discussions with the representatives of the views of the Government of NCT of Delhi, State Governments of Haryana and Punjab on the subject.

3. The Committee expresses its thanks to the officers of the Ministry of Environment, Forest and Climate Change, Central Pollution Control Board, Ministry of Housing and Urban Affairs, Ministry of Health and Family Welfare and Road Transport and Highways and Department of Agriculture and Farmer’s Welfare, Government of NCT of Delhi, State Governments of Haryana and Punjab and the non-official witnesses for placing before the Committee the required material and replying to the clarifications sought by the Members on the subject.

4. In the meeting held on 9th December, 2025, the Committee considered the draft Report and adopted the same.

NEW DELHI;
09 December, 2025
Agrahayana 18, 1947 (Saka)

(BHUBANESWAR KALITA)
Chairman,
Department-Related Parliamentary
Standing Committee on Science and Technology,
Environment, Forests and Climate Change,
Rajya Sabha.

CHAPTER – 1

INTRODUCTION

1.1 The Delhi National Capital Region (Delhi-NCR) consists of the city of Delhi, fourteen districts of the State of Haryana, eight districts of the State of Uttar Pradesh and two districts of the State of Rajasthan. Besides Delhi, Gurugram, Faridabad, Noida, Greater Noida and Ghaziabad are the major urban centres in Delhi-NCR. The total area of this region is about 55,083 square kilometers. This region is a major administrative, economic, and cultural hub. Its rapid growth and urbanization have spurred extensive infrastructure development, placing unprecedented strain on natural resources and the environment. While this transformation has yielded significant socio-economic benefits, it has also degraded the region's air and water quality, directly impacting the daily lives and well-being of its residents.

1.2 Today, Delhi-NCR is one of the most polluted regions. The region has become inhabitable. The people of the region are going through a severe health crisis where even the fundamental right of breathing clean air has become a distant dream for them. It has been more than a decade since the situation of pollution in Delhi-NCR got deteriorated although both the Union Government and the concerned State Governments have taken several measures to tackle and alleviate the worsening situation of air pollution in the region.

1.3 Air pollution in Delhi - National Capital Region (NCR) is a collective result of multiple factors including high level of anthropogenic activities in the high-density populated areas in NCR, arising from various sectors viz. Vehicular Pollution, Industrial Pollution, Dust from Construction & Demolition Project activities, Road and Open Areas Dust, Biomass Burning, Municipal Solid Waste burning, and air pollution from dispersed sources. During post-monsoon and winter months, lower temperature, lower mixing heights, temperature inversion conditions and stagnant winds lead to trapping of the pollutants resulting in high pollution in the region. It gets further aggravated due to the emissions from stubble burning in neighbouring States.

1.4 In view of the gravity of the situation and the fact that there had been little improvement in this long-standing problem, the Committee took up the subject "Air Pollution in Delhi-NCR and steps taken by various agencies for its mitigation" for detailed examination. The Committee, accordingly, held a meeting on the subject on 4th December, 2024 and heard the views of the representatives of the Ministry of Environment, Forest and Climate Change and Central Pollution Control Board. In order to obtain the views of some non-governmental organisations on the subject, the Committee met on 15th July, 2025 and heard views of the representatives of Centre for Science and Environment and Confederation of Indian Industry in the matter. Thereafter, the Committee also heard the Secretaries of the Ministry of Housing and Urban Affairs, Ministry of Health and Family Welfare and Road Transport and Highways. The Committee also visited Okhla Sewage Treatment Plant, New Delhi on 13th August, 2025 and heard the views of the representatives of Government of NCT of Delhi on the subject. The Committee also visited Chandigarh and heard the views of Chief Secretaries of Haryana and Punjab on the subject on 19th September, 2025. Thereafter, the Committee heard the views of the Department of Agriculture and Farmer's Welfare on the issue of stubble burning in its meeting held on 31st October, 2025. In all these meetings, the Committee discussed the subject from various points of view and tried to understand the various steps taken/being taken by the concerned agencies/Departments/ Ministries/State Governments.

1.5 In their background note submitted in December 2024, the Ministry of Environment, Forest and Climate Change *inter-alia* provided the following information to the Committee:

National Clean Air Programme

1.6 National Clean Air Programme (NCAP) has been launched by Ministry of Environment, Forest and Climate Change in January 2019 with an aim to improve air quality in 130 cities (non-attainment cities and Million Plus Cities) in 24 States/UTs by engaging all stakeholders.

1.7 NCAP envisaged reduction by 20-30% in PM 10 concentration over baseline in year 2017 by 2024. Now, target has been revised to achieve reduction in PM10

level up to 40% or achievement of national standards (60 microgram/cubic meter) by 2025-26. Annual PM10 reduction target of 4-15% has been assigned to each city to improve air quality.

Progress - Action Plan

- a) NCAP focuses on preparation and implementation of national level action plan, state level action plans & city level action plans of the targeted 131 cities.
- b) The national level plan includes the action plans of different Ministries/ Departments of Government of India. This includes convergence of schemes/ programmes of different Ministries/ Departments, received action plans from 7 line Ministries (Ministry of Power, Ministry of Road Transport and Highways, Ministry of Housing and Urban Affairs, Ministry of New and Renewable Energy, Ministry of Heavy Industries, Department of Agriculture and Farmers Welfare and Ministry of Petroleum and Natural Gas)
- c) State Action Plans have been prepared by 24 States/UTs.
- d) City level action plans have been prepared in 130 cities. Further, Annual Action Plans are prepared by cities for taking measures for improvement of air quality.

Financial Arrangement

- a) Allocation and release of funds are linked with air quality improvement performance and achievement of annual targets (PM10 reductions) in respective cities.
- b) 48 Million Plus Cities/Urban Agglomerations are funded under 15th Finance Commission Million Plus City challenge fund as an air quality performance grant, and remaining 82 cities are funded by MoEFCC.
- c) Ministry of Environment, Forest and Climate Change is the nodal agency for monitoring ambient air quality and recommending Department of Expenditure for disbursing grants to 48 million plus cities.
- d) An allocation of Rs. 19,807.6 crore has been allocated to 130 cities under National Clean Air Programme during 2019-20 till 2025-26 as performance based incentive grant for achieving the targeted reductions in air pollution.
 - i. An amount of Rs.16,539 crore has been allocated to 48 Million Plus Cities and Urban Agglomerations under 15th Finance Commission Million Plus City Challenge Fund

ii. An amount of Rs. 3,591 crore has been allocated to remaining 82 non-attainment cities under Control of Pollution Scheme of MoEFCC.

e) An amount of Rs. 13,415.43 crore has been released so far, for 130 cities:

i. Rs.2394.88 Crores have been released to 82 non-attainment cities funded by Ministry of Environment, Forest and Climate Change under NCAP since 2019-20 till date for initiating measures to improve air quality such as construction and demolition waste management facilities, non-motorized transport infrastructure, green buffers, laying of pavements, mechanical street sweepers, composting units etc. An amount of Rs.1020 Crores is allocated to 82 cities for FY 2025-26.

ii. Under 15th Finance Commission (XV-FC), Rs.11020.55 crore has been released to 48 MPCs/UAs till FY 2025-26 (till date) based on the air quality performance assessment.

Air Quality Improvement

1.8 103 cities out of 130 cities have shown improvement in air quality in terms of annual PM 10 concentrations in FY 2024-25 with respect to the baseline of FY 2017-18. 22 cities have met National Ambient Air Quality Standards (NAAQS) for PM 10 (60 µg/m³) in FY 2024-25.

Monitoring, Evaluation and Reporting (MER)

1.9 Air quality monitoring is conducted at 836 stations (340 continuous and 496 manual) in 130 cities and the data is transmitted to CPCB through concerned SPCB/PCCs throughout the year. Performance of cities is assessed based on annual average of PM10 concentrations and Air Quality Index (AQI) computed from the air quality data collected annually through these stations.

1.10 Committees have been set up at national, state and city level for coordination, monitoring and evaluation of progress on action plans by various stakeholder agencies/Departments/Ministries: -

a. National Level

- Apex Committee under Chairmanship of Hon'ble Minister, EFCC
- Steering Committee under the Chairmanship of Secretary, Ministry of Environment, Forest and Climate Change

- Monitoring Committee under the Chairmanship of Additional Secretary, Ministry of Environment, Forest and Climate Change

- Implementation Committee under the Chairmanship of Chairman, CPCB

b. State Level

- Steering Committee under the Chairmanship of Chief Secretary

- Implementation Committee under the Chairmanship of Additional Chief Secretary/Principal Secretary, Environment

c. City Level – City level Implementation and Monitoring Committee under the Chairmanship of District Collector/Municipal Commissioner.

1.11 04 Apex Committee meeting under the chairmanship of Hon’ble Minister of Environment, Forest and Climate Change, 7 Steering Committee meetings under the chairmanship of Secretary, Ministry of Environment, Forest and Climate Change, 13 Monitoring Committee Meetings under the chairmanship of Additional Secretary, Ministry of Environment, Forest and Climate Change and 17 Implementation Committee meetings under the Chairmanship of Chairman, CPCB, have been convened till date.

1.12 Ministry of Environment, Forest and Climate Change has launched “PRANA” a portal for monitoring implementation of NCAP on 7th September 2021. In this portal, action plans of cities, states and line ministries will be reflected and monitored for their implementation status. It will provide all information related to various policies / programs /schemes/activities of the stakeholders along with the progress made towards improvement in air quality across the country. This portal will be a platform for monitoring and feedback on all efforts made for air quality improvement.

a) MoUs have been signed among CPCB, SPCB/PCC and ULBs for 82 non-attainment cities identified under NCAP.

b) 63 Institute of Reputes (IoRs) are assigned to 130 cities for capacity building and for effective implementation of City action plans.

Guidelines under NCAP

1.13 The following guidelines have been issued for effective implementation of NCAP:

- a) Guidelines for Release and Utilisation of Funds for 82 cities under National Clean Air Program
- b) Operational Guidelines for 42 cities under XV Finance Commission
- c) Ranking of Cities – “Swachh Vayu Survekshan”: 9 better performing cities are provided cash award every year under “Swachh Vayu Survekshan” for encouraging the cities to improve air quality in respective cities.
- d) Guidelines for Capacity Building Public Outreach under NCAP: provides structure to conduct National, State and City level CBPO activities on air quality management.
- e) Guidelines for NKN and IoRs under NCAP: to provide technical assistance to for implementation of National, State and city level action plans.

Knowledge Support, Capacity Building & Public Awareness

1.14 A National Knowledge Network (NKN) with experts from IITs, academia and independent experts has been established and is operational, to provide technical and knowledge support to the programme at national/state/city level. NKN primarily provides knowledge based scientific support and prepare guidelines on various aspects of the program and will be an advisory entity to CPCB for all air quality associated matters.

1.15 Air quality management requires scientific evidence-based planning and execution of activities. To extend scientific support for various activities identified in city action plan, Institute of Repute (IoR), - an institute working in or nearby, preferably IITs or NITs or local Institutes working or having expertise in air quality management, has been made knowledge partner to each cities through an MoU in March 2021. Role and responsibilities of the ULBs, SPCB and IoR have been defined to undertake the approved activities of the Program in a systemic, scientific and time bound manner.

1.16 Ministry of Environment, Forest and Climate Change has conducted various National and Regional level workshops for sensitization, knowledge sharing and

capacity building of the stakeholders for effective implementation of NCAP. Expo on Startups has been organised to invite startups in air quality management & monitoring, and financial institutions to provide a platform for scaling up their solutions.

Air Pollution in Delhi NCR

1.17 The quality of air in the National Capital Region and Adjoining Areas remains a major cause of concern. There are multiple sources contributing to high air pollution levels in Delhi NCR. Vehicles, Industries, Road dust, Dust from construction & demolition activities, biomass & waste burning are the key sources. In addition, meteorology significantly affects Delhi's air quality, particularly during winters. The ventilation index, which combines wind speed and mixing height, is crucial. Cold, dry air and ground-based inversions with low wind conditions and low mixing heights lead to stagnant air and poor dispersion.

1.18 Between October and November, paddy stubble burning in Punjab, Haryana, and other NCR districts also contributes to poor air quality due to unfavourable meteorological conditions. During this period, winds are mostly from North West and West directions bringing stubble burning pollution towards Delhi. The low winds and unfavourable meteorology does not support dispersion of pollutants; it gets stagnant and results in high episodic levels of severe AQIs.

Constitution of CAQM and its initiatives

1.19 The Commission for Air Quality Management (CAQM) is a statutory body formed under the Commission for Air Quality Management in National Capital Region and Adjoining Areas, Act 2021 for better co-ordination, research, identification and resolution of problems surrounding the air quality index and for matters connected therewith or incidental thereto.

1.20 CAQM has been actively tackling air pollution in NCR, especially during winter, focusing on key sectors: agricultural stubble burning, vehicle pollution, dust from construction and demolition activities, dust from roads and open areas, municipal solid/plastic waste burning, biomass burning, industrial pollution, diesel

generator (DG) set pollution, fires in sanitary landfills and other episodic events, and firecrackers and miscellaneous dispersed sources.

1.21 To guide and implement the comprehensive policy, CAQM has issued 95 Statutory Directions, 17 Advisories, and various orders, guidelines, and communications targeting identified sectors.

1.22 Revised Graded Response Action Plan (GRAP) has been formulated by CAQM. GRAP is a set of emergency measures that are taken to prevent further deterioration of air quality after AQI of Delhi-NCR region reaches a certain threshold. It outlines specific actions to be taken by various agencies based on the severity of air pollution, which typically worsens during peak winter months.

- The GRAP classifies air quality into four stages:
 - Stage I – Poor (AQI between 201-300)
 - Stage II – Very Poor (AQI between 301-400)
 - Stage III – Severe (AQI between 401-450)
 - Stage IV – Severe + (AQI >450)

1.23 Based on daily forecasts from the IMD and IITM, actions for Stages I, II, III, and IV are implemented in advance if the projected AQI levels are expected to persist for three or more days.

1.24 A Sub-Committee on GRAP plans advance action and issues necessary orders for invoking various provisions of the GRAP, based on the prevalent air quality and the AQI forecast to be provided by IMD from time to time.

1.25 Implementing / enforcement agencies have been identified against each of the actions envisaged in the revised schedule of GRAP and such agencies are required to strictly implement / enforce these towards controlling further deterioration of air quality in the NCR.

1.26 CPCB has issued directions under Section 5 of the Environment (Protection) Act, 1986 on 04.10.2024 to NCR SPCBs & DPCC for strict implementation of actions prescribed under stages of GRAP invoked from time to time in view of the air quality situation in Delhi-NCR.

1.27 CPCB has also issued directions under Section 18 (1)(b) of the Air (Prevention & Control of Pollution) Act, 1981 on 18.10.2024 to NCR SPCBs & DPCC for implementation of actions prescribed under GRAP, pertaining to them and other agencies.

1.28 A Special Enforcement Task Force (ETF) constituted in the CAQM assists the Safeguarding and Enforcement Sub-Committee. To assist the ETF, 40 Flying Squads/ Inspections Teams assisted by the CPCB carry out incognito checks in the entire NCR on a regular basis for identifying serious violations of the statutory Directions of the CAQM.

1.29 The Flying Squads have conducted inspections at about 19,499 sites / units since inception and closure directions have been issued in 1133 cases found with gross violations.

1.30 In July 2022, CAQM introduced a comprehensive policy outlining sector-specific actions with measurable targets, timelines, and implementation plans by various agencies in NCR states. This framework focuses on interventions across different sectors contributing to air pollution.

National Clean Air Programme in NCR

1.31 There are total 06 Non-attainment cities (NACs) in Delhi NCR, out of which 03 cities– Delhi, Alwar and Noida are funded under National Clean Air Programme (NCAP) and 03 cities- Ghaziabad, Meerut and Faridabad are funded under Fifteenth Finance Commission (XV-FC). City Action Plans for improvement in air quality have been rolled out for implementation in all the 06 identified cities.

Physical Progress

- Annual action plan for FY 24-25 have been submitted on PRANA by all 6 NACs of Delhi NCR i.e. Delhi, Faridabad, Noida, Meerut, Alwar & Ghaziabad.
- Public Grievance Redressal System (PGRS) and Emergency Response System (ERS) have been developed for the 6 NACs.
- Source Apportionment (SA) study has been completed for Delhi, Ghaziabad, Alwar and Noida and it is in progress for Meerut and Faridabad. The study helps in identifying the sources and extent of their contribution in the air pollution. As

per available SA study data, major contributor for PM₁₀ in the 4 cities is Dust from various sources.

- All 6 cities of Delhi NCR under NCAP have shown reduction in PM 10 concentrations in the range of 15.8-35.8% in 2024-25 as compared to 2017-18.
- The major significant work done by cities for the improvement of Air Quality from Approved City Action Plan (CAP) as per the UC received are as follows:
 - a. End-to-end paving of roads along with black-topping and maintaining potholes free roads.
 - b. Greening of traffic corridors, open areas, gardens, community places, schools and housing societies.
 - c. Creation of public awareness on pollution source and control measures.
 - d. To create multiple separate space/zones to handle C&D waste in the city.
 - e. Lifting of solid waste generated from desilting and cleaning of municipal drains for its disposal.
 - f. Regular cleaning of street surfaces and spraying of water to suppress dust.
 - g. Regular collection, segregation and scientific disposal of waste.
 - h. Remove road dust/silt regularly by using mechanical sweepers.

Financial Progress

- Under NCAP, a total amount of Rs 95.47crore has been released to Delhi, Alwar and Noida till now and total Rs 30.74 crore have been utilized (~32%) for implementation of City action plan in these cities.
- Under 15thFinance Commission (XV-FC) grant, a total amount of Rs 380.57 crore has been released to Ghaziabad, Meerut and Faridabad for air quality improvement in FY 2020-21 to till now and total Rs 303.79 crore have been utilized (79.8%).
- So far total about Rs 476.04 crore have been released under NCAP and XV-FC grant to 6 NACs of Delhi NCR for improvement of air quality and out of it, Rs 334.53 crore have been utilized (~70.3%).
- Under NCAP, in FY 2025-26, Rs. 17.87 crore, 18.41 crore, & 45.08 crore fund is allocated to Alwar, Delhi & Noida respectively for air quality improvement.

- Under XV-FC, in FY 2025-26, Rs. 29 crore, 72 crore, & 43 crore grant is allocated to Faridabad, Ghaziabad, & Meerut respectively for air quality improvement.

Environment Protection Charge (EPC) Fund

1.32 The Hon'ble Supreme Court vide order dated August 12, 2016 has levied 1% of ex-showroom price for all diesel cars/SUVs with engine capacity 2000 CC & above sold/registered in Delhi and NCR as Environment Protection Charge (EPC).

1.33 In compliance of the said order, CPCB has been maintaining EPC funds and utilizing it for air quality management in Delhi NCR region. As of September, 2025, status of EPC funds is as under:

Amount accrued in EPC account	₹ 551.41 crore
Amount Disbursed	₹ 211.73 crore
Committed liabilities for sanctioned projects/activities	₹ 221.99 crore
Corpus for utilization through gap funding guidelines for 19 cities of Delhi NCR	₹ 54 crore
Balance/available funds for utilization	₹ 63.69 crore

1.34 Major thrust areas for funds utilization include capacity building with regard to infrastructure enhancement, mass awareness on air pollution, R&D Activities w.r.t air quality management & vehicular pollution control, health impact studies vis-à-vis air pollution in Delhi-NCR, specific projects to control pollution in Delhi NCR and Punjab.

1.35 Steering Committee headed by Secretary, MoEF&CC has been constituted to guide and review utilization and advice on new funding areas. Total of 04 meetings have been convened so far since constitution.

1.36 Project Appraisal and Approval Committee (PAAC) headed by Chairman CPCB considers and approve funding proposals. A total of 30 meetings have been

convened so far since constitution of PAAC for consideration of various project proposals related to air quality management such as trial of new air pollution mitigation technologies, studies on health impact of air pollution, source apportionment, funding for strengthening of lab infrastructure and monitoring network, funding of infrastructure activities and procurement of equipment for control dust emission etc. received for funding under EPC funds.

1.37 Major projects conducted from EPC funds includes project on spatial mapping, near real time source apportionment, health impact of stubble burning on population residing in vicinity etc. Trial of various new technologies for air pollution mitigation have also been conducted such as Air purification units developed by NEERI for traffic junction pollution, dust suppressant for construction sites and road dust control developed by EPRI, medium scale air purification unit (smog tower) developed by IIT Bombay and Tata Projects Ltd, ionisation technology developed by S&TP Pune. Results of dust suppressant were found encouraging and accordingly advisory issued for its use in Delhi-NCR. Besides, inspection by CPCB teams in Delhi-NCR is also an activity approved by PAAC.

1.38 Following are the new areas considered for fund utilization based on decisions taken by Steering Committee:

- Funding of infrastructure projects (road construction, paving, procurement of anti-smog guns & road sweepers, etc.) of ULBs/SPCBs and Gap funding for implementation of micro-level action plans in non-attainment cities.
- Funding establishment of paddy straw based pelletization and torrefaction plants: 17 applications (14 Punjab, 02 Haryana and 01 UP) sanctioned of which 02 plants are not coming up (1 in Punjab and 1 in UP). Rs.14.5 crore sanctioned towards the remaining 15 applications and Rs. 12.8 crore released to 12 applicants. Total capacity of 15 sanctioned plants is 57.5 TPH (expected production of 2.07 lakh tonne pellet/ annum and expected utilization of 2.70 lakh tonnes of paddy straw/ annum).
- Funding retrofitment/upgradation of DG sets in Government hospitals: Proposal for retrofitment of 4 DG sets in U.P. sanctioned at a cost of Rs. 19.3 lakhs. Proposal for retrofitment of 17 DG sets and procurement of 9 new gas based gensets sanctioned at a cost of Rs. 1,41,42,358/- and Rs. 30,12,667/-, respectively to AIIMS,

Delhi and its associated institutes in Haryana.

➤ Gap funding support for implementation of activities of city action plans of NCR cities (other than non-attainment cities and cities funded under XVFC). Detailed guidelines prepared in line with NCAP model, and funding to be provided to 19 cities in NCR (Greater Noida, Dharuhera, Gurugram, Sonipat, Bharatpur, Muzaffarnagar, Bulandshahr, Panipat, Charkidadri, Bahadurgarh, Baghpat, Hapur, Bhiwani, Jind, Narnaul, Karnal, Palwal, Nuh and Bhiwadi). Rs. 150 crore corpus allocated for 1st year i.e. FY 24-25. 07 proposals having cost of Rs. 58.7 crore from 5 cities of UP and 02 Rajasthan cities appraised and clarification sought. From 2024-25 onwards, 3/4 amount of annually received EPC funds will be disbursed to cities based on performance assessment.

1.39 The Status of sanctioned infrastructure projects of ULBs/SPCBs & Gap funding for implementation of micro-level action plans in non-attainment cities is as follows:

S. No.	State	ULB/Agency	Work/Purpose	Sanctioned Amount (Rs.)
1.	Uttar Pradesh	Ghaziabad Municipal Corporation (GMC)	8 road construction projects	13.37 crore
2.		UPPCB	Procurement of 16 Mechanical Road Sweeping Machines (MRSMs) and 10 Anti-smog guns (ASGs)	13.13 crore
3.		GMC*	Procurement of 1 MRSM and 10 ASGs	6.5 crore
4.		New Okhla Industrial Development Authority (NOIDA Authority)	Procurement of 4 MRSMs and 5 ASGs	5.60 crore
5.		Meerut Municipal Corporation (MMC)*	13.38 km (17 roads) road construction/repair work	19.4 crore
				58 crore
6.	Haryana	Municipal Corporation Faridabad (MCF)*	Procurement of 10 MRSMs and 10 ASGs	8.05 crore
7.			16 km road construction and 2.5 km paving works	27.1 crore
				35.15 crore
8.	Delhi	Municipal Corporation of Delhi (MCD)	18roadconstruction/pavingworks	4.93 crore

9.		New Delhi Municipal Corporation (NDMC)	Procurement of 5 MRSMs	14.3 crore
				19.23 crore
10.	Rajasthan	Municipal Corporation Alwar*	Vehicles for collection of MSW	4.5 crore
				4.5 crore
Total for Delhi-NCR				116.88 crore

Note: Funds are released in two installments of 50% each. The first installment is released after the tendering process has been completed and work order is submitted to CPCB. The second (and final) installment is released after completion of works.

**Proposals worth Rs. 57.275 crore from GMC (5ASGs: Rs. 2.25 crore), MMC (Rs. 19.4 crore), MCF (Road works, 5 ASG, 5 MRSM: Rs. 31.125 crore) and MC Alwar (Rs. 4.5 crore) were recently sanctioned in the last PAAC meeting.*

1.40 The Committee notes the various schemes and programmes of the Ministry of Environment, Forest and Climate Change for air quality management in the country and in the National Capital Region and adjoining areas. The Committee also takes note of the allocations made and fund utilization for the purpose. **The Committee would like to point out that air pollution in Delhi is not something new but has been a long-standing problem. This is further illustrated by the fact that this Committee had examined this issue of “Air Pollution in Delhi and National Capital Region” and presented a very comprehensive Report on the subject to the Parliament in August, 2018 and made a number of constructive recommendations in that report. The Committee observes that more efforts are needed to further improve the air quality in Delhi-NCR.**

CHAPTER – 2

AIR QUALITY STANDARDS AND MONITORING OF AIR QUALITY

Air Quality Standards

2.1 In order to gain further information on the subject, the Committee held interaction with the Centre for Science and Environment (CSE) regarding the sector-specific annual targets that Delhi-NCR must achieve to meet WHO air quality standards by 2030. The Committee was informed that WHO sets interim air quality guidelines. Individual countries progressively align their National Ambient Air Quality Standards (NAAQS) in stages with the WHO interim air quality guidelines.

2.2 CSE informed the Committee that India’s NAAQS for PM 2.5 is 40 microgram per cubic meter which is lenient than even the first interim target of 35 microgram per cubic meter. This needs to be further lowered to 35, 25, 15, 10 and finally to 5 microgram per cubic meter. This has been summarized in the table below:-

Pollutants	Time weighted average	India - NAAQS Industrial, residential, rural and other areas ($\mu\text{g}/\text{m}^3$)	India - NAAQS Ecologically sensitive areas (notified by Central Government) ($\mu\text{g}/\text{m}^3$)	WHO guidelines				
				WHO Interim target				WHO Air Quality guideline level
				1	2	3	4	
PM10	Annual	60	60	70	50	30	20	15
	24 hours	100	100	150	100	75	50	45
PM2.5	Annual	40	40	35	25	15	10	5
	24 hours	60	60	75	50	37.5	25	15
NO ₂	Annual	40	30	40	30	20	-	10
	24 hours	50	80	120	50	-	-	40

Source: WHO global air quality guidelines

2.3 It was further informed that in the year 2024, Delhi’s annual PM 2.5 level was 104.9 microgram per cubic meter. This requires 62 per cent reduction to meet India’s own NAAQS or 76 per cent reduction to meet the stage two interim target of 25 microgram per cubic meter or a very significant reduction of 95 per cent to meet the WHO guidelines of 5 microgram per cubic meter. This has been summarized in the table below:-

PM 2.5 Annual Average 2024 ($\mu\text{g}/\text{m}^3$)		Reduction Target
Delhi	104.9	
NAAQS Target	40	62 %
WHO Interim Target		
1	35	67 %
2	25	76 %
3	15	86 %
4	10	90 %
WHO Air Quality Final Target	5	95 %

2.4 The Committee was also informed that even during the lockdown days of the Pandemic – when nearly all economic activities had come to near halt, and the PM2.5 levels fell by nearly 50 per cent, and PM10 by 60 per cent compared to the same period in 2019, the levels could not reach the final guideline of the WHO. In view of this, the Committee feels that the possibility of meeting the WHO final guideline of 5 microgram per cubic meter by 2030 seems very challenging and remote.

2.5 The Committee notes that WHO air quality guidelines are indicative/recommended guidelines and are not enforceable. Countries are advised to set national standards according to their own geography and socio-

economic factors. The Committee observes that to achieve the current Air Quality Standards, Delhi NCR needs to work towards significant reduction in each sector of pollution control to meet near zero emissions targets including transport, industry, power plants, waste streams, solid fuels in households and dust sources.

Monitoring of Air Quality

2.6 The availability of accurate, real-time data is the fundamental prerequisite for any sound policy-making, and this is nowhere more critical than in the monitoring and management of the Air Quality Index (AQI). A robust AQI monitoring network serves as the foundational "central nervous system" for understanding and combating air pollution. It provides a precise diagnosis of pollution—identifying specific pollutants, their sources, and hotspots—which enables proactive measures like health advisories and pre-emptive pollution controls. Furthermore, this data is indispensable for evaluating the success of interventions; ensuring resources are directed toward strategies that genuinely protect public health. In short, a robust AQI monitoring network is the essential compass that guides the entire ecosystem of air quality management.

2.7 Accordingly, the Committee sought details of the air quality monitoring mechanism in Delhi and NCR. The Ministry of Environment, Forest and Climate Change furnished the following information through its Background Note submitted to the Committee:-

2.8 With the collaboration of various stakeholders, the Government is actively implementing measures to improve air quality. These efforts involve the utilization of innovative technologies, scientific research, and policy development to advance clean air actions. The key actions are presented below,

National Ambient Air Quality Standards (NAAQS)

2.9 They are foundational pillar of India's air quality management efforts. These standards, introduced under the Air (Prevention and Control of Pollution) Act 1981, serve as a critical framework for regulating and controlling air pollution. At

present, the National Ambient Air Quality Standards (NAAQS) of 2009 are in effect. It includes permissible limits for 12 pollutants namely, PM₁₀, PM_{2.5}, SO₂, NO₂, O₃, CO, NH₃, Pb, Benzo[a]pyrene, As, Ni, Benzene. The revision of the same is underway.

National Air Quality Index

2.10 Air Quality Index is a tool for effective communication of air quality status to people in terms, which are easy to understand. It transforms complex air quality data of various pollutants into a single number (index value), nomenclature and colour. The six AQI categories, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe are decided based on ambient concentration values of air pollutants and their likely health impacts, known as health breakpoints. The same are presented below:

Health Breakpoints for the Eight Pollutants in AQI

AQI Category	AQI	Concentration range*								Associated Health impacts
		SO ₂	NO ₂	PM ₁₀	PM _{2.5}	O ₃	CO	NH ₃	Pb	
Good	0-50	0-40	0-40	0 - 50	0 - 30	0-50	0-1.0	0-200	0-0.5	Minimal Impact
Satisfactory	51-100	41-80	41-80	51-100	31-60	51-100	1.1-2.0	201-400	0.5-1.0	Minor breathing discomfort to sensitive people
Moderate	101-200	81-380	81-180	101-250	61-90	101-168	2.1-10	401-800	1.1-2.0	Breathing discomfort to the people with lung, heart disease, children and older adults
Poor	201-300	381-800	181-280	251-350	91-120	169-208	10-17	801-1200	2.1-3.0	Breathing discomfort to people on prolonged exposure
Very-Poor	301-400	801-1600	281-400	351-430	121-250	209-748	17-34	1200-1800	3.1-3.5	Respiratory illness to the people on prolonged exposure

Severe	401-500	1600+	400+	430+	250+	748+	34+	1800+	3.5+	Respiratory effects even on healthy people
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**CO in mg/m³ and other pollutants in µg/m³; 2h-hourly average values for PM₁₀, PM_{2.5}, NO₂, SO₂, NH₃, and Pb, and 8-hourly values for CO and O₃.*

Monitoring of air quality in Delhi NCR

2.11 Ambient air quality network in Delhi NCR comprises of 143 ambient air quality monitoring stations (84 Continuous Ambient Air Quality Monitoring Stations (CAAQMS) and 59 manual ambient air quality monitoring stations). In Delhi, the air quality network comprises of 40 CAAQMS and 07 manual air quality monitoring stations.

2.12 Continuous Ambient Air Quality Monitoring Stations (CAAQMS) provide real-time, automated data through electronic sensors, allowing for immediate analysis and public awareness, while Manual Ambient Air Quality Monitoring Stations (AAQMS) use a manual sampling process that yields data on a delayed schedule, typically daily or weekly. The main differences are in data collection frequency, automation, and real-time capabilities, making CAAQMS better for immediate alerts and long-term trends, whereas AAQMS is suitable for short-term, less frequent monitoring.

2.13 The Committee was also informed by the Ministry that the Delhi National Capital Region (NCR) is enhancing its air quality monitoring infrastructure. The current network of 84 real-time Continuous Ambient Air Quality Monitoring Stations (CAAQMS)—which includes 40 stations in Delhi—is being augmented with an additional 27 stations. This expansion will raise the total number of stations to 111, with new installations planned for Delhi (6), Haryana (10), Uttar Pradesh (10), and Rajasthan (1).

2.14 In response to the Committee's inquiry, the State Government of NCT of Delhi informed the Committee that Delhi has a comprehensive spatial network of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) consisting of 40 stations operated by multiple agencies. These include 24 stations under the Delhi Pollution Control Committee (DPCC), 7 under the Indian Meteorological Department (IMD), 6 under the Central Pollution Control Board (CPCB), 2 under

the Indian Institute of Tropical Meteorology (IITM), and 1 under the Ministry of Housing and Urban Affairs.

2.15 The DPCC, through its 24 stations, conducts real-time monitoring of eight critical ambient air parameters: PM 2.5, PM 10, SO₂, NO₂, CO, NH₃, O₃, and Benzene.

2.16 To further strengthen this infrastructure, the Commission for Air Quality Management (CAQM) has directed the establishment of six new CAAQMS. Locations for these have been identified at IGNOU, JNU, the DOS/ISRO Earth Station, the Commonwealth Sports Complex, Delhi Cantonment, and Netaji Subhash University of Technology (West Campus).

2.17 The Committee also took note of the Report published by CSE on air pollution in Delhi NCR, which mentions that:-

“Delhi does not require more monitoring stations but the existing ones can be better distributed for improved population coverage. Most stations are concentrated in the central areas while southern, northwest and peripheral regions remain inadequately-monitored. Further rationalization of the monitoring network is needed for optimum coverage of population and land-uses. Despite such large number of monitors, these are not well distributed to cover population in all land uses and there are still some “shadow zones” with low station density. Currently, the monitoring stations in Delhi are mainly centred in and around the southern and central part of Delhi.

The southwest and northwest peripheries have minimal monitoring stations, leading to gaps in air quality monitoring. The stretch between Mundka, Bawana and Narela should have more number of monitoring stations as these are the areas that record some of the highest PM 2.5 levels. Moreover, with a fully established monitoring network the focus now has to be on the auditing of the monitoring system to improve quality of the data and rationalization of location of monitors.”

2.18 The District-wise distribution of 39 monitoring stations is shown in table below:-

District	Number of air quality	% share of total
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	monitoring stations	
Central	7	17.94
East	1	2.56
New Delhi	5	12.82
North	6	15.38
North-east	0	0
North-west	2	5.12
Shahadra	2	5.12
South	4	10.25
South-west	1	2.56
West	5	12.82
South-east	6	15.38
Total	39	100

2.19 The Committee observes that the National Ambient Air Quality Standards (NAAQS) were last revised in 2009 and the Ministry has informed the Committee that their revision is under process. The Committee recommends that the Ministry of Environment, Forest and Climate Change should expedite the process and come up with the revised National Ambient Air Quality Standards at the earliest.

2.20 The Committee observes that apart from 40 CAAQMS, Delhi still has 7 manual air quality monitoring stations, which cannot provide real time updates. The Committee, therefore, recommends that all manual air quality monitoring stations in Delhi NCR, including 7 manual monitoring stations in Delhi, should be upgraded to CAAQMS. The Committee also recommends that all air quality monitoring stations in Delhi NCR should be upgraded with globally best available technology to ensure generation of real-time, accurate and scientific data that identifies the specific sources and components of

pollution for effective policy formulation, appropriate corrective approach and public awareness.

2.21 The Committee also observes that the distribution of air quality monitoring stations is heavily skewed towards the central and southern parts of the city, which are relatively less populated, greener and affluent than rest of the city. This geographical bias results in a distorted and non-representative dataset, systematically excluding the more polluted, densely populated, and less affluent localities. The Committee further observes that even most of the 6 new CAAQMS proposed to be setup in the city are situated in relatively greener sites like JNU campus and trans-Yamuna region has again been left out. The Committee, therefore, strongly recommends that the Ministry of Environment, Forest and Climate Change must reconsider the sites for its proposed 6 new CAAQMS. The Committee also recommends that the Ministry should evenly redistribute the air quality monitoring stations not only in Delhi but all across the NCR.

CHAPTER – 3

SOURCES OF AIR POLLUTION

3.1 The development of targeted and impactful air quality management strategies hinges on the precise identification of pollution sources. Accurate source apportionment ensures that regulatory actions and public funds are directed towards the most significant contributors, from vehicles to industrial emissions, for maximum benefit.

3.2 The Committee sought the details of the sources of air pollution in Delhi and it was informed by the State Government of NCT of Delhi that Air Pollution in Delhi is significantly influenced by both local and regional meteorological conditions, as well as emissions from neighboring States within the National Capital Region (NCR). The city's subtropical climate is characterized by extreme seasonal variations that exacerbate pollution levels. During winter (October to February), temperature inversions, low wind speeds, and reduced atmospheric mixing height trap pollutants near the surface, leading to severe deterioration in air quality. In summer (April to June), higher temperatures and stronger winds enhance pollutant dispersion, resulting in relatively better air quality. However, seasonal phenomena such as stubble burning in nearby States, combined with Delhi's own emissions from vehicular traffic, industrial activities, and biomass combustion, contribute to sustained air pollution throughout the year.

3.3 It further informed the Committee that as per the study conducted by Department of Environment, Government of Delhi through IIT Kanpur in 2015, the major sources of air pollution in Delhi were identified as under:-

- Vehicular pollution.
- Road and soil dust and its re-suspension.
- Dust generated due to construction and demolition activities.
- Burning of dry leaves/garbage etc.
- Industrial pollution.
- Trans-state movement of pollutants, especially due to burning of crop residue in neighboring States.

3.4 As per the National Ambient Air Quality Monitoring Standards (NAAQMS), critical air pollutants contributing to increase in Air Quality Index (AQI) mainly includes PM 2.5 and PM 10. The table below depicts the % contribution of various sources towards PM 10 and PM 2.5 during winter and summer season, as per the study done by IIT Kanpur in 2015:

Source	Average for six monitoring locations			
	% contribution (PM10)		% contribution (PM2.5)	
	Winter	Summer	Winter	Summer
Vehicles	19.7	6.4	25.1	8.5
Secondary particulates	24.6	10.15	29.9	14.9
Biomass burning	16.7	6.8	25.8	12.2
Industries	0.65	1.05	0.8	1.2
Coal and fly ash	12.1	37.2	4.8	25.95
Construction material	3.1	4.1	1.5	3.0
Soil and road dust	14.4	26.5	4.3	27.1
Soil waste burning	8.75	7.75	7.75	7.2

3.5 The Committee was further informed by the State Government of NCT of Delhi that as per study titled "Source Apportionment of Ambient Particulate Matter during Winter Season in Delhi", conducted by IIT Madras and IIT Delhi in 2017, vehicular emissions were found to contribute approximately 21–35% to PM 10 levels and 27–51% to PM 2.5 levels in Delhi. Other key contributors to PM 10 include fuel oil combustion (20–46%), mineral dust (20–33%), biomass burning

(4–6%), and waste combustion (1–6%). For PM_{2.5}, fuel oil combustion accounts for about 27–38%, mineral dust for 4–21%, solid waste burning for 6–10%, and biomass burning for 14–15%.

3.6 The Committee also sought details of the steps taken by the Ministry of Environment, Forest and Climate Change to identify the sources of air pollution in Delhi NCR. The Ministry informed the Committee that the Central Pollution Control Board (CPCB) operates a centralized air quality portal for Delhi NCR. This portal provides real-time data, including hourly PM concentrations and the Air Quality Index (AQI) from various monitoring stations. Daily AQI reports, which include current air quality status, forecasts from the IMD/IITM Pune, and key meteorological data like wind speed and temperature, are shared with the Commission for Air Quality Management (CAQM) for analysis. To support proactive measures, CAQM uses a Decision Support System (DSS) developed by IMD/IITM Pune. This system combines weather and pollution data to identify pollution sources, forecast air quality levels, and guide timely interventions such as the Graded Response Action Plan (GRAP).

3.7 A comparison of the sources identified by IIT Kanpur in 2015 and TERI-ARAI in 2018 regarding percentage contribution of pollution sources to PM 2.5 concentration in Delhi is as under:

Pollution Source	Summer		Winter	
	IIT Kanpur 2015 (in %)	TERI-ARAI 2018 (in %)	IIT Kanpur 2015 (in %)	TERI-ARAI 2018 (in %)
Secondary particulate	15	17	30	26
Vehicles	9	18	25	23
Industrial	1	11	1	10
Coal + flyash	26	-	5	-
Biomass burning	12	15	26	22

Pollution Source	Summer		Winter	
	Construction dust	3	34	2
Soil + road dust	27	-	4	-
Solid waste burning	7	-	8	-
Others	-	5	4	-

Source: IIT Kanpur, 2015, PM2.5 apportionment study; TERI-ARAI 2018: Source apportionment study

3.8 The Committee feels that there is a need for conducting fresh study that maps and quantifies all the emissions sources and pollution load from the sources of air pollution in Delhi NCR and recommends that the Government should commission fresh source apportionment studies in this regard to reflect the changes in the economic activities in the region or to reflect the impact of new major policy developments and implementation. A committee of scientific experts should determine the appropriate frequency for these updates to ensure they accurately reflect changing conditions.

CHAPTER – 4

ADDRESSING HEALTH HAZARDS FROM AIR POLLUTION

4.1 Air pollution poses a profound and escalating threat to public health. The degradation of air quality is intrinsically linked to a vast spectrum of adverse health outcomes, affecting populations across their entire lifespan. Beyond the immediate irritation of the eyes, nose, and throat, sustained exposure to polluted air is a leading environmental risk factor for chronic and often fatal diseases.

4.2 The health implications are particularly severe for the respiratory and cardiovascular systems. Inhaled pollutants penetrate deep into the lungs, triggering and exacerbating conditions such as asthma, chronic obstructive pulmonary disease (COPD), and lung cancer. Furthermore, microscopic particles can enter the bloodstream, causing systemic inflammation, damaging blood vessels, and accelerating atherosclerosis (hardening of the arteries).

4.3 The most vulnerable segments of society—children, the elderly, and those with pre-existing conditions—disproportionately bear this health burden, highlighting a critical issue of environmental justice. In essence, the air pollution in Delhi NCR has transcended the domain of an environmental issue to become a health emergency.

4.4 The Committee therefore, heard the representatives of the Ministry of Health and Family Welfare on the adverse impact of air pollution on public health and measures taken by it to mitigate them. The Ministry informed the Committee that it has a three-pronged approach for managing the health hazards arising out of the severe air pollution. The three main pillars of their strategy are Awareness, Capacity Building and Strengthening of Health Systems.

A. Awareness generation of the health issues due to air pollution:

4.5 The Ministry informed the Committee that it actively disseminates seasonal health advisories concerning pollution-related illnesses. The Ministry's efforts focus on raising public awareness, improving preparedness, and coordinating response measures to protect vulnerable populations during periods of high

pollution. To achieve this, it guides state health departments, prepares healthcare facilities, develops public health advisories, and implements Information, Education, and Communication (IEC) campaigns.

4.6 The Ministry further highlighted the crucial role of Accredited Social Health Activists (ASHAs), who serve as a vital link between the community and the health department. ASHA workers actively generate awareness through routine home visits, community meetings, and regular interactions. They also participate in village and slum-level forums such as Village Health Sanitation & Nutrition Committee and Mahila Arogya Samiti (VHSNC/MAS) meetings, as well as platforms like Village/Urban Health Nutrition Days.

4.7 The Ministry also apprised the Committee that it has developed and disseminated IEC materials—including posters, radio jingles, radio spots, and videos—to the States for translation and outreach to target groups. Furthermore, the Ministry leads the observation of the International Day of Clean Air for Blue Skies, a weeklong health awareness campaign across all States, UTs, and districts. This campaign focuses on air pollution, its health impacts, and protective measures for the general public and vulnerable groups like women, children, and occupationally exposed individuals such as traffic police and municipal workers.

4.8 It also releases Public Health Advisories on air pollution and its health impacts to States and UTs, directing them to disseminate these advisories to districts. These advisories outline necessary actions and provide essential "do's and don'ts" for the public.

B. Capacity Building of Healthcare workforce:

4.9 The Ministry also focuses on capacity and skill-building for healthcare interventions to complement awareness generation. It trains the healthcare workforce, including ASHA workers, ensuring that they receive basic instruction on prevention and health promotion. The Ministry informed that it enhances this training at higher care levels to include treatment and follow-up procedures.

4.10 The Ministry has designated Centers of Excellence, including AIIMS Delhi, JIPMER, and the Vallabh Bhai Patel Chest Institute, to provide technical support

on air pollution. These centers provide advanced care and manage complications from pollution-related illnesses.

4.11 The Ministry has developed specific training modules for each cadre of the healthcare workforce, including program officers. It has also created tailored training materials for program officers, medical officers, surveillance nodal officers, and ASHA health workers. These materials cover critical topics such as pollution sources, associated risk factors, health implications, prevention, and personal protection. For service providers, the Ministry includes additional topics on surveillance and reporting mechanisms for effective program implementation.

4.12 Furthermore, the Ministry has developed community-level training material on air pollution and health, focusing on women, children, traffic police, and municipal workers. In addition, it has created Infographic Modules on “Health Sector Preparedness for Air Pollution” and a “Handbook for Health Professionals on Air Pollution and Its Impact on Health”.

C. Strengthening of Health Systems:

4.13 The Ministry is enhancing existing service delivery mechanisms at primary care facilities (Ayushman Arogya Mandir) and secondary care to ensure the provision of care for pollution-related illnesses. It further strengthens this work through effective collaboration with other Ministries and Departments for an integrated approach.

4.14 The Ministry developed and launched the National Health Adaptation Plan for Diseases due to Air Pollution in 2021. Following this, all States and UTs developed their own State Level Adaptation Plans on Air Pollution and Health under a State Action Plan that the Ministry approved.

4.15 Through State-level Programme Implementation Plans (PIPs), the Ministry helps States and UTs identify activities and allocate funds annually to support all air pollution-related health sector activities. It also conducts surveillance of air pollution-related respiratory illnesses through a network of more than 230 sentinel sites spanning 30 States/UTs and extends this surveillance to all 130 cities listed under the National Clean Air Program (NCAP).

D. Health Sector Preparedness and Response

4.16 The Ministry has developed health adaptation plans at national and state levels, which incorporate Graded Action Plans tied to Air Quality Index (AQI) thresholds, public health department measures, and hospital preparedness measures. At the facility level, the Ministry ensures preparedness through defined guidelines and by establishing specialized clinics (e.g., at RML Hospital). These guidelines detail the availability of logistics and the capacity to manage a surge in cases.

4.17 The Ministry leverages existing platforms and services, integrating air quality data from the Central Pollution Control Board with health outcome data from sentinel hospitals via the Integrated Health Information Platform (IHIP). It has also established Early Warning Systems to disseminate alerts to States and UTs, enabling them to take proactive measures during high pollution episodes.

4.18 During the meeting held on 15th July 2025, the Committee enquired from the Ministry of Health and Family Welfare as to how it tracks hospitalization surges linked to severe air quality episodes. The Ministry informed the Committee that National Centre for Disease Control (NCDC) has established Sentinel Surveillance of Air Pollution-related Illnesses across more than 200 cities. Visits to the emergency department due to the following conditions are included:

- a) Acute respiratory infections or exacerbations of respiratory cases
- b) Acute lower/upper respiratory tract infections
- c) Acute exacerbation of Asthma
- d) Acute infections of Influenza
- e) Pneumonia (Viral/Bacterial)
- f) Acute Chronic respiratory diseases
- g) Acute Exacerbation of Obstructive Lung Disease and Bronchiectasis
- h) Acute respiratory distress syndrome (ARDS)

4.19 It was further informed that data on the following variables related to hospital visits and admissions are collected and monitored:

- a) Total number of Emergencies reported to the Emergency Department (ED)
- b) Total Number of Acute Respiratory Illness cases reported to ED
- c) Cases of Respiratory Illnesses requiring admission (Hospitalization)

- d) Cases of ARI reported to the ED and requiring nebulization
- e) Cases of respiratory illness requiring non-invasive ventilation
- f) Cases of respiratory illnesses requiring invasive ventilation

4.20 This data entry for the surveillance is done on the Integrated Health Information Platform (IHIP). Application Programming Interfaces (APIs) have been developed with Central Pollution Control Board (CPCB), wherein Air Quality data from various stations are received on IHIP on a daily basis. Respiratory Health Outcome data are plotted against the Air Quality Index (AQI) data on the IHIP dashboard. These dashboards are accessible to State/District/Facility Officials. To correlate air pollution and health trends, National, State, and District Nodal Officers can simultaneously view real-time AQI data and patterns on the emergency visit and hospitalization incidents on the indicators stated above. This enables quick identification of pollution spikes coinciding with rise in hospital visits or admission cases.

4.21 The Committee also sought details of budget allocation to support pollution-specific healthcare infrastructure in NCR. The Ministry replied that since Health is a State subject, the responsibility for managing health-related issues, including the prevention and treatment of diseases, rests with individual State Governments. Under NHM States/UT are provided with budget to implement the National Health Programme schemes. In regions like Delhi, where air pollution is a concern, States have taken steps to address respiratory illnesses by establishing chest clinics for respiratory clinics. These clinics focus on diagnosing, treating, and managing conditions caused by poor air quality, such as asthma, chronic obstructive pulmonary disease (COPD), and other lung-related issues. These clinics provide essential care and aim to reduce the public health burden of pollution-induced diseases.

4.22 Budget allocated for NCDC programme activities for Air-Pollution related illnesses and other activities in States, under National Health Mission (NHM), are as follows:

NCDC- programme activities for air pollution related illnesses and related activities	FY 2022-23 (in lakhs)	FY 2023-24 (in lakhs)	FY 2024-25 (in lakhs)	FY 2025-26 (in lakhs)

NCDC- programme activities for air pollution related illnesses and related activities	FY 2022-23 (in lakhs)	FY 2023-24 (in lakhs)	FY 2024-25 (in lakhs)	FY 2025-26 (in lakhs)
Delhi	103.84	109.03	68.85	68.85
Haryana	37.95	37.95	115.7	112.5
Rajasthan	367.31	367.01	1188	1188
Uttar Pradesh	1134.00	1244.25	1990.03	2394.03

4.23 The Committee takes note of the steps taken by the Ministry of Health and Family Welfare for mitigation of adverse impact of air pollution on the health of the citizens. However, the Committee feels that given the seriousness and urgency of the situation and the considerable impact of the air quality on human health, much more needs to be done in this regard in the shortest possible time.

4.24 The Committee recommends that the Ministry should also rope in the public and private schools of Delhi-NCR to raise awareness amongst the school children on this critical issue.

4.25 The Committee observes that due to the continuing problem of air pollution, a large number of people are using air purifiers at home/offices etc. However, the air purifiers and their HEPA filters are currently subject to a significant 18% GST, even after the recent overhaul of the GST structure.

4.26 The Committee finds it contradictory that while Government efforts to mitigate the country's severe air pollution crisis have consistently fallen short, a prohibitive tax is levied on a critical device that citizens are forced to rely on for personal protection. Imposing such a tax effectively monetizes a public health failure. The Committee feels that the citizens of the country should not

be penalized for trying to save themselves from a catastrophic situation. Therefore, the Committee feels that the Government should take a sympathetic view and recommends that the Government should either abolish or lower the GST on air purifiers and HEPA filters.

4.27 The Committee also observes that certain sections of the society such as delivery riders, traffic police personnel, bike taxi riders, etc. are more vulnerable to the hazards of the air pollution. The Committee recommends that targeted and specific programmes should be launched for protection of these sections. These may include, for instance, directing e-commerce and logistics companies to provide high-quality protective masks (such as N95) to their delivery riders free of cost, and instituting mandatory, company-funded annual health check-ups, with specific provisions for additional check-ups following severe pollution episodes.

4.28 Furthermore, the Committee recommends the creation of a dedicated health risk profiling and monitoring system for these workers, the formulation of enforceable Standard Operating Procedures (SOPs) for high-pollution days—which could include limiting continuous outdoor exposure hours and ensuring access to indoor rest areas—and the launch of targeted public health campaigns to educate them on personal protective measures. Additionally, the establishment of specialized, streamlined healthcare access channels, such as dedicated OPD counters for respiratory ailments at major public hospitals should be considered to ensure timely and hassle-free medical attention for these essential frontline workers.

4.29 The Committee observes that the situation in Delhi NCR worsens during peak winter months and the elderly and the young, being the most

vulnerable, need immediate relief and cannot afford to wait for Government policies to yield results. Therefore, the Committee recommends that air purifiers should be installed in all public schools of Delhi NCR, especially for the primary wards during severe air pollution. The Committee further recommends the installation of air purifiers in all public hospitals of Delhi NCR especially the ICUs, pulmonology, maternity, neo-natal and geriatric wards. Additionally, the Committee recommends that the Government should make it mandatory to install air purifiers in all Government offices of the region. The Committee also recommends incentivizing private sector for investing in air purification measures in their offices, by allowing companies to claim tax rebates on the purchase and installation of air purifiers/similar equipments in their office establishments.

CHAPTER – 5

CONTROLLING THE VEHICULAR EMISSIONS

5.1 Vehicular emission stands as the biggest contributor to pollution in Delhi NCR, with comprehensive studies consistently ranking vehicles among the top two pollution sources. IITM's dynamic estimates of hourly changes in source contribution during winter show that vehicles are the top contributors among the local sources of pollution in Delhi.

5.2 Ministry of Environment, Forest and Climate Change informed the Committee about the following steps taken for controlling pollution from vehicular sector:

- Directions have been issued for plying of inter-city buses only on BS-VI diesel / CNG / EV mode. New registration of only CNG / electric autos has been mandated across NCR w.e.f. 01.01.2023. Existing diesel auto rickshaws are also targeted to be phased out from the entire NCR by 2026 in a time bound manner. NCR States have been asked to introduce policy to promote e-vehicles while Delhi has already introduced the same.
- Action against End-of-Life (EoL) Vehicles/Overaged vehicles is being taken by NCR states. EoL vehicles are to be disposed off through Registered Vehicle Scrapping Facilities. A total of 66 RVSF in U.P, 16 in Haryana and 02 in Rajasthan have been approved.

5.3 The Committee was further informed that for mitigation of air pollution from vehicular sources, the Government has been advising on a number of measures to the concerned State Governments and Govt. of NCT of Delhi (GNCTD) as follows:

- (i) Effective implementation and compliance of the new PUCC regime with the Central Motor Vehicles (Amendment) Rules, 2021 dated 14.06.2021.
- (ii) Challaning of visibly polluting/overloaded/invalid PUC in Delhi NCR.
- (iii) NCR State Governments / GNCTD to develop dedicated mechanisms to continuously monitor and take steps to ensure smooth traffic management.

- (iv) Emphasizing use of Cleaner Fuels and Electric Mobility for public transport. Enhancement of last-mile connectivity linked with the metro stations. Delhi has integrated approximately 25% electric buses (of the city's bus fleet) into its public transport system and planned to induct over 8,000 zero-emission electric buses by 2026.
- (v) Setting up of EV Charging infrastructure in Delhi-NCR
- (vi) Besides, other mid-to-long-term initiatives are also under evaluation based on learnings so far and global practices.
- (vii) Fast-tracking adoption of cleaner mobility services by Motor Vehicles across the sectors.

5.4 The Committee was further informed that Commission for Air Quality Improvement (CAQM) has issued various statutory directions in this regard.

5.5 CSE, while making presentation before the Committee, informed the Committee that since 2001-02, over 1.135 crore vehicles have been registered in Delhi. Since 2015-16, the yearly registration has been 600,000-715,000 vehicles per year. However, there has been significant progress in cleaning the fleet. The adoption of cleaner technology is evident, as all new private and commercial vehicles registered in the last five years are predominantly BS VI compliant, while older, polluting pre-2010 vehicles have nearly vanished from the roads, leading to a substantial reduction in tailpipe emissions. A key strategy in this energy transition has been to reduce the share of diesel vehicles on road. This is crucial because heavy-duty diesel vehicles have been identified as a particularly high-impact polluter, contributing as much as 46 per cent of the total particulate load from vehicles in the city. The implementation of targeted disincentives for diesel vehicles has been met with considerable success. The share of diesel cars in new registrations, which peaked at 41.36 per cent in 2013–14, has plummeted to just 5.87 per cent in 2023–24. Concurrently, a massive CNG transition has shifted the commercial vehicle segment away from diesel, reducing its share in new commercial vehicle registrations from 36 per cent to a mere 4 per cent over the same period, drastically cutting toxic diesel emissions.

5.6 Addressing the specific challenge of heavy-duty trucks entering Delhi has required a robust regulatory framework, largely driven by a series of Supreme Court directives since 2001. This roadmap has included banning non-destined and

older trucks, imposing an Environment Compensation Charge (ECC), building peripheral expressways to provide bypass routes, and implementing enforcement mechanisms like weigh-in-motion bridges and an RFID-based collection system.

5.7 The Committee was further informed that currently out of 124 entry points into Delhi, handheld RFID technology for cashless collection of ECC and toll tax has been introduced at all locations, including 13 border points being equipped with fully automated RFID systems. The CAQM directive of November 9, 2021 had asked SDMC to install automated infrastructure at additional 10 entry points – Noida Major, Loni Main, Dhansa border, Kundli II, New Seemapuri, Bajghera, New Kondli, Chander Nagar, Jharoda and Pul Prahladpur. Though handheld RFID is available at these locations, these are not as efficient and lead to congestion and pollution. Further, while local regulations on truck entry and movement are critical, the heavy-duty truck segment requires continued attention. As these vehicles largely operate under a national permit, state-level strategies are limited. **Therefore, the ongoing national initiative to expand highway-based CNG/LNG refueling systems and charging infrastructure for electric vehicles needs to be accelerated by putting it on a fast track. This is essential to encourage a substantial shift of long-haul trucking and other commercial vehicles to cleaner gas and electricity over the next five years, building upon the progress already made.**

5.8 The Committee desired to know from the Government of NCT of Delhi, the steps taken by it to enforce the directives of the Hon'ble Court. In response, the Government of NCT of Delhi through their Background Note dated 25th July, 2025, informed the Committee that to ensure enforcement of these directives, 385 teams of the Transport Department and Delhi Traffic Police have been constituted, leading to substantial action in the first half of 2025, including the checking of 8,23,132 non-destined goods vehicles and the issuance of over 6,37,617 challans for unauthorized parking. Furthermore, a strict ban on the entry of all

transport/commercial goods vehicles, other than BS-VI, CNG, LNG, and EVs, into Delhi have been enforced with effect from the 1st November, 2025.

5.9 The Government of NCT of Delhi informed the Committee that the entire fleet of public transport in Delhi has been switched over to CNG and Electric power, with ongoing efforts to increase the share of Electric transport. Presently, there are 6,638 buses in operation, including 2,948 electric buses, with a target to augment the total fleet to 11,000 buses, shifting entirely to electric buses. To aid public convenience, the "One Delhi Application" was re-launched for live bus tracking and online tickets.

5.10 The Committee appreciates the fact that Delhi Government is targeting to replace its entire fleet of public buses to electric and recommends that the target should be met in a definite timeline. The Committee further recommends that Government should further increase its target from 11,000 buses to provide pollution-free transport facilities to the inhabitants of Delhi.

5.11 The Committee also recommends the introduction of a premium, scheduled bus service tailored to meet the expectations of commuters seeking a higher standard of comfort and reliability. Modelled on the operational success of some of the private cab aggregators, this service could leverage technology to provide a seamless user experience, including real-time bus tracking and advanced seat reservation via a dedicated mobile application. This initiative could attract a segment of the population that currently relies on private vehicles, thereby serving the dual purpose of generating a new revenue stream for public transit and contributing to a reduction in private vehicle usage and urban congestion.

5.12 The Committee notes that a significant proportion of organised sector employees reside in Government owned/company owned accommodations, which are often clustered in specific residential areas. This unique residential pattern

presents a strategic opportunity to implement an efficient and sustainable transit solution. **The Committee, therefore, strongly recommends the establishment of a dedicated fleet of fully air-conditioned electric buses to transport employees from these residential complexes to their respective offices. To ensure cost-recovery and long-term sustainability, a suitable monthly fee could be charged for this service. This strategy would offer a two-fold payoff. Firstly, it will ensure reliable and timely attendance of the employees. Secondly, it will take a significantly reduce the number of vehicles on the roads, especially the polluting private vehicles.**

5.13 The Committee also recommends that the Government should evolve a policy requiring private companies in sectors with roles amenable to remote work (e.g., Information Technology, Consulting, Financial Services) to activate mandatory Work-From-Home (WFH) protocols during officially declared periods of severe pollution. This measure will serve the dual purpose of safeguarding public health by reducing the population's exposure to hazardous air and diminishing the traffic volume.

5.14 To address the commuting footprint of organizations where remote work is not feasible, the Committee recommends creating a structured incentive programme wherein private companies with significant net worth and large headcount will have to mandatory introduce fully air-conditioned, zero-emission electric buses for the transit of their employees. To ensure fiscal viability and align with national priorities, companies should be permitted to claim capital and operational expenditures for such initiatives under their Corporate Social Responsibility (CSR) mandates.

5.15 The Government of NCT of Delhi further apprised the Committee that the Hon'ble National Green Tribunal and the Hon'ble Supreme Court have directed that diesel vehicles more than 10 years old and petrol vehicles more than 15 years old shall not be allowed to ply on the roads. Pursuant to these orders, till the 30th June, 2025, 28,370 End-of-Life (EoL) vehicles were impounded. The Transport Department is implementing an Automatic Number Plate Recognition (ANPR) project, with cameras installed at about 494 petrol pumps. The CAQM, after detailed deliberations, has directed that all EoL vehicles identified through the ANPR system shall be denied fueling at fuel pump stations with effect from the 1st November, 2025 in the NCT of Delhi.

5.16 The Delhi Electric Vehicle (EV) Policy 2020 intends to deploy 25% of all new vehicles as battery-operated vehicles. More than 12% of the total new vehicle registrations were electric in 2024, and more than 4 lakh electric vehicles were registered till 30th June, 2025. To support this transition, a robust network of EV charging infrastructure is being established, with 3,100 charging stations, 4,793 charging points, and 893 battery swapping stations established during the previous policy period. There is a proposal to install around 18,000 Public and 30,000 private/semi-public EV Charging points by 2026. Other measures include the mandatory affixation of colour-coded stickers for vehicle identification and the operation of 1,140 electric autos at metro stations for last-mile connectivity.

5.17 Keeping in view the vehicular pollution from the neighbouring states, the Committee also sought information from Government of Haryana in this regard. In their background note submitted to the Committee, the State Government of Haryana informed the Committee that it has taken following steps control vehicular Emissions:-

- i. As per CAQM Direction no. 89, Diesel Vehicle having age above 10 years and Petrol Vehicle having age above 15 years have been banned in the NCR part and such vehicles have been declared as EoL (End of Life) vehicles and need to be scrapped through Registered Vehicle Scrapping Facilities (RVSFs).
- ii. As per the CAQM Directions no. 70, the diesel autos are banned in the NCR districts Gurugram and Faridabad with effect from 31.12.2024, and will be

- phased out from the NCR Districts Rohtak, Jhajjar and Sonapat by 31.12.2025 and from the rest of the NCR before 31.12.2026.
- iii. 21 RVSF facilities have been established and various incentives have been declared for mobilizing EoL vehicles to these facilities. Some of the incentives are as under:-
- a) Exemption in the Motor Vehicle Tax i.e. 10% of the tax due for the purchase of new vehicle purchased from the registered dealer or against Certificate of Deposit (CoD) or 50% of the CoD value whichever is less.
 - b) Registration fee rebate to the extent of 25% on the registration of new vehicle on the basis of CoD.
 - c) Exemption of Rs. 5000/- from the total arrears of the motor vehicle tax for the vehicles registered in the state of Haryana for scrapping of vehicles through RVSF.
 - d) Environment protection charges @ 1% of the ex-show room price of every diesel car with an engine capacity of 2000 cc.
 - e) Environment compensation charges @INR 1 per CC of the vehicle which has completed critical age at the time of fitness testing.
- iv. As per CAQM Direction no. 89, the End of Life Vehicle will be denied the fuel at the fuel pumps. Such directions will be implemented by providing the Automatic Number Plate Recognition (ANPR) Cameras at the fuel pumps. Such exercise will be completed by 31stOctober, 2025 for the three NCR districts i.e. Gurugram, Faridabad & Sonapat and by 31st March, 2026 in the rest of NCR districts of the State. The fuel shall be denied with effect from 01stNovember, 2025 to the three districts as mentioned above and with effect from 01st April, 2026 to the rest of the NCR of the State.
- v. The State introduced its Electric Vehicle (EV) Policy in 2022 with an aim to promote clean transport, make it a global hub for manufacturing of EVs and their components and make EVs affordable for citizens.
- vi. The State Government has notified the Haryana Vehicle Scrappage Policy in 2022 and has now issued Haryana Registered Vehicle Scrappage & Recycling Facility Incentive Policy 2024 under which subsidy passed for establishment of RVSF, rebate on SGST, park development and skill development. Presently, 21 RVSFs are operational in the State.

- vii. One inspection and certification centre is operational in Rohtak and is in the process of being upgraded to Authorized Testing Station. Further, the State Transport Department has agreed in principle to setup Authorized Testing Stations in PPP mode.

5.18 Dwelling on the issue of vehicular pollution, the Ministry of Road Transport and Highways informed the Committee that the Hon'ble National Green Tribunal (NGT), Delhi *vide* its order dated 07.04.2015 has banned all petrol vehicles older than 15 years and all diesel vehicles older than 10 years to ply on the roads of Delhi-NCR. Further, the Hon'ble Supreme Court while ratifying the order passed by Hon'ble NGT directed *vide* order dated 29.10.2018 that such End-of-Life (EoL) vehicles shall not ply in Delhi-NCR. The Ministry further informed that in Delhi-NCR, approximately 2.2 crore vehicles have valid registration and fitness. Among these, only 2.8 lakh vehicles with valid registration and fitness are non-compliant of NGT order (i.e. diesel vehicles older than 10 years and petrol vehicles older than 15 years). The Ministry informed that it has taken multiple initiatives to combat vehicular pollution. These initiatives are focused towards developing an ecosystem to scrap old polluting vehicles, improving the adoption of Electric Vehicles, Alternate Fuel Vehicles and Flex Fuel Vehicles, Stringent mass emission standards, establishing a robust PUCC regime, and identifying old polluting vehicles entering Delhi NCR roads. The Ministry has taken the following measures:-

(i) Scrapping of old polluting vehicles under the Vehicle Scrapping Policy: The Ministry launched the 'Vehicle Scrapping Policy' in 2021 aimed at creating an eco-system for phasing out of unfit and polluting vehicles in an eco-friendly manner based on their fitness on voluntary basis. The policy has three core objectives: reducing air pollution, promoting a circular economy, and improving road safety. To ensure effective implementation, the Government is setting up a network of Registered Vehicle Scrapping Facilities (RVSFs) for environment friendly, safe, and scientific scrapping of vehicles. Additionally, Automated Testing Stations (ATs) are being established to enhance transparency and objectivity in fitness testing. Under the policy, transport vehicles must undergo fitness testing every two years for the first eight years and annually thereafter. For non-transport vehicles, valid fitness certification is

required at the time of registration renewal after 15 years, and subsequently every five years. The Ministry informed that in Delhi NCR, more than 35RVSFs have been set up and 1.15 lakh vehicles have been scrapped till date contributing to reduction in vehicular pollution. Moreover, in Delhi NCR, 2 ATSS are operational and 1.05 lakh tests have been conducted. To incentivize participation, the Ministry has introduced a suite of measures including motor vehicle tax concessions, waiver of registration fees for new vehicles purchased against a scrapping certificate, and encouraging discounts from automotive manufacturers. Digital enhancements to the 'Vahan' portal, like the 'VScrap' module, have been rolled out to bring transparency and ease the process.

(ii) **Promoting Electric Vehicles (EVs):** The Ministry is actively building the regulatory and infrastructural framework for EV adoption. This includes notifying safety and performance standards, making EV charging facilities mandatory at all Wayside Amenities (WSAs), and providing financial incentives such as exemption from permit requirements and registration fees. The ministry has also established norms for the retrofitting of existing vehicles with hybrid electric systems or electric kits.

(iii) **Boosting Alternate and Flex Fuels:** Aligning with national missions like the National Green Hydrogen Mission and the National Biofuel Policy, the Ministry is facilitating a shift away from conventional fossil fuels. Key actions include: notifying hydrogen as an automotive fuel and formulating safety and type-approval standards for H2 vehicles, notifying mass emission standards for various ethanol blends (from E10 to E100). Mandates are in place for E20 material-compliant vehicles (since April 2023) and E20 engine compliant vehicles (from April 2025). Automakers have already developed prototypes for 2, 3, and 4-wheelers. The Ministry has notified standards for Compressed Natural Gas (CNG), Bio-CNG, and Liquefied Natural Gas (LNG) vehicles, including rules for converting existing agricultural machinery to run on these cleaner fuels.

(iv) **Robust Pollution Under Control (PUGC) Regime:** To ensure vehicles comply with emission norms, the Ministry has launched PUGC 2.0.

This upgraded system incorporates advanced features like geo-fencing and photo/video proof of a vehicle's presence at the testing center to prevent fraud and ensure genuine testing.

5.19 The Committee sought opinion of the CSE regarding adoption of strong hybrid vehicles and whether they will be effective till the adoption of EVs pickup. CSE informed the Committee that the strong Hybrid Electric Vehicle (HEV) that are currently available in Indian market use both the internal combustion (usually petrol) engine and the battery-powered motor power train, which are meant to improve the fuel efficiency of the internal combustion engines. The petrol engine is used both to drive and charge the battery when needed. This is different from Plug in Hybrid (PHEV) that uses both an internal combustion engine and a battery charged from an external socket – thus, vehicle's battery can be charged with electricity rather than the engine. PHEVs are more efficient than HEVs but less efficient than battery operated electric vehicles (BEVs). HEVs in India typically have batteries that are smaller than even electric two wheeler batteries i.e. in the range between 0.76 to 1.8 kWh. They have fuel tanks with capacities ranging from 40 to 52 litres. Hybrids, with their combination of petrol engines and electric motors, can improve fuel efficiency somewhat than the traditional ICE vehicles, but will continue to contribute to pollution with its large petrol tank. Moreover, their real world emissions will depend on how effectively the battery phase is operating in the urban driving conditions, which is never monitored. In contrast, battery sizes of electric cars in India may vary, ranging from 15 kWh for smaller cars to over 100 kWh for larger, premium SUVs. This can give real-world range of approximately 150 to 500 km on a single charge. In the United States, particularly California, strict Zero-Emission Vehicle (ZEV) mandates grant credits exclusively for Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Fuel Cell Electric Vehicles (FCEVs), deliberately omitting conventional hybrids (HEVs). This approach is mirrored in China, where the influential New Energy Vehicle (NEV) credit system provides valuable credits for BEVs, PHEVs, and FCVs, but offers no credits for HEVs. Similarly, across the European Union, national policies have either disqualified hybrids from purchase incentives entirely or provide them with significantly lower subsidies than those available for BEVs. It may also be noted that HEVs in India are already enjoying some incentives like super credits for compliance with the fuel economy standards. The EVs however

earn comparatively higher credit points. Public incentive should be provided to only promote new generation electric vehicles or fuel cell vehicles to meet an ambitious electrification target for zero emissions transition. Hybrids are old and well established technologies meant only to improve fuel efficiency of internal combustion technologies. These cannot be bracketed with electric vehicles to dilute the electrification roadmap.

5.20 The Committee observes that Hybrid Electric Vehicles remain fundamentally dependent on fossil fuels and continue to emit tailpipe pollutants, unlike true zero-emission vehicles.

5.21 The Committee recommends that public incentives, including but not limited to production-linked incentives, purchase subsidies, and tax benefits, must be strategically focused on accelerating the adoption of genuine zero-emission vehicles like Battery Electric Vehicles and Fuel Cell Electric Vehicles. Plug-in Hybrid Electric Vehicles could be considered as a transitional technology due to their capacity for external charging and extended electric-only range.

5.22 The Committee also enquired CSE regarding the adverse effects of ethanol-blended fuels on engine health and whether there is any evidence which indicate that older vehicle engines are incompatible with such fuels and that their use may result in increased emissions. CSE replied that in India, the Automotive Research Association of India along with the CSIR - Indian Institute of Petroleum and Indian Oil Corporation had carried out a Government sponsored E20 suitability project for two and four wheelers in 2014-15. Laboratory tests showed negligible corrosion of aluminum, brass, carbon-steel or stainless-steel components, while advanced components retained mechanical strength and volume stability. However, NBR-PVC hose blends and epichlorohydrin seals showed upto 100 per cent swelling and were identified for substitution.

5.23 Same study showed about fifty per cent lower carbon-monoxide and twenty per cent lower unburned hydrocarbons. But oxides of nitrogen remained unchanged in catalyst-equipped cars but rose by ten per cent in the carburetted

fleet. Studies in other countries have seen increase in unregulated emissions. Therefore, countries like Brazil regulate pollutants like aldehydes from flexi fuel/ethanol vehicles. As ethanol blend makes petrol more volatile that increases evaporative emissions and losses of fuels that also contribute to ozone formation. Therefore, countries like Brazil, California have adopted evaporative standards – more stringent than India.

5.24 Vehicles manufactured before comprehensive evaporative-control and oxygen-sensor standards are prone to higher carbonyl, permeation-VOC and, in some cases, NO_x emissions when operated on ethanol blends. An average fuel-economy penalty of six to seven per cent for petrol cars and three to four per cent for carburetted two-wheelers, was noted.

5.25 The Government of India's Roadmap for Ethanol Blending 2020-25, prepared by NITI Aayog and the Ministry of Petroleum & Natural Gas, has relied on those ARAI findings and therefore anticipates no engine-life curtailment from E20. But it does acknowledge a six to seven per cent mileage loss for pre-E10 calibrations and recommends calibrated excise or GST incentives to offset the consumer's additional fuel spend.

5.26 Currently, the Government of India is proposing to introduce higher ethanol blends going upto 27 per cent to 30 per cent. This will require rigorous testing of on-road vehicles to assess the impact on both regulated and unregulated emissions, fuel economy of vehicles, corrosion of material and engine impacts. Accordingly, the vehicle manufacturers will have to upgrade the technology of the vehicles.

5.27 The Committee acknowledges the strategic rationale of the Ethanol Blending Roadmap in furthering the nation's energy security objectives. However, there are concerns regarding the potential impact on vehicular emissions and public health, which the Committee believes warrant a more cautious approach to its implementation. The Committee notes that while extant studies indicate a potential reduction in certain regulated pollutants like carbon monoxide, these benefits are accompanied by certain trade-offs. The rise in NO_x emissions from a substantial segment of the vehicle fleet,

namely carburetted vehicles, is a matter of concern, given the direct impact of NO_x on air quality. Furthermore, the inherent volatility of ethanol-blended petrol leads to increased evaporative emissions, which are precursors to ozone formation. The fact that India's current regulatory standards for such evaporative emissions are less stringent than those in place in pioneering regions like Brazil and California suggests a regulatory gap. This gap risks undermining the policy's intended benefits by allowing an increase in unregulated and harmful pollutants, including aldehydes, which have known adverse health effects. The Committee also notes that the compatibility of older vehicles, lacking advanced emission control systems, with higher ethanol blends remains a valid concern, both in terms of potential material damage and elevated emissions. The acknowledged fuel economy penalty associated with these blends further complicates the matter, as it implies a higher volume of fuel consumption to achieve the same mobility, thereby offsetting some of the per-litre environmental advantages.

5.28 Therefore, the Committee recommends that Government should undertake a comprehensive review of the nation's vehicular emission standards. This review should specifically evaluate the necessity of adopting more stringent evaporative emission standards, aligned with international best practices, to effectively mitigate the risks associated with higher ethanol blends.

5.29 The Committee also recommends that the Government should develop a clear public information campaign regarding the compatibility of older vehicles with new fuel standards.

5.30 The Committee wishes to underscore that while ethanol blending may form part of a transitional energy strategy, it should not inadvertently divert policy focus or fiscal support from the paramount objective of transitioning to a zero-tailpipe-emission vehicle fleet. The Committee therefore recommends that the promotion of ethanol blends be carefully calibrated to ensure it serves as a genuine bridge to a cleaner transportation future, without delaying the ultimate adoption of battery electric and hydrogen fuel cell vehicles.

5.31 The Committee noted that the adoption of EVs in Delhi had not progressed to the desired extent and enquired CSE regarding the measures that can be taken to incentivize people of Delhi NCR to heartily adopt EVs. It was informed that the EV Policy 1.0 had set the voluntary target of 25 per cent electrification of new vehicles by 2024. However, currently, the EV penetration is 12.51 per cent of new vehicle registrations. The following policy measures were suggested to incentivize the people of Delhi NCR to adopt EVs:-

- Need time bound regulatory target along with registration and sales mandate.
- Need stronger focus on infrastructure development and investment. Only direct subsidy cannot suffice. Build high-density, publicly accessible fast charging infrastructure.
- Improve delivery of subsidies and create a targeted scrappage-linked incentive scheme
- Launch a Government-supported interest subvention scheme (e.g., through a large financial institution such as SBI) etc. Create insurance-linked risk pools or co-lending schemes to reduce financing premiums. Make finances or loans available at par with ICE counterparts.
- Develop industry-standard EV residual value norms using OEM-provided battery health data. In tandem, create a framework for development and support of a used electric vehicle market.
- Offer subsidized financing and workplace charging. Create closed-loop programs where charging infrastructure is set up at offices/housing complexes.

- Strategic expansion of well-distributed charging stations and financial support for higher-capacity chargers and cover a greater share of infrastructure outlay (transformers, wiring, site development).
- Simplify approvals and offer competitive land grants, low-rent arrangements for charging infra, and broader profit-sharing models for private players, especially in government or public land in city centers
- Develop public digital maps and apps showing functional stations, realistic charge times by vehicle model, and transparent pricing.
- Mandate a minimum guarantee for uptime of charging infrastructure through a service level agreement that is at least 90-95%. Currently, this figure hovers around 20-30%.
- Mandate the use of open communication protocols (such as OCPP and OCPI) for charger networks and integrate payment systems to allow one-app, city-wide access for users.
- Co-fund upgrades to electricity connections and transformers in societies and public charging hubs. Mandate that new and upcoming housing and commercial developments pre-allocate percentage spaces and electrical capacity for EV charging.
- Enhance consumer awareness to inform users about real charging speeds, optimal charging practices, and available subsidies. Address safety and technical concerns among RWAs.
- Level playing field for battery swapping and extend incentives
- Reduce GST on standalone batteries from 18% to 5% to improve affordability for both companies and end-users.
- Mandate minimum battery safety and recyclability standards even for low-speed vehicles. Address the regulatory blind spot around delivery segment EVs used in shared, aggregator fleets.
- Set up a collection and transportation system for EV batteries. Since batteries contain hazardous materials, handlers and firemen should be trained.
- Incentivize good-quality EVs meeting AIS 156 and Central Motor Vehicles Rules (CMVR) standards.
- Make it easier for retrofit kits and battery swapping solutions to get homologated at scale, lowering costs and enabling faster rollout.

5.32 The Committee feels that there is a need to increase the share of Electric Vehicles (EVs) in Delhi and urgent steps need to be taken for augmenting the adoption of EVs by the public. The Committee recommends that both the Central Government and the State Government of Delhi should take necessary action in this regard and may also consider the suggestions enumerated above to achieve the desired results. To further accelerate this transition, a dual strategy of incentives and disincentives is crucial. On the incentive side, the Government may consider offering subsidized or even free public parking for EVs to make them a more attractive option. Conversely, to persuade a shift away from conventional vehicles, parking rates for petrol and diesel vehicles can be increased significantly. Beyond parking measures, the Committee recommends more direct regulatory interventions to curb the proliferation of polluting vehicles. This may include the introduction of an annual ceiling on the registration of new non-electric vehicles across the entire National Capital Region (NCR).

5.33 The Committee observes that a primary barrier to adoption of EVs is the initial purchase price, which necessitates intervention in the credit market. The Committee recommends that the Ministry of Finance should actively persuade Public Sector Banks to introduce dedicated "Green Car Loans" for EVs, offering interest rates that are substantially lower than those for Internal Combustion Engine vehicles. Complementing this, the Reserve Bank of India should be urged to formulate specific schemes, such as creating a priority-sector lending category for EV loans, which would incentivize all commercial banks to offer similarly concessional financing and expand credit flow across the sector. Simultaneously, lowering the long-term cost of ownership is critical. The Ministry of Finance should mandate Public Sector General

Insurance Companies to design and offer comprehensive insurance policies for EVs at significantly cheaper premium rates, reflecting their lower risk profile and maintenance costs. To ensure industry-wide adoption of this practice, the Insurance Regulatory and Development Authority of India should be requested to issue guidelines for standardizing these affordable, EV-specific insurance products, fostering competition and wider consumer choice.

5.34 The Committee also recommends that the Ministry of Finance should introduce robust tax incentives under the Income Tax Act. These incentives should include provisions such as a deduction on the interest paid on EV loans and potentially an additional deduction on the principal amount repaid. These incentives should be available under both the old and new tax regimes to reach the widest possible taxpayer base. The Committee further recommends that the Central Government and the State Governments should launch a special scheme that encourages their employees to purchase EVs. This could be achieved by offering them access to interest free or concessional loans, thereby stimulating the market and normalizing EV ownership from within the public sector itself. The Government should also push private sector to offer such incentives to its employees.

5.35 The Committee acknowledges the significant environmental benefits of phasing out older, more polluting vehicles. The Committee is of the view that a broad, age-based prohibition is an unsustainable and potentially counterproductive strategy. The risks of such an approach, including the inter-regional displacement of polluting vehicles and the failure to identify grossly polluting vehicles within newer fleets, necessitate a more sophisticated and merit-based policy framework. **The Committee, therefore, recommends that Government should shift its**

strategy from a sweeping age-based ban to a targeted, performance-oriented system for identifying and retiring unfit vehicles. The success of this new strategy hinges on the rigorous and transparent deployment of advanced testing mechanisms to accurately identify high-emitting vehicles. For commercial vehicles, this entails the full operationalization of the Automated Testing Stations (ATS) as mandated by the Ministry of Road Transport and Highways, supplemented by stringent oversight to prevent the dilution of standards through repeated testing. For private vehicles, the current Pollution Under Control (PUC) regimen is demonstrably inadequate. The Committee therefore recommends the immediate implementation of remote sensing technology to effectively screen for high-emitting vehicles under real-world driving conditions.

5.36 Furthermore, the Committee recommends strengthening the fitness testing protocol for private vehicles by mandating the first fitness test after 10 years, rather than the current 15 years, with particular attention given to vehicles with larger engine sizes such as SUVs. Concurrently, a structured system of fiscal incentives must be implemented to encourage voluntary scrappage. These incentives should be strategically targeted, prioritising high-mileage commercial vehicles and offering enhanced benefits for the replacement of old vehicles with zero-emission electric alternatives, applicable to both commercial and private segments.

5.37 The Committee is of the firm view that a holistic policy combining robust, technology-driven enforcement with targeted economic incentives will prove far more effective in renewing the national vehicle fleet and achieving the desired reductions in vehicular pollution across the NCR.

5.38 The Committee enquired from the Ministry of Housing and Urban Affairs regarding the impact of delayed rapid rail projects on vehicular emissions and congestion in Delhi NCR. The Committee also sought details of deadlines are to resolve the pending approvals for these corridors. The Ministry replied that National Capital Region Transport Corporation (NCRTC), which is the implementing agency for RRTS corridors in National Capital Region (NCR), has submitted the revised proposals for Delhi-Gurugram-SNB (Shahjahanpur-Neemrana-Behror) and Delhi-Panipat-Karnal Namo Bharat RRTS corridors in March, 2025. The proposal is under examination at Central Government. After examination, Central Government will consider financial assistance to RRTS projects, based on feasibility of the proposal and availability of resources. The Delhi-SNB and Delhi-Panipat-Karnal RRTS corridors are presently not sanctioned projects by Government of India. Further, Delhi-Ghaziabad-Meerut Namo Bharat RRTS corridors will help in reduction of private vehicles on the roads, decrease in traffic, reduction of pollution, reduced travel time, vehicle operating costs, road stress and accidents by reducing congestion (increasing the modal share of public transport).

5.39 The Committee also enquired the reasons for delay in approval to rapid rail extensions to Alwar, Panipat and Baraut. The Ministry replied that National Capital Region Planning Board (NCRPB) prepared a 'Functional Plan on Transport for NCR-2032' which identified eight Regional Rapid Transit System (RRTS) corridors to connect various important towns of NCR with semi-high speed rail based commuter transit system in order to improve rail based connectivity in NCR, namely (i) Delhi-Gurugram-Rewari-Alwar (ii) Delhi-Ghaziabad-Meerut (iii) Delhi-Sonapat-Panipat (iv) Delhi-Faridabad-Ballabhgarh-Palwal (v) Delhi-Bahadurgarh-Rohtak (vi) Delhi-Shahdara-Baraut (vii) Ghaziabad-Khurja and (viii) Ghaziabad-Hapur. The Task Force appointed by the erstwhile Planning Commission of India (now NITI Aayog) had prioritized following three RRTS corridors for implementation:

- Delhi-Ghaziabad-Meerut
- Delhi-Gurugram-Alwar
- Delhi-Panipat

5.40 Out of the above three corridors, 82.15 Km Delhi-Ghaziabad-Meerut Namoo Bharat RRTS corridor has already been sanctioned by the Central Government in March, 2019 and is presently in operation.

5.41 The Committee acknowledges and appreciates the operationalization of the Delhi-Ghaziabad-Meerut Namoo Bharat RRTS corridor. However, the Committee notes with concern that even this corridor is not fully operationalized and has missed several deadlines. Moreover, this achievement is significantly overshadowed by the inordinate and concerning delays in sanctioning and implementing the other critical corridors identified as priorities.

5.42 The Committee notes with deep disquiet that the revised proposals for the Delhi-Gurugram-SNB and Delhi-Panipat-Karnal corridors were submitted in March 2025 and remain under examination, representing a critical and unacceptable gap in the strategic response to the region's intertwined transport and pollution crises. The prioritization of three key corridors was established years ago, and the completion of only one to date signals a pace of execution that is not commensurate with the urgency of the crisis. Each day's delay translates into thousands of additional vehicles on the roads, compounding congestion and emitting pollutants that directly impact the health and well-being of the region's inhabitants. The Committee, therefore, recommends that the Ministry of Housing and Urban Affairs should expedite the approval of Delhi-Gurugram-SNB and Delhi-Panipat-Karnal RRTS corridors with the utmost priority. Concurrently, the Ministry should also conduct a comprehensive review of the remaining five RRTS corridors and should expeditiously initiate the process for their approval.

5.43 The Committee also enquired about the role of Transit-Oriented Development schemes in reducing the vehicular emissions. The Ministry of Housing and Urban Affairs informed that the Transit Oriented Development (TOD) Policy of Delhi was notified *vide* S.O. 3063(E) on 30.07.2021. The policy states that the Transit-Oriented Development (TOD) approach in Delhi will help in bringing people and jobs closer to mass transit and lead to much needed integration of land use and transport in the city. It will result incompact, walkable, mixed-use developments within influence zones of transit stations. This is a critical paradigm shift that can potentially improve public transit ridership, reduce vehicular congestion, and reduce greenhouse emissions and pollution in the long term. One of the outcomes of the policy is to achieve enhanced mobility through prioritization of pedestrian and NMT infrastructure and Modal shift in favour of public transport. It also envisages reduced parking norms of 1 Equivalent Car Space (ECS) per100 sq.mt. of covered area, with the aim to reduce number of vehicles in the TOD scheme. Further, the mandatory provisions for parking space for Bicycles and Electric Vehicles, promotes non-polluting modes of transport.

5.44 The Committee appreciates the formulation of the Transit-Oriented Development (TOD) Policy for Delhi. The principles enshrined in the policy, which aim to create compact, walkable, and mixed-use neighbourhoods centred around mass transit hubs, represent a critical and necessary paradigm shift in urban planning. The specific provisions for enhanced pedestrian and non-motorized transport infrastructure, reduced private vehicle parking norms, and the promotion of cycling and electric vehicles are precisely the kind of forward-looking measures required to fundamentally alter the transport dynamics of the region. The potential of TOD to reduce reliance on private vehicles, thereby curbing tailpipe emissions and congestion, is significant. However, the Committee expresses its profound concern that the existence of a policy on paper is insufficient. The Committee notes that till date only TOD project i.e. at Karkardooma, Delhi is under

execution on ground. The current pace of the TOD implementation appears inadequate to generate the transformative impact needed within the urgent timeframe demanded by the public health crisis. The Committee recommends that the Ministry of Housing and Urban Affairs and the Government of NCT of Delhi should expedite the implementation of this scheme. Moreover, the Ministry should coordinate with the State Governments of Haryana and Uttar Pradesh to adopt and implement similar TOD projects in cities under their jurisdiction.

5.45 The Committee observes that phase 4 of the expansion of Delhi Metro has faced delay. The Committee also observes that while 3 metro lines (Aerocity to Tughlakabad, Mukundpur to Maujpur and Janakpuri West to R.K. Ashram Marg) were approved by the Government in March 2019, the remaining 2 metro lines (Inderlok – Indraprastha and Lajpat Nagar – Saket G Block) were approved only in March 2024. Moreover, the Rithala – Narela – Nathupur (Kundli) metro line was approved only in December, 2024. Thus, these metro lines which were originally scheduled to be completed by 2024 will now start getting operationalized by 2026 culminating in 2028. The Committee also observes that 2 metro lines (Noida Sector-62 (Electronics City) – Sahibabad and Vaishali – Mohan Nagar) are still pending for approval.

5.46 The Committee, therefore, recommends that the Government should expeditiously clear all pending approvals for the remaining metro lines. To avoid the delays that have plagued previous phases, the Committee also recommends initiating the planning and approval process for Phase 5 at the earliest. This proactive approach is critical for ensuring that the project remains on schedule and meets the city's future mobility needs.

CHAPTER – 6

COMBATING THE MENACE OF STUBBLE BURNING

6.1 Crop residue burning is episodic pollution that contributes significantly to the regional air quality. It is already well understood that there is a small time window between the harvesting season of rice and sowing of wheat due to delayed sowing of rice in Punjab and Haryana in June because of the concerns of groundwater depletion. Also, mechanization of crops leaves behind smaller stubble on the ground which is expensive to remove. Due to these reasons, for the farmers of Haryana and Punjab, the burning of residue is the easiest option for disposal. Winter inversion and wind patterns further aggravates its effect on the northern Gangetic plains and highly populated region of Delhi NCR.

6.2 The Government of NCT of Delhi informed the Committee that approximately 2000 hectares of non-basmati paddy is grown within the city's borders. The Government has provided free bio-decomposers and subsidized machinery to the farmers for the prevention and control of agricultural stubble burning in the city. Moreover, enforcement is carried out by 16 patrolling teams (11 daytime and 5 nighttime), which led to 12 First Information Reports (FIRs) being filed against violators in 2024.

Steps taken by State Government of Punjab

6.3 In their background note on the subject submitted to the Committee, the State Government of Punjab informed that while the wheat straw is used as fodder for the animals, the use of paddy straw is limited. It further informed the Committee that total paddy straw generation in Punjab in 2024 was 18.63 Million Tonnes. It also informed the Committee that it has taken following steps to prevent and prohibit the stubble burning:

- a) The Action Plan as per the directions of the CAQM for control of crop residue burning in the State of Punjab is being implemented by all the stakeholder departments as well as the Deputy Commissioners of the State for implementation in true letter and spirit.

- b) The detailed review of preparedness is being done at the level of Chief Secretary for the last 4 months.
- c) Target Paddy straw to be managed (2025) as per plan
- In situ Management:- 11.4 Million Tonnes
 - Ex situ Management:- 7.06 Million Tonnes
 - Paddy straw to be used as fodder :- 0.17 Million Tonnes
 - Target Paddy Straw which could be managed in 2025 = 18.63 MT
- d) Due to the efforts made by the State Government, there has been considerable decline in the fire incidents year on year.

Year	2022	2023	2024
Period	15 th September to 30 th October		
Cumulative active fire events	49922	36663	10909

Overall 71% reduction in comparison to previous year period

- e) Control rooms in all the 23 districts of the State have been set up by the Punjab Government for the purpose of control of stubble burning.
- f) The Department of personnel had issued administrative instructions to all the Heads of the Departments, Divisional Commissioners, Registrar, Punjab and Haryana High Court, District and Sessions Judges, all the Deputy Commissioners and Sub Divisional Officers to direct its employees and staff members including that of the Boards, Corporations not to burn agriculture residue and shall also sensitizes other people about the ill effects of the burning of agriculture residue and encourage them not to burn paddy straw/ agriculture residue. The Departments have been told to implement the directions strictly and take disciplinary action against such employees who are found indulged in the burning of agriculture residue.
- g) The Panchayats have been requested by the Department of Rural Development and Panchayats not to burn the paddy straw.

- h) Directions have been issued by the Punjab State Pollution Control Board to make the attachment of Super Straw Management System with Harvester Combines mandatory.
- i) The Department of Revenue has been directed to make red entries in the revenue record of the farmers, who are found burning paddy straw.
- j) The Deputy Commissioners of the Districts have been inspected to issue prohibitory orders under section 163 of the Bharatiya Nagarik Suraksha Sanhita, 2023 (BNSS), thereby prohibiting the burning of paddy straw / stubble in the State.
- k) An android based mobile application (for close monitoring of stubble burning incidents) has been developed through Punjab State Remote Sensing Centre for 2025 and a dashboard has been created with role-based login for field officers to provide end to end reporting and action taken for each fire incident captured via satellite.
- l) Process is going on to appoint nearly 9500 Nodal Officers across the State to be in contact with the representatives in the villages to make farmers aware of the ill effects of stubble burning through them and about directions of this Hon'ble Court and also to check crop residue fire incidents.
- m) Apart from Nodal Officers, teams of the Department of Rural Development and Panchayats, Cooperation and Soil and Water Conservation and Punjab Mandi Board will be constituted to visit villages and take appropriate measures to stop stubble

In-situ Management:

6.4 The Committee was informed that the State of Punjab has made a target of managing 11.7 million tonnes of paddy straw through in-Situ management in 2025. The steps taken by the State for in-situ management are as under:-

- a) Comprehensive review of Crop Residue Management (CRM) machines is being done.
- b) 1.48 lakh CRM machines have been made available to the farmers in the last 6 years.

- c) Gap analysis for 2025-26 has been done.
- d) Online portal for application and distribution of CRM has been launched.
- e) Unnat Kisaan app made operational for the farmers to directly contact for hiring of machines.
- f) Block and village wise mapping has been done.
- g) Targets of exclusive 500 Ex-situ CHCs issued to prioritize balers and rakes.
- h) The sale of seed of long duration variety, PUSA-44 was not allowed in the State in 2024.
- i) Efforts are being made for crop diversification. During 2025, Area under Cotton shall be 1.18 Lakh ha in 2025. State is providing incentive of Rs 17500 /Ha for diversifying to maize. Maize sown in 1700ha. Direct rice seeding done in 200000 acre.

Ex-situ measures:

6.5 The following Ex-situ measures have been taken:-

A. Industrial Boilers: State exceeded targets for paddy straw consumption in industrial boilers in 2024.

- **Existing Industries (Using paddy straw bales):-**38 no. industries exclusively utilizing in total 20.47 lakh TPA of paddy straw in industrial boilers (including 02 no. units located in Himachal Pradesh but utilizing paddy straw from inter-state border areas of Punjab).
- **Existing Industries (Using paddy straw blending with other fuels):-**23 no. industries are blending paddy straw with other fuels to be used in boilers resultant utilization of 5.09 TPA.
- **Upcoming industries:-**18 no. industries have proposals to install such boilers thus anticipating additional utilization of paddy straw @ 8.07 lakh TPA in upcoming Kharif Season-2025.
- **Targeting 41 lakh tonnes** of paddy straw consumption in 2025, considering recent decision by State Government to offer capital subsidy for installing paddy straw-based boilers.

B. Biomass Power Projects: 11 operational plants in the state consuming 11.07 lakh tonnes of paddy straw.

C. Compressed Biogas (CBG) Plants: 6 operational projects, with 04 more in pipeline.

D. Pelletization Plants: 31 operational units, with 37 more expected by November 2025 CBG plants. Total projected paddy straw consumption for pelletization to reach 17 lakh MT by 2025 end.

E. Thermal Power Plants: - Consumption of paddy straw pellets nearly 4.5 lakh tonnes upto 31.07.2025. Further to increase by 7.3 lakh TPA upto 31.03.2026.

6.6 Meticulous implementation of the following enforcement measures have been taken:-

- a) The District Level Monitoring Committees and Sub Divisional Level Monitoring Committees had started conducted meetings since the month of January 2025 itself.
- b) SOP for no crop burning incidents notified and being adhered to.
- c) Notices, show-cause notices, suspension orders, termination and filing of prosecutions u/s 14 of Commission for Air Quality Management and Adjoining Areas Act, 2021 against the Nodal and Supervisory Officers.
- d) DCs along with SSPs are themselves are monitoring the situation at ground level
- e) Notification for Constitution of Parali Protection Force (PPF) issued.
- f) Micro management of stubble at village level.
- g) Hotspot identification has already been done and the data provided to all DCs
- h) Each District prepared its separate Hotspot Action Plans.
- i) Extra police force has been deployed in hotspot areas to render special assistance.
- j) Regular review meetings are being carried out at CS level with DCs and stakeholder departments.

6.7 The State Government of Punjab also informed the Committee that it is making sincere and concerted efforts to prohibit and control the cause of stubble burning, but faces financial limitations. The paddy is grown on approximately 30 lakh hectares of land in the State of Punjab and it has proposed an incentive of Rs. 2500 per acre to be called as Crop Residue Management Incentive Payment (CRMIP), which will encourage the farmers to not burn the paddy stubble. The State Government of Punjab has proposed that this amount may be shared as follows:-

- a) Rs. 500/- per acre by Punjab Government
- b) Rs. 500/- per acre by Delhi Government
- c) Rs. 1500/- per acre Government of India

6.8 This plan would cost a total of Rs. 1925 crores and the proposed share of Punjab, Delhi and Government of India works out to be Rs. 375 crores, Rs. 375 crores and Rs. 1175 crores respectively.

6.9 The State Government of Punjab further informed the Committee that it has written letters to the Central Government in this regard wherein it had been proposed that the Government of India, Punjab and Delhi Governments should together help the farmers to meet the additional expenses of incorporating the stubble in soil or manage it without burning. However, the proposal of the State of Punjab was not accepted by the Ministry of Agriculture and Farmers Welfare, Government of India. In response, the Union Ministry of Agriculture and Farmers Welfare submitted that the Centre operates a Crop Residue Management Scheme under which financial assistance to the tune of 1700 crore has already been provided to the State of Punjab and the state has been advised to utilize a portion of these funds towards paddy straw management. Further offering cash incentives to farmers for not burning stubble could, in fact, encourage farmers in other states to start burning stubble in order to receive similar benefits.

6.10 The Committee enquired with the State Government of Punjab regarding contribution of the Punjab Preservation of Subsoil Water Act (PPSW), 2009 in

compressed harvest cycles and stubble burning and what amendments to the PPSW Act could align water conservation with feasible stubble management. The State Government of Punjab informed the Committee that the Punjab Preservation of Subsoil Water Act, 2009 prohibits paddy transplantation before a notified date to coincide with the monsoon season. This reduces groundwater extraction during the peak summer, which was a major cause of ground water depletion. The delayed planting naturally pushes back the harvesting of the paddy crop to late October and early November. Farmers have a short window between harvesting the paddy and preparing the fields for the next winter (Rabi) crop, typically wheat. The rapid harvest-to-sowing cycle makes residue burning the cheapest and fastest method for field preparation. It coincides with poor atmospheric conditions that trap the smoke and pollution, affecting the air quality. The Government of Punjab has issued a notification specifying the sowing schedule for paddy in the State. The notification details the sowing periods for Direct Seeded Rice (DSR) and traditional paddy cultivation across different districts of Punjab aimed at optimizing water resources using Canal Water and addressing environmental concerns such as stubble burning and air quality management. As per this notification, sowing of paddy has been proposed to be done in staggered manner (3 phases) and sowing in whole of Punjab is not done in one go. In the 1st phase sowing is done in western districts of Punjab like Sri Muktsar Sahib, Fazilka, Faridkot, Ferozpur and Bathinda where there is good network of canals. In the 2nd Phase, sowing is done in northern Punjab especially Kandi belt of Ropar, Hoshiarpur, Pathankot, Gurdaspur, SBS Nagar districts etc. In the 3rd phase sowing is done in Central Punjab districts such as Ludhiana, Jalandhar, Sangrur, Moga etc. It is expected that due to staggered sowing, varieties mature at different times and produces would come in mandis at different times and it would ease the marketing and management of produce. In addition, farmers would get enough window/time to prepare their land for subsequent crop and instead of adopting the shortcut of burning will be motivated to manage the stubble more effectively. This Act provides prohibition of sowing nursery of paddy and transplanting paddy before the dates notified by the State Government by notification in the Official Gazette for any local area. Hence at present, no amendment is required in the said Act.

Steps taken by State Government of Haryana

6.11 The Committee had also sought details from the State Government of Haryana about the steps taken by them in this regard. In response, the Committee was informed that Paddy straw burning is currently practiced on a large scale in Haryana to clear the fields for the sowing of rabi crops, that is, rainy wheat and potato, because the time window available between the harvesting of paddy crop (September 20 – November 15, depending upon the varieties of paddy) and the sowing of the next crop is very short (two–three weeks). Burning of paddy straw is most common in combined harvested fields because it leaves harvested paddy straw and standing stubble (25–30 cm height) in the field. Paddy straw is seldom used as fodder due to its high silica content.

6.12 The State Government of Haryana informed the Committee that it has taken many State specific initiatives apart from the various directions issued from the Hon'ble Supreme Court of India, National Green Tribunal and CAQM. It informed that there is significant decrease in the active fire location identified in the State over the past years and there is significant reduction in crop burning incidences. The some of the important steps taken by it are as under:-

- a) Issued a Notification prohibiting the burning of left over straw across the entire State.
- b) Constituted a State Level Committee under the Chairmanship of Additional Chief Secretary (ACS) Agriculture Department, to implement and review the orders of NGT for prevention of stubble burning in the State.
- c) Constituted the District Level Committees under the chairmanship of the Deputy Commissioner for implementation of orders of NGT in controlling the air pollution in NCR Districts.
- d) Haryana State Pollution Control Board (HSPCB) has issued directions regarding mandatory use of Super Straw Management System with Combine Harvesters for harvesting paddy in the State.
- e) HSPCB has issued directions to all the Deputy Commissioners, Superintendent of Police, Deputy Director Agriculture Department for initiating penal action as per section 15 of Environment Protection Act,

1986, where FIRs are lodged against the violating farmers for stubble burning in their farms.

- f) During the year 2024, additional 9844 subsidized Crop Residue Management (CRM) machineries were allotted to farmers and since 2018, total 100882 subsidized CRM machineries have been allotted to the farmers/CHCs till date.
- g) Financial Incentive @ Rs. 1000/- per acre for in-situ/ex-situ management of paddy crop residue, incentive @ Rs. 7000/- per acre for diversification of paddy area with alternative crops under Mera Pani Meri Virasat scheme, Incentive @ Rs. 4000/- per acre for adoption of direct sowing of rice is being provided to farmers. Another incentive of Rs. 1,00,000/- and Rs. 50,000/- is being given to the panchayats which perform and switch from red zone (having farm fires more than 5 in the previous year) and yellow zone (having farm fires from 2 to 5 in the previous year) to green zone (having farm fires 0 or maximum 1), respectively. In 2025-26, the State has further increased the incentives @ Rs. 1200/- from Rs. 1000/-per acre for in-situ/ex-situ management of paddy crop residue, incentive @ Rs. 8000/- from Rs. 7000/- per acre for diversification of paddy area with alternative crops under Mera Pani Meri Virasat scheme, Incentive @ Rs. 4500/- from Rs. 4000/- per acre for adoption of direct sowing of rice is being provided to farmers
- h) For diversified use of paddy to avoid stubble burning, 6 Biomass based power plants and 23 Briquetting/pelletization plants are currently working in the State.

6.13 To address crop residue burning, the Ministry of New and Renewable Energy (MNRE) launched the National Bioenergy Programme, on November 2, 2022. This program is structured to run from the fiscal year 2021-22 to 2025-26 and is planned in two phases. The first phase has been approved with a significant budget of Rs. 858 crore. The program is strategically divided into two key sub-schemes to tackle different aspects of waste-to-energy conversion:

1. Waste to Energy Programme: This sub-scheme is focused on generating energy from various waste streams. It provides support for establishing large-scale projects, including:

- Biogas and Bio-CNG plants: They produce combustible gas for heating or vehicle fuel.
- Power plants: These generate electricity using urban, industrial, and agricultural wastes or residues. It is important to note that this specifically excludes projects that convert Municipal Solid Waste (MSW) to power.

2. Biomass Programme: This sub-scheme has a dual focus:

- Manufacturing Support: It aids in setting up facilities to produce briquettes and pellets, which are compacted forms of biomass that can be used as a cleaner fuel in industrial boilers and power plants.
- Cogeneration Promotion: It encourages the use of biomass (other than bagasse from sugarcane) in industries for combined heat and power (cogeneration) projects.

6.14 Aligning with this national framework, the State had proactively established its own "Haryana Bio-Energy Policy" in 2018 through its New and Renewable Energy Department (HAREDA). The State is actively executing this policy and regularly monitoring its progress to ensure the development of bioenergy projects within the state.

6.15 The State Government of Haryana informed the Committee that as a result of these measures taken by it, in the year 2021, total 6987 Active Fire Locations (AFLs) were reported by the Haryana Space Application Centre (HARSAC), which reduced to 2303 AFLs in 2023, which tantamount to 67% reduction in AFLs in the State in comparison to AFLs reported by HARSAC in 2021. In the last paddy season, till 30th November, 2024, total 1828 AFLs were reported by HARSAC. All the AFLs reported by the HARSAC have been physically inspected by the field officers for verification, challaning, lodging FIRs and taking other punitive actions. As per report submitted by the field officers, out of 1406 AFLs, significant number i.e. 566 were not found at site during verification and only 840 AFLs were actually found at the site this year.

6.16 The Committee also obtained the views of Ministry of Agriculture and Farmer's Welfare on the subject and the Ministry informed the Committee that in order to support the efforts of the concerned State Governments to address air

pollution and to subsidize machinery for management of crop residue, a Scheme on Crop Residue Management in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi' was introduced in 2018-19. The scheme focuses on management of crop residue through various in-situ and ex-situ management options. The Scheme was 100% centrally funded with effect from 2018-19 to 2022-23. On the recommendations of Expenditure Finance Committee (EFC), the scheme has been merged with Sub-Mission on Agricultural Mechanization (SMAM) with effect from 2023-24 and is being implemented under the Umbrella of Rashtriya Krishi Vikas Yojana (RKVY) as Centrally Sponsored Scheme with funds sharing between Centre and State in 60 (Centre):40(State) ratio. The measure taken by the Ministry as under:-

In-situ Management

- The Scheme promotes the usage of machines such as Super Straw Management Systems, Happy Seeder, Super Seeder, Smart Seeder, Surface Seeder, Zero till seed cum fertilizer drill, Mulcher, Paddy Straw Chopper, Hydraulically Reversible Mould Board plough, Crop reapers and Reaper binders for in-situ management of crop residue.
- Under the scheme, financial assistance @ 80% of the project cost for the projects costing up to Rs. 30 lakhs is provided for establishment of Custom Hiring Centres (CHCs) of crop residue management machinery by Rural Entrepreneurs, Cooperative Societies of Farmers, Farmer Producer Organizations (FPOs) and Panchayats to make available machines and equipments on rental basis.
- Financial assistance @ 50% of the cost of machinery is provided to farmers for procurement of crop residue management machinery on individual ownership basis.

Ex-situ Management:

- Subsidy for balers @ 50% of the cost for individual farmers and @ 80% under CHCs is provided.
- With a view to enable efficient ex-situ management of paddy straw, provisions have been made with effect from 2023-24 to establish techno-commercial projects for paddy straw supply chain with a flexibility in

financial contribution of beneficiary/ aggregator (Farmers, Rural entrepreneurs, Cooperative Societies of farmers, Farmers Producer Organizations (FPOs) and Panchayats) and Industries utilizing the paddy straw. The Government provides financial assistance @ 65% on the capital cost of machinery costing up to Rs. 1.50 crores. Minimum 10% of the project cost has to be contributed by the beneficiary/aggregator. The intervention aims at establishing a robust supply chain of paddy straw for various end user industries in biomass power generation and biofuel sectors.

Information Education and Communication (IEC) Activities:

6.17 Under the scheme, the funds are also provided to the State Governments and Krishi Vigyan Kendras (KVKs) of ICAR for undertaking Information, Education and Communication (IEC) activities on a massive scale for creating awareness among farmers which include Print and electronic media advertisements, awards to the Gram Panchayats for zero burning, awareness programmes/Kisan Melas, columns/articles, TV programmes and panel discussions, hoardings, posters and banners at prominent locations, Publicity materials distribution - leaflets & pamphlets, Radio Jingles, TV Scrolls & films on television channels, training of farmers & demonstration of technologies at farmers' fields, mobilization of school students etc.

Use of Bio-decomposer

6.18 The Indian Council of Agricultural Research (ICAR) has developed Pusa Decomposer, a microbial consortium of fungal species (in liquid, capsule and powder forms) for rapid decomposition of paddy straw. Use of this consortium accelerates process of paddy straw decomposition in the field itself in 20-25 days. Provisions have been made under Crop Residue Management Scheme for conducting large-scale demonstration of bio-decomposer technologies on the farmers' fields by State Governments, Krishi Vigyan Kendras (KVKs) and institutions under Indian Council of Agricultural Research (ICAR) by engaging service providers/custom hiring centres, having adequate resources.

6.19 The details of funds released by the Ministry from 2018-19 to 2024-25 are as under:-

State/Agency	Fund released from 2018-19 to 2024-25 (Rs. in crore)	Percentage of total fund
Punjab	1756.45	47.14%
Haryana	1081.71	29.03%
UP	788.67	21.17%
Madhya Pradesh	-	-
NCT of Delhi	6.05	0.16%
ICAR and Others	93.28	2.50%
Total	3726.16	-

6.20 The details of machines supplied by the Ministry from 2018-19 to 2024-25 are as under:-

State	Number of Machines	Percentage	No. of Custom Hiring Centres Established	Percentage
Punjab	149203	45.92%	26116	61.76%
Haryana	100882	31.05%	6775	16.02%
Uttar Pradesh	74548	22.95%	9392	22.21%
Delhi	247	0.07%	0	0
Total	324880		42283	

6.21 Thus, it can be seen from the above table that of the total machines supplied, maximum number of machines (45.67% of total machines) has been supplied in the State of Punjab and maximum number of Custom Hiring Centres (61.75% of the total) has been established in Punjab.

6.22 The Ministry supplied the following information with respect to reduction in incidents of paddy stubble burning:-

State	Incidences of Paddy Stubble Burning in the States (Numbers)							
	2017	2018	2019	2020	2021	2022	2023	2024
Punjab	67079	59664	50735	83002	71304	49922	36650	10909
Haryana	13085	9227	6364	4202	6987	3661	2296	1406
UP whole (UP NCR)	8784 (492)	6623 (208)	4230 (204)	4631 (407)	4242 (252)	3017 (198)	3985 (212)	6142 (414)
Total	88948	75514	61329	91835	82533	56600	42931	18457

6.23 Thus, as per the data furnished in the above table, reduction in paddy stubble burning incidence in 2024 can be summarized as follows:-

- 79.2% Reduction in comparison to 2017
- 75.6 % reduction in comparison to 2018
- 67.4% Reduction in comparison to 2022
- 57.0% Reduction in comparison to 2023

6.24 The details of funds allocated and released by the Ministry in 2025-26 are as under:-

State	Allocation of Funds for 2025-26 (Rs. in crores)	Fund released in 2025-26 (as on 15.09.2025) (Rs. in crores)
Punjab	300.00	150.00
Haryana	150.00	75.00
UP	100.00	50.00
Madhya Pradesh	50.00	25.00
Total	600.00	300.00

6.25 The Ministry informed the Committee that to monitor the progress and for time bound implementation of the various schemes for management of paddy straw

in a convergent and synergistic manner, it has constituted an Inter-Ministerial Committee (IMC). The terms of reference of the IMC are as under:

- The IMC may hold regular meetings with State Governments in Delhi and may also visit states for effective monitoring and timely resolution of any issues.
- The IMC may study various schemes of Departments/Ministries that may support ex-situ utilization of paddy straw.
- IMC may suggest convergence mechanism and modification in guidelines if any required for different schemes/initiatives of Ministries/Departments to address the problem of paddy stubble burning in a holistic manner.

6.26 So far IMC had met 17 times regularly. The 1st meeting of IMC was convened on 13.12.2023 and the latest meeting was held on 01.09.2025. Apart from the above, the 4 meetings at the level of Secretaries were convened since March, 2024 to September, 2024 to review the progress of the Crop Residue Management scheme for effective management of the paddy straw. An Inter-Ministerial Minister level meeting to address the issues of Management of Crop Residue Burning was convened on 26.10.2024 under the Co-chairmanship of Union Minister of Agriculture & Farmers Welfare and Union Minister of Environment, Forest and Climate Change. Monitoring of the Crop residue management scheme at the level of Joint Secretary (M&T) is being done regularly.

6.27 Further, the review meetings with the States are being convened regularly with reference to the following points to achieve zero stubble burning in the States.

- States to complete supply of machines by August 2025
- States to approve paddy straw supply chain projects so that machines and equipment can be procured by September
- States to ensure effective utilization of machines
- ICAR and States to initiate and further intensify IEC during October and November

6.28 The Committee observes that the transboundary nature of air pollution necessitates a seamlessly coordinated response that transcends individual

State jurisdictions. The current fragmented approach, with disparities in enforcement, incentives, and procurement policies, leads to inefficiencies and inter-State and Centre-State disputes, undermining the collective effort. Therefore, the Committee recommends the immediate formulation and implementation of a binding Joint Union and Inter-State Action Plan under the aegis of the Commission for Air Quality Management (CAQM).

6.29 The Committee further recommends that the CAQM should be empowered to constitute a Committee on Crop Residue Management comprising the Chief Secretaries of Punjab, Haryana, Uttar Pradesh, Rajasthan, and the GNCT of Delhi, along with senior officials from the relevant Union Ministries (Agriculture, Environment, Power, Renewable Energy). This Committee should meet quarterly, with mandatory meetings in August and September to finalize preparedness, to ensure continuous dialogue and decision-making. The Committee also recommends that the Joint Action Plan must mandate the harmonization of critical policies across the NCR and adjoining areas. This includes:

- a) **Standardized Ban on Varieties:** A uniform and strictly enforced ban on the cultivation of long-duration, high-residue paddy varieties like PUSA-44 across all the States.
- b) **Common Enforcement Protocols:** Aligned penalties for stubble burning, standardized procedures for revenue record entries (e.g., 'red entries'), and joint patrolling protocols in border districts.
- c) **Unified Incentive Structures:** While States may have additional incentives, a base-level, uniform financial incentive for in-situ management and crop diversification should be established across the

region to prevent a "race to the bottom" and ensure a level playing field for farmers.

- d) **Integrated Resource Pooling and Machinery Sharing: A Regional CRM Machinery Pool should be created. This digital platform would allow for the real-time tracking and cross-border movement of CRM machines from Custom Hiring Centres (CHCs) during peak demand periods, optimizing resource utilization and addressing local shortages efficiently.**
- e) **Collaborative Ex-Situ Infrastructure and Supply Chains: The Joint Plan should facilitate the development of regional clusters for ex-situ utilization. For instance, States with surplus paddy straw (Punjab, Haryana) should enter into formal agreements with States hosting biomass-based power plants or CBG units (e.g., in Uttar Pradesh or Rajasthan) for a guaranteed supply of bales.**
- f) **Joint Fiscal Responsibility and Funding: For pan-region initiatives, such as the proposed Crop Residue Management Incentive Payment (CRMIP), the Joint Action Plan must clearly delineate the share of financial responsibility between the Central Government and the participating States/UTs. This will prevent delays and ensure that critical financial support to farmers is not held hostage to inter-Governmental fiscal disputes.**
- g) **Data Sharing and Unified Communication: A common, publicly accessible platform for sharing real-time data on fire incidents (from all satellites), air quality parameters, and enforcement actions should be established. Furthermore, a unified IEC (Information, Education, and**

Communication) campaign with consistent messaging should be launched across all States to maintain the uniformity of the campaign.

h) Dispute Resolution Mechanism: The Committee should be vested with the authority to swiftly adjudicate any inter-State disputes that may arise concerning the implementation of the Joint Action Plan, ensuring that administrative bottlenecks do not derail the collective mission.

6.30 The Committee observes that there exists a critical mismatch between the supply of Crop Residue Management (CRM) machines and the peak demand during the short harvesting window. Operational inefficiencies, logistical bottlenecks in the allocation of machines from common pools, and the prohibitive operational costs for small and marginal farmers indicate that mere numerical availability of machinery is insufficient. Therefore, the Committee recommends that the Ministry of Agriculture and Farmers Welfare, in conjunction with State Governments, should undertake a district-wise audit of CRM machinery, focusing not just on quantity but on operational readiness and logistical deployment plans. The States should enhance the efficiency of Custom Hiring Centres (CHCs), particularly through Farmer Producer Organizations (FPOs) and Panchayats, by ensuring real-time tracking of machinery and transparent, time-bound allocation, especially to small and marginal farmers. Furthermore, the operational subsidy for hiring machines should be re-examined to make it more accessible to the most vulnerable farmers.

6.31 The Committee also observes that while the ex-situ ecosystem is developing, with promising offtake by industrial boilers, biomass power plants, and Compressed Biogas (CBG) units, the supply chain for paddy straw remains nascent

and inefficient. The farmers often receive little to no monetary benefit from the sale of straw due to poor market linkages, inadequate baler capacity, and a lack of storage and transportation infrastructure, thereby negating the financial incentive to forgo burning.

6.32 Accordingly, the Committee recommends that the Ministry of Agriculture and Farmers Welfare should support the development of paddy straw supply chain infrastructure. This includes providing targeted capital subsidies for balers, rakes, storage facilities, and transportation networks to entrepreneurs, cooperatives, and FPOs. State Governments should act as facilitators to ensure fair price discovery and formal agreements between biomass aggregators and end-use industries, thereby ensuring that a fair share of the economic value reaches the farmers.

6.33 The Committee also recognises that the core of the issue lies in the agricultural cropping pattern itself. The continued dominance of water-intensive non-basmati paddy, particularly the now-banned long-duration varieties like PUSA-44, in the region's kharif season is the fundamental driver of the enormous volume of stubble generated. While initiatives for crop diversification exist, their scale remains insufficient to alter the landscape significantly. The Committee observes that the existing Minimum Support Price (MSP) and procurement regime, heavily centered on paddy and wheat, is a primary structural driver dissuading farmers from transitioning to less water-intensive and low-residue crops. The assurance of Government purchase for paddy creates an insurmountable economic disincentive for diversification. To fundamentally alter this calculus, a strategic reorientation of MSP policy is imperative.

6.34 The Committee, therefore, recommends that the Ministry of Agriculture and Farmers' Welfare, in coordination with the Food Corporation of India (FCI) and State Governments, must move beyond merely announcing MSPs for crops like millets, pulses, and oilseeds. It is essential to institute a time-bound, systematic, and guaranteed procurement

system for these diversified crops at their declared MSP. This would involve pre-declaring procurement targets for millets and other alternative crops in diversification zones, ensuring adequate procurement infrastructure is in place, and integrating these crops into the Public Distribution System (PDS) and other Government schemes (e.g., Mid-Day Meal, Integrated Child Development Services) to create immediate and reliable demand.

6.35 The Committee further recommends that the Commission for Agricultural Costs and Prices (CACP) should explicitly incorporate "environmental externalities" into its MSP calculation formula. Crops that confer positive environmental benefits, such as millets which require significantly less water, improve soil health, and generate minimal residue—should be accorded a premium MSP to reflect their value in water conservation, air quality improvement, and sustainable land management. This would make them financially more attractive than water-guzzling paddy on a per-hectare basis. The implementation of MSP must be coupled with robust investment in the post-harvest value chain for millets and other alternative crops. This includes grants for establishing processing units, branding and marketing support for regional specialties and initiatives to develop a robust export market.

6.36 The Committee also recommends that one or two districts in Punjab and Haryana should be identified and developed as "Sustainable Agricultural Transformation Zones" as a pilot project. In these zones, a bundled incentive package should be offered, comprising: (i) the premium MSP for millets/pulses, (ii) the existing crop residue management incentive, and (iii) an additional direct benefit transfer for water saved, measured against a paddy

cultivation baseline. This integrated approach would provide a powerful and multifaceted economic signal for change.

6.37 The Committee has also taken cognizance of the media reports indicating that a segment of farmers are resorting to tactical evasion, such as small-scale or night-time burning, to circumvent detection by satellites. The Committee is concerned that satellite-based monitoring, while pivotal, can be vulnerable to deliberate evasion through practices like small, scattered fires or burning during nocturnal hours. To counter this, a multi-layered surveillance and enforcement strategy is imperative. The Committee, therefore, recommends that Indian Space Research Organisation (ISRO) should launch a dedicated high resolution satellite capable of 24*7 monitoring of farm fires even during night. Further, ISRO should develop a space application mapped with digital farm land records, which could send real time alerts to the concerned authorities. The Committee also recommends that The "Parali Protection Force" or equivalent bodies should not only patrol but also develop local intelligence networks. A confidential grievance or reporting mechanism, possibly with appropriate incentives for verified information, should be established to encourage community self-policing, making it difficult for evasion tactics to succeed. Further, the practice of micro-management at the village level must be intensified. Nodal Officers should be held directly accountable for any fire incidents within their designated jurisdiction, irrespective of satellite detection, with their performance evaluations linked to on-ground outcomes.

6.38 The Committee acknowledges the decision of the State of Punjab to ban the long-duration paddy variety PUSA-44, a significant step given its high yield but equally high residue generation. However, a mere ban is insufficient

without robust follow-through. The Ministry of Agriculture and Farmers Welfare should impress upon the concerned State Governments to strengthen their seed supply chain monitoring to ensure compliance with the ban and prevent the emergence of a black market for PUSA-44 seeds. Enforcement actions against unauthorized sale and distribution of banned seeds must be taken. The Committee also recommends that Ministry of Agriculture and Farmers' Welfare should conduct a thorough review of all such varieties of seeds prevalent in the market and ban their use country-wide under The Seeds Act, 1966.

6.39 The Committee recognizes the seminal role of the Punjab Preservation of Sub-Soil Water Act, 2009, in combating the critical issue of groundwater depletion by legally mandating delayed paddy transplantation. However, the Committee also finds that this well-intentioned legislation has had the significant, albeit unintended, consequence of exacerbating the stubble burning crisis. By compressing the window between the harvesting of paddy and the sowing of wheat to just 20-25 days, the Act creates a time-bound compulsion for farmers to clear their fields through the quickest and cheapest method available i.e. burning. The Committee feels that the Act has done more harm than good. The Committee observes that the recent notification by State Government of Punjab for staggered sowing across three phases is a commendable and necessary policy intervention. By scheduling sowing based on canal water availability—starting with the well-irrigated western districts, followed by the northern Kandi belt, and finally the central districts—it aims to distribute harvest times, ease market congestion, and extend the field preparation window for individual farmers. The Committee recommends that this approach should be rigorously enhanced and enforced. Nevertheless, the

Committee also feels that staggering sowing alone is insufficient and long-term sustainability necessitates a gradual shift in cropping patterns. The Committee recommends that the State Government of Punjab must encourage diversification away from water-intensive paddy in over-exploited zones through assured procurement and attractive compensation packages for alternative crops like maize, pulses, and oilseeds.

CHAPTER – 7

CURBING THE INDUSTRIAL POLLUTION

7.1 Industrial pollution is a critical and persistent contributor to the severe air and environmental crisis in Delhi NCR. While vehicle emissions and seasonal dust often dominate headlines, the region's dense concentration of industries forms a constant and significant source of contamination. Situated in satellite cities like Ghaziabad, Faridabad, Noida, and Gurugram, these industries—ranging from large-scale manufacturing to countless unregulated small-scale units—release a hazardous mix of pollutants. This includes particulate matter (PM_{2.5} and PM₁₀), toxic heavy metals, and harmful gases from the burning of fossil fuels and waste.

7.2 A major aggravating factor is the widespread use of illegal fuels, such as petroleum coke and low-grade industrial waste, which are highly polluting. Furthermore, the improper disposal of industrial wastewater and chemical waste contaminates soil and groundwater, posing a long-term health risk. Despite regulatory efforts, the challenge of enforcement on thousands of small units, coupled with the trans-boundary nature of the pollution, makes industrial pollution a complex and formidable obstacle to achieving clean air and a healthy environment in the capital region.

7.3 The Committee in its meeting held on 4th December, 2024 sought details of the measures taken by the Ministry of Environment, Forest and Climate Change and Central Pollution Control Board (CPCB) to regulate and control the industrial pollution. The Ministry informed the Committee that the Ministry and CPCB have taken following measures in this regard:-

Action Plan for Controlling emissions from DG sets

- CPCB has come out with System and Procedure for Emission Compliance Testing of Retro-fit Emission Control Devices (RECD) for Diesel Power Generating Set Engines up to Gross Mechanical Power of 800 kW.
- Four Certification Agencies identified for testing and certification of RECD: (a) Automotive Research Association of India (ARAI, Pune), (b) International Centre for Automotive Testing (ICAT, Manesar), (c) Indian

Institute of Petroleum (IIP, Dehradun) and (d) Vehicle Research Development Establishment (VRDE, Ahmednagar)

- Applications received from manufacturers for RECD certification, and 9 certified for RECD systems for DG sets of 40.8-799 kW capacity.
- RECDs/dual fuel kits are mandated for DG sets of 19-799 kW capacity, as per CAQM directions.
- For DG sets having capacity more than 800kw, adoption of emission control mechanism has been mandated subject to compliance of emission standards prescribed by CAQM.

Switch over of Industries to Cleaner Fuel

7.4 A new approved fuel list is in force in Delhi NCR with effect from 01.01.2023, mandating that industries operate exclusively on PNG or biomass. While some industries are permitted to use other fuels for specific technical or process-related reasons, the vast majority have complied. Out of 7,759 fuel-based industries, 7,449 have successfully transitioned to the approved fuels, and the remaining 310 are in the process of being closed.

7.5 Furthermore, the CPCB has mandated that all brick kilns in Delhi NCR adopt zig-zag technology, which reduces emissions and fuel consumption through more efficient combustion. Of the 4,608 kilns in the region, 3,003 have already been converted, with the remainder (1,605) prohibited from operating until they comply. The conversions are distributed as follows: 1,762 in Haryana, 1,024 in Uttar Pradesh, and 217 in Rajasthan.

7.6 The Committee enquired with the Government of NCT of Delhi, the measures taken to control air pollution caused due to industries. It informed through a Background Note dated 25.07.2025 submitted to the Committee that it has taken following measures in this regard:

7.7 Shifting of industries to PNG/Approved fuels: 1,925 out of 1,975 industries have transitioned to Piped Natural Gas (PNG) in compliance with CAQM

Directions 64 and 65 concerning approved fuels. The remaining 50 industries, which are currently using the approved fuel LPG, are now in the process of converting to PNG. Regular inspections are conducted to ensure full compliance.

7.8 Shifting of DG sets to ECD/Dual fuels: In accordance with CAQM Direction 76, the use of old diesel generator (DG) sets is now prohibited. To comply, owners must either replace them with new compliant models or install an approved Emission Control Device (ECD).

7.9 The Committee sought inputs of the State Government of Haryana on this issue. It furnished the following information through its Background Note submitted to the Committee:-

7.10 On the basis of pollution index, the industries in the State have been categorized in red, orange, green and white category, wherein red is most polluting and white are least polluting industries. The red, orange and green industries are mandatorily need to take the consent to establish and consent to operate from Haryana State Pollution Control Board, whereas white category industries are exempted from taking such permissions. As per the record of Haryana State Pollution Control Board in the State, 1414 of Red category, 5188 of Orange category and 390 of Green category of industries are operational.

7.11 The State Government has issued following orders for reducing emissions from the industries-

- HSPCB has directed all the Red Category (Large and Medium) Air Emitting industries, established in NCR Districts of Haryana to install Online Continuous Emission Monitoring Device (OCEMD). Around 400 Red Category Air Emitting units have installed OCEMS.
- Haryana has banned New Pyrolysis units since July, 2018 and old units are operating as per SOP issued by CPCB.
- As per the CAQM direction no. 65, State has notified the list of approved fuels for NCR vide dated 22.07.2022 / 20.04.2023. 100% industries in NCR (Haryana) are operating on approved fuels since 2023. Strict vigil is exercised against the use of unapproved fuel and closure actions are being taken against the violators.

- Haryana has shortened the period of inspection of industries at higher frequencies to control the pollutant emissions: Highly polluting 17 industries are inspected every three months, Red category industries are inspected every six months. Orange and Green category industries are inspected every 1 and 2 years respectively.
- CAQM regularly constitutes teams for surprise inspections of industries and on the directions of the CAQM closure action taken against the defaulting units and they are being prosecuted under CAQM Act.
- As per CAQM direction no. 76, operations of DG sets across all sectors in NCR including Industrial, commercial, Residential and office establishments is being regulated. DG sets in the capacity range of 19 KW to less than 41 KW to be operated on Dual fuel mode or with Retrofitted Emission Control Devices (RECD) and DG sets in the capacity range of 41 KW to less than 800 KW to be operated on Dual fuel mode or with Retrofitted Emission Control Devices (RECD).
- Source Apportionment and Emission Inventory Study of the level and source of pollution in selected cities of Haryana i.e. Gurugram, Panipat and Sonipat has been finalized. HSPCB has engaged The Automotive Research Association of India for conducting source apportionment study in Gurugram, Sonipat and Panipat and draft report has been submitted by The ARAI.
- The City action plan for the 12 numbers NCR cities has been formulated and under this plan the funding will be received from Central Pollution Control (CPCB) as a gap funding for the various programmes to mitigate the air pollution. Rs. 26 Cr. has already been received for the five number cities.
- As per CAQM direction no. 72, all the coal based Thermal Power plants situated in the State including co-generating Captive Thermal Power Plants are in the process of achieving the target of at least 5% co-firing of biomass pellets. As on date the thermal power plants are close to 4% of achievement of such biomass co-firing.
- As per NGT directions, coal has already been banned in the Brick Kilns situated in the NCR and such brick kilns are allowed to use the biomass.
- Recently, as per CAQM direction no. 92, Haryana has mandated use of biomass pellets/briquettes in all brick kilns located in the districts beyond NCR

aiming for 50% co-firing of paddy straw based pellets/briquettes with a target of at least 20% with effect from 01.11.2025, 30% with effect from 01.11.2026, 40% with effect from 01.11.2027 and 50% with effect from 01.11.2028.

7.12 The Committee noted that CSE's Report on air pollution in Delhi NCR mentions that Delhi has a number of industrial estates spread over an area of 4,647 acres. Currently the infrastructure and institutional setup is created and redeveloped through redevelopment of conforming and non-conforming industrial areas through Delhi State Industrial & Infrastructure Development Corporation Limited (DSIIDC) & Delhi Development Authority (DDA) in some of the industrial areas across the City. There are 29 planned industrial areas and four flatted factory complexes and the State Government of NCT of Delhi has notified 25 non-conforming areas for redevelopment. As on December 31, 2022, there were total 393,877 MSMEs registered in Delhi. This includes 365,849 micro enterprises, 25,091 small and 2,937 medium enterprises.

7.13 There are no major industries in Delhi and the large-scale establishments not meeting the various environmental norms by the Central Pollution Control Board and Delhi Pollution Control Committee are either closed or shifted out of Delhi to other neighbouring States. However, there are about a lakh of small unorganized units and large numbers of small-scale units, including plastic recycling units, which are not in the listed legal industrial estates but in unauthorized areas and peripheral areas that are challenging to monitor. Strategic interventions are needed to address these units.

7.14 One big thrust of the judicial and executive action in Delhi so far has been to push for clean fuels in the industrial sector. Several measures have been taken in this direction, the driver being the issuance of the approved fuel list.

7.15 The regulation of permissible fuels in Delhi and the National Capital Region (NCR) has undergone significant changes since the initial notification on August 27, 1996. On August 27, 1996, the Delhi Pollution Control Committee (DPCC) issued a notification under the Air (Prevention and Control of Pollution) Act, 1981, specifying a list of approved fuels for the National Capital Territory (NCT) of

Delhi. The approved fuels included coal with low sulphur content (less than 0.4 per cent), fuel oil, Light Diesel Oil (LDO), Low Sulphur Heavy Stock (LSHS) with sulphur content not exceeding 18,000 Parts Per Million (PPM), motor gasoline (petrol), diesel, Liquefied Petroleum Gas (LPG), Compressed Natural Gas (CNG), kerosene, naphtha (for power generation), aviation turbine fuel, firewood (restricted to domestic use in rural areas and crematoriums) and biogas. This list had originally aimed to control air pollution by limiting the use of high-sulphur fuels.

7.16 The Supreme Court directive of October 2017 to prohibit the use of furnace oil and pet coke in Delhi, Haryana, Uttar Pradesh and Rajasthan catalyzed the revision of the older approved fuels list to exclude these high-pollution fuels. On June 29, 2018, the government of National Capital Territory of Delhi issued an updated notification amending the original 1996 list.

7.17 The revised list of approved fuels included Bharat Stage VI compliant petrol and diesel with 10 PPM sulphur, LPG, natural gas/CNG, aviation turbine fuel, firewood for crematoriums and other religious purposes, wood charcoal for tandoors and grills in hotels, restaurants, banquet halls, and eateries equipped with emission control systems, biogas, refuse-derived fuel (only for waste-to-energy plants) and any other clean fuels notified by the Government of NCT of Delhi or the Government of India.

7.18 This has virtually banned use of coal, pet coke, furnace oil, and other dirty downstream fuels and recycled fuels like tyre oil. A small concession had to be made for use of charcoal only in tandoors and grills of hotels/restaurants/banquet halls/eating houses as there was strong plea to protect certain kinds of traditional cuisine. But the notification has asked for some kind of emissions control systems.

7.19 This action in Delhi was subsequently extended to include the entire NCR to harmonize the approved fuel list. Accordingly, CAQM issued a standardized approved fuel list in June 2022 for the NCR. This additionally included hydrogen/methane and electricity. By 2023, out of 7,759 fuel-based industries in the NCR, 7,449 had transitioned to approved fuels, with the remaining 310 industries facing closure for non-compliance.

7.20 Currently, coal is banned in entire NCR (except coal with low sulphur in thermal power plants) and use of unapproved fuels can lead to closure along with imposition of heavy Environmental Compensation (EC) with effect from January 1, 2023.

7.21 Around the time when the approved fuel list was revised, in a landmark intervention against industrial pollution, the Supreme Court of India responding to the recommendations of Environment Pollution (Prevention and Control) Authority (EPCA) curbed the use of highly polluting petcoke and furnace oil due to high sulphur content in these fuels – 74,000 PPM in petcoke and 24,000 PPM in furnace oil – both widely used in industries without emissions control systems. The court issued a far-reaching directive on October 24, 2017, banning the use of petcoke and furnace oil as industrial fuels for combustion in Delhi, Haryana, Rajasthan, and Uttar Pradesh. However, exemptions were granted to four specific end-user industries: cement, calcium carbide, lime kilns, and gasification that used petcoke as feedstock.

7.22 The ruling ignited further legal debates, with aluminium producers, calciners, and iron and steel manufacturers petitioning the court for permission to import petcoke. The matter remains under judicial review. Meanwhile, on November 17, 2017, the Supreme Court urged all Indian States to implement similar bans on these high-sulphur fuels.

7.23 The Supreme Court's intervention on use of high sulphur fuels also exposed a significant regulatory gap – most industries in India lacked standards for sulphur oxides (SO_x) and nitrogen oxides (NO_x) emissions. This raised serious concerns about the impact of sulphur-rich fuels on air quality, particularly their contribution to sulphur dioxide (SO_2) emissions and secondary particulate pollution. Recognizing the urgency of the issue, the Supreme Court issued another directive on December 31, 2017, mandating SO_x and NO_x emission standards for 34 industrial sectors nationwide. In response, the Ministry of Environment, Forest and Climate Change introduced the country's first-ever SO_x and NO_x regulations for 16 industrial sectors, marking a significant policy shift towards pollution control.

However, challenges remain in ensuring enforcement, as State Pollution Control Boards (SPCBs) currently face capacity constraints in monitoring compliance with these new standards.

7.24 Since 2018–19, as per the data from the Ministry of Petroleum and Natural Gas, Delhi has reported zero consumption of both furnace oil and petcoke. The consumption of petcoke gradually reduced from 82,000 tonnes in 2014–15 to around 18,000 tonnes in 2017–18 and zero since 2018–19. However, it is unclear if these fuels are discontinued in the unauthorized areas and in the small-scale units.

7.25 Before the approved fuels list, there was stiff competition from alternative fuels prices such as furnace oil/diesel, which had come down drastically due to lower crude prices. This led to a growing competition from alternative fuels in commercial and industrial segments of the city.

7.26 However, the Government's decision to place City Gas Distribution (CGD) companies on the priority list for allocation of low-cost domestic gas for transport and PNG-domestic was a game changer. This gave an advantage to the CGD companies in competition with alternative fuels and also increased the preference for CNG vehicles. Moreover, Delhi Pollution Control Committee (DPCC) has banned all other industrial fuels except PNG and has advised all industrial customers (wherever PNG is available) to switchover to PNG. Indraprastha Gas Limited (IGL), the authorized CGD entity in Delhi has efficiently coordinated to implement the mandate. Correspondingly, the PNG consumption in Delhi's industry sector increased by 14 per cent between 2021–22 and 2023–24, increasing from 43,000 tonnes in 2021–22 to 49,000 tonnes in 2023–24, while in the commercial sector it increased by 67 per cent.

7.27 The additional challenge of pollution from use of captive use of diesel generator sets in the industry sector was addressed by the moving DG set segment to PNG. In 2023, CAQM directed switching over of DG sets to PNG and dual fuel (PNG and diesel) mode in Delhi and NCR. IGL's PNG network is widely available among various Industrial and commercial clusters of Delhi with a focused approach to further expand/strengthen pipeline network by providing last-mile

connectivity to the industrial and commercial establishments in existing areas where pipeline grid is available and expanded pipeline network can cater to other industrial areas. This has also been extended to residential areas. In industrial and commercial segment 2,967 new registrations were completed during the FY 2023–24 and pipeline laying was started in new areas Chandni Chowk and Paharganj in Delhi. IGL is also working in a collaborative and participatory approach with the State Pollution Control Boards, so as to work out an action plan to convert all industrial and commercial units to PNG (wherever IGL's PNG network is available).

7.28 During the last decade significant action has been taken to accelerate energy transition in the industry sector to eliminate dirty fuels, including coal, furnace oil and petcoke. The next steps need to target unregulated industries in non-conforming areas and peripheral areas.

7.29 During its presentation before the Committee on 15th July, 2025, the representative of CSE also raised the issue of bringing the Natural Gas under the purview of GST to make it more economical for industries to use. This suggestion was also backed by the representatives of the Confederation of Indian Industry (CII) present in the same meeting.

7.30 The Confederation of Indian Industry (CII) also made a brief presentation before the Committee on 15th July, 2025. In its presentation, CII suggested following measures to curb industrial pollution:-

- Launch a Dedicated Clean Production Scheme for innovation in air pollution control and shared infrastructure beyond compliance in facilities, cluster-level common infrastructure
- Ensure access to uninterrupted power supply and dedicated financing for upgrading to cleaner technologies.
- Establish a joint Industry-Regulator Steering Panel to harmonize and simplify emission monitoring standards across all NCR states.
- Implement a system of independent third-party audits to verify industrial emission controls, complemented by mandatory industry self-assessment reports.

7.31 The Committee observes that the primary focus of the Government must be on accelerating the transition of industries to cleaner fuels. Therefore, the Committee recommends that the remaining non-compliant industrial units in the NCR must either be made to switch to cleaner fuels or be systematically closed without further delay. The Committee also recommends that to enhance the economic viability of transition of industries to cleaner fuels, Government should actively consider bringing natural gas (including CNG and LPG used in transportation sector) under the Goods and Services Tax (GST) regime, as suggested by industry and research bodies. This would reduce the cost disparity between natural gas and other, dirtier fuels, making compliance more attractive.

7.32 The Committee further recommends a focused Government intervention to curb the use of illegal fuels like pet coke and furnace oil in the unorganized sector. The Committee also feels that enforcement and monitoring capabilities require a substantial upgrade. The challenge of monitoring a vast number of small, unorganized units in non-conforming areas demands a strategic shift from purely punitive measures to a facilitative and technology-driven approach. The Committee recommends that a system of independent third-party audits should be mandated to verify industrial emission controls, complementing the efforts of under-resourced State Pollution Control Boards.

7.33 The Committee further recommends that the expansion of Online Continuous Emission Monitoring Systems (OCEMS) must be expedited beyond the current 400 red category units in Haryana to cover all significant air pollution emitting industries across NCR, with data in real-time to ensure accountability.

7.34 The Committee also recommends that dedicated and accessible financing mechanisms, including soft loans and grants, need to be established to help industries, especially small and medium enterprises, to upgrade their technologies for cleaner environment.

CHAPTER – 8

POLLUTION FROM THERMAL POWER PLANTS

8.1 While stubble burning gets all the limelight in public and media, the air pollution caused due to thermal power plants located in the adjoining States often miss the scrutiny it deserves.

8.2 During its meeting held in Chandigarh on 19th September, 2025, the Committee sought details from the Ministry of Power regarding role played by thermal power plants in the air pollution of Delhi NCR. The Ministry informed the Committee that all Thermal Power Plants (TPPs) are required to comply with the emission norms notified by the Ministry of Environment, Forest and Climate Change and directions issued by the Central Pollution Control Board (CPCB) from time to time. Before 2015, norms for emissions from TPPs other than Particulate Matter were non-existent. Higher chimney height had been mandated by MoEF&CC vide Notification dated 30.08.1990 so that the pollutants can be dispersed over a wide area. Ministry of Environment, Forest and Climate Change vide Notification dated 07.12.2015 has prescribed Stack emission standards (SO₂, NO_x, SPM etc.) for Coal / lignite based TPPs. Further, Ministry of Environment, Forest and Climate Change vide Notification dated 31.03.2021 prescribed for categorization of TPPs into three categories i.e. Category A, B and C along with timelines for compliance of these emission standards. Accordingly, the TPPs were categorized as under:

- (i) **Category -A** (Within 10 km radius of National Capital Region or cities having million plus population);
- (ii) **Category- B** (Within 10 km radius of Critically Polluted Areas or Non-attainment cities);
- (iii) **Category- C** (Other than those included in Category A and B)

8.3 There are a total of 11 Coal based TPPs with 35 Units (13,555 MW) within 300 Km of Delhi NCR i.e. States of: Haryana- 05 TPPs (12 Units), Punjab- 04 TPPs (13 Units) and Uttar Pradesh- 02 TPPs (10 Units), providing critical base load power to Delhi NCR and adjoining regions. Of these 35 units, 14 units (5,350

MW) are in Category-A and remaining 21 Units (8,205 MW) are in Category-C as per Categorization prescribed by MoEF&CC vide Notification dated 31.03.2021.

8.4 The measures taken by these TPPs for emission control include the following:

(i) **Co-firing of Biomass:** These TPPs are mandated to use 5-7% of biomass co-firing with Coal. Further, as per Environment (Utilization of crop residue by TPPs) Rules 2023, Delhi NCR TPPs are mandated to use a minimum 5% biomass blend. CAQM has also prescribed Environmental Compensation for non-compliance.

To institutionalize above transition, Sustainable Agrarian Mission on use of Agro Residue in Thermal Power Plants (SAMARTH) Mission was launched in July 2021. The key developments under the mission include:

(a) Mandatory biomass co-firing targets for all coal-based thermal power plants: 5% from FY 2024-25, increasing to 7% from FY 2025-26, with a focus on stubble-burning-prone regions;

(b) Biomass utilization achievements (as on 31.08.2025): Over 30,99,526 metric tonnes of biomass pellets co-fired across 71 TPPs nationwide. As on 31.08.2025, over 23.37 Lakh metric tonnes of biomass pellets co-fired across 11 TPPs in Delhi-NCR;

(ii) Compliance to Suspended Particulate Matter (SPM), NO_x and SO_x emissions norms:

(a) SPM norms: SPM compliance has been completed in 33 out of 35 units and remaining 2 units (GHTP Lehra Mohabbat, TPP Punjab 2 x 250 MW) are in process of upgradation;

(b) NO_x norms: All 35 units have carried out Combustion Modification/SCR Installation for compliance with NO_x emission norms;

(c) SO₂ norms: For compliance, out of 14 Units under Category-A , 10 Units have installed FGD systems, 1 Unit has installed FGD and currently is in advance stage of commissioning, and remaining 3 Units are in process of achieving compliance.

8.5 The Ministry further informed the Committee that the SO₂ emission standards prescribed in Ministry of Environment, Forest and Climate Change

Notification dated 07.12.2015 have been reviewed by the Central Government taking into consideration the various representations received regarding exemption or relaxation in timelines of these standards due to limited availability of technology providers, its techno-economic feasibility, negative impact of COVID-19 pandemic on supply chain, price escalation due to high demand and low supplies, low SO₂ concentration in ambient air and heavy burden on consumers due to increase in electricity price etc. and studies conducted by various independent research institutes to evaluate the need of universal applicability and enforcement of these standards.

8.6 Keeping above in view, Ministry of Environment, Forest and Climate Change has issued a Notification on 11.07.2025 regarding applicability of SO₂ emission standards for TPPs along with timelines and its details are given below:

(i) TPPs declared to retire before 31.12.2030 shall not be required to meet specified standards for SO₂ emissions in case such plants submit an undertaking to Central Pollution Control Board (CPCB) and Central Electricity Authority (CEA) for exemption on ground of retirement of such plant;

(ii) The existing and under commissioning Category A TPPs shall comply with SO₂ emission standards by 31.12.2027. Other Category A plants to be commissioned after 31.12.2027 will operate only after ensuring compliance of these standards;

(iii) For all Category B Plants or Units, whether existing or upcoming, the applicability of SO₂ emission standards, shall be decided by the Central Government based upon recommendations of the Expert Appraisal Committee in charge of thermal Power Projects as per the procedure laid in the notification dated 11.07.2025;

(iv) The SO₂ emission standards shall not be applicable to all Category-C TPPs subject to compliance of stack height criteria notified by MoEF&CC on 30.08.1990 and the timeline for compliance of stack height criteria is 31.12.2029.

8.7 In view of above, only one TPP (having 03 Units) i.e. Panipat TPP, Haryana under Category –A in Delhi-NCR is yet to install FGD system and timeline for its compliance is up to 31.12.2027.

8.8 The Ministry of Environment, Forest and Climate Change informed the Committee that it has revised the timeline for meeting the emission norms by

Thermal power plants (TPPs) through its Notification dated 11th July, 2025. The Committee was further informed that as per a study conducted by IIT Delhi in May, 2024, sulphate aerosols contribute only 0.96% to 5.25% of PM 2.5 concentrations and 0.57%-3.67% of PM 10 concentration in cities near thermal power plants.

8.9 The TPPs have been categorized into three categories based on their location:

- Category A: Within 10 km radius of National Capital Region or cities having million plus population.
- Category B: Within 10 km radius of Critically Polluted Areas or Non-attainment cities.
- Category C: Other than those included in category A and B

8.10 As per the notification dated 11th July, 2025, the following timelines are applicable for meeting emission norms for TPPs for Category A, B and C:

S. No.	Category	Location/area	Timelines for compliance (Non-retiring units)		Last date for retirement of units for exemption from compliance	
			Parameters other than SO ₂ emissions (PM, NOx and Hg)	SO ₂ emissions	Parameters other than SO ₂ emissions (PM, NOx and Hg)	SO ₂ emissions
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Category A	Within 10 km radius of National Capital Region or cities having million plus population.	Upto 31 st December 2022	Up to 31 st December, 2027	Upto 31 st December 2022	Exempted if TPP is retiring before 31 st December, 2030
2	Category B	Within 10 km radius of Critically Polluted Areas or Non-attainment cities as defined by CPCB	Upto 31 st December 2023	Shall be decided on a case to case basis by the Central Government based upon the recommendations of the Expert Appraisal Committee (EAC) in	Upto 31 st December 2025	Shall be decided on a case to case basis by the Central Government based upon the recommendations of the Expert Appraisal Committee (EAC) in

				charge of TPPs constituted under Environment Impact Assessment notification 2006 based on the appropriate scientific studies		charge of TPPs constituted under Environment Impact Assessment notification 2006 based on the appropriate scientific studies
3	Category C	Other than those included in category A and B	Upto 31 st December 2024	Not applicable subject to meeting the prescribed stack/ chimney height	Upto 31 st December 2025	Not applicable

8.11 There are 11 coal based TPPs located within 300 km radius of Delhi-NCR, comprising of a total of 35 units of total capacity of 13,560 MW. Out of these 11 TPPs, 4 TPPs comprising of 14 units with total installed capacity of 5,350 MW are located within 10 km radius of Delhi-NCR. These 4 TPPs (14 units) come under category A and remaining 7 TPPs come under category C.

List of 4 TPPs within 10 km radius of Delhi NCR

S. No.	Name of Thermal Power Plant	State	Unit No.	Capacity (MW)	Year of Commission
1	Mahatma Gandhi TPS, Apraava Energy Ltd., Jhajjar	Haryana	1	660	2012
			2	660	2012
2	Indira Gandhi STPS, Aravali Power Comp. Pvt. Ltd., Jhajjar	Haryana	1	500	2011
			2	500	2012
			3	500	2013
3	Dadri NCTPS, NTPC, GautamBudhh Nagar	Uttar Pradesh	1	210	1993
			2	210	1994
			3	210	1995
			4	210	1995
			5	490	2010

S. No.	Name of Thermal	State	Unit No.	Capacity	Year of
			6	490	2010
4	Panipat TPS, HPGCL, Panipat	Haryana	6	210	2001
			7	250	2004
			8	250	2005
Total		4 TPPs	14 Units	5350 MW	

8.12 The compliance of meeting SO₂ norms is applicable to TPPs in Category A, i.e. 4 TPPs (14 units). Timeline of 31st December, 2027 has been prescribed for TPPs in Category A for meeting SO₂ norms. In case of TPPs in category C, emission norms for SO₂ are not applicable. Accordingly, 7 TPPs which are part of Category C do not require meeting SO₂ norms, subject to maintaining prescribed stack height.

8.13 It has been informed that out of the 14 units (part of 4 TPPs), 11 units have already installed Flue Gas Desulphurisation (FGD) systems to meet SO₂ norms. Panipat TPS, HPGCL, Panipat has not installed FGD and is required to meet the SO₂ norms by 31st December, 2027.

8.14 CSE informed the Committee that out of the 13 identified thermal power plants, two—Badarpur Thermal Power Station and Rajghat Power Plant—have been decommissioned and currently, 11 thermal power plants, comprising a total of 35 units with an installed capacity of 13,555 MW, fall under the Delhi-NCR region. Of these, 11 units (4,800 MW capacity) have installed Flue Gas Desulfurization (FGD) system. Out of these 35 units, SO₂ emission data is not available for 9 units. Among the remaining 26 units, only 6 units are in compliance with the SO₂ emission norms (FGD installed), while 76% are non-compliant. For NO_x emissions, according to the CAQM report dated 27th February, 2025, 34 units have implemented the required combustion modifications. Only one unit at Rajiv Gandhi Thermal Power Station (HPGCL) is yet to complete the upgrade. The details are tabulated below.

Name of Thermal power plants	Category	Total Capacity	Status of FGD	SO ₂ Compliance Status of thermal power Units, as per MOP data, for the year FY 2024-25	NO _x Compliance Status as per CAQM report dated 27/02/2025
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NTPC Dadri	A	4 X 210 MW 2 X 490 MW	FGD installed in all six units.	Unit 2- Compliance Unit 3- Compliance Unit5-Compliance Unit1- Non-compliance Unit 4-Non-compliance Unit 6- Data not available (FGD units are under stabilization).	NOx control measures installed
Aravali thermal power plant (Indira Gandhi TPS), Haryana	A	3 X 500 MW	FGD installed in two units (Unit 1&2). FGD likely to be installed in Unit 3.	Unit 1- Data not available Unit 2- Data not available (FGD units are under stabilization. Unit3-Non-compliance (1091mg/Nm3).	NOx control measures installed
Mahatma Gandhi TPS , Jhajjar Power	A	2 X 660 MW	FGD installed in both units.	Unit 1- Compliance Unit 2- Compliance	NOx control measures installed
HPGCL Panipat	A	2 X 250 MW 1 X 210 MW	Bid under evaluation, FGD not installed in any units.	Unit 6- Non-compliance Unit 7- Non-compliance Unit 8- Non-compliance	NOx control measures installed
Rajiv Gandhi TPS (HPGCL)	C	2 X 600 MW	Bid Submission date by 10.03.25, FGD not installed in both units.	Unit 1- Non-compliance Unit 2- Non-compliance	Upgradation of combustion modification for compliance with NOx emission standards norms issue in one unit.
YamunanagarTPS (HPGCL)	C	2 X 300 MW	Bid under evaluation, FGD not installed	Unit 1- Non-compliance Unit 2- Non-compliance	NOx control measures installed
Rajpura TPP (Nabha Power Ltd.)	C	2 X 700 MW	FGD installed, but not operational	Unit 1- Non-compliance Unit 2- Non-compliance	NOx control measures installed
Talwandi Sabo TPP	C	3 X 660 MW	EOI published on 17.08.24, according to CAQM, process on hold.	Unit 1- Non-compliance Unit 2- Non-compliance Unit 3- Non-compliance	NOx control measures installed
Guru Hargobind Singh PS (LehraMohabbat TPS)	C	2 X 210 MW 2 X 250 MW	Wet FGD planned	Unit 1- Non-compliance Unit 2-Data not available Unit 3- Non-compliance Unit 4- Non-compliance	NOx control measures installed
Ropar TPS	C	4X 210 MW	Tender yet to be floated	Unit 3-Data not available Unit 4-Data not available Unit 5-Data not available Unit 6-Data not available	NOx control measures installed
Harduaganj TPS (UPRVUNL)	C	1X 105 MW 2X 250 MW 1X 660 MW	FGD installed in one unit. Bid submission for other 3 Units by 23/04/25.	Unit 1- Data not available Unit 7-Compliance Unit 8- Non-compliance Unit 9- Non-compliance	NOx control measures installed

8.15 The Committee notes with concern that some thermal power plants in the vicinity of NCR require compliance with SO₂ norms and lack emission control systems like FGDs considering their significant role in contributing to

Delhi-NCR's air pollution. The Committee is of the view that repeated extensions may not be given to these thermal power plants for meeting their compliance norms. The Committee recommends that the Ministry of Power and the Ministry of Environment, Forest and Climate Change must ensure that FGDs are installed in these TPPs as per the 11 July, 2025 Notification.

8.16 The Committee also recommends that CAQM, together with the Ministry of Environment, Forest and Climate Change and the Ministry of Power, should conduct a monthly review to monitor the progress of FGD installation and operationalization for each non-compliant unit.

8.17 The Committee enquired CSE regarding the Notification issued by the Ministry of Environment, Forest and Climate Change on 11th July, 2025 to exempt thermal power plants from installing Flue Gas Desulphurisation (FGD) systems. CSE informed the Committee that this notification to exempt thermal power plants from installing FGD is based on studies conducted by NEERI Nagpur, IIT Delhi and National Institute of Advanced Studies. These reports state that the sulphur content of coal of other countries is much higher compared to Indian coal (< 0.5%) and therefore, prima facie, there does not seem to be a justified reason for reducing the SO₂ emission limit in Indian coal-based TPP.

8.18 The Committee was further informed that the NEERI report notes that Indian coal has inherently low sulphur content (typically <0.5%) and questions the rationale behind tightening the SO₂ emission limit to 100 mg/Nm³ within a short timeframe. However, this argument overlooks several key points. If Indian coal is indeed low in sulphur, meeting the 100 mg/Nm³ limit should not be a major challenge. Emission norms are not merely about aligning with global benchmarks; they are meant to protect public health, support climate goals, and promote cleaner technologies. The NEERI report argues that since Indian coal has low sulphur content (<0.5%), reducing SO₂ emission limits with a short timeline may not be justified. However, Indian coal is characterized by low calorific value (GCV - 3400 Kcal/kg), high ash (> 42 %) and low sulphur content (< 0.5 %) in comparison to imported coal with high calorific value (GCV ≥5000 Kcal/kg), low ash (6-10 %)

and relatively higher sulphur content (≥ 1 %). Due to the lower calorific value, larger quantities of Indian coal are required to generate the same energy output—resulting in comparable SO₂ emissions to imported coal. Thus, the tonnage of SO₂ emitted per cubic meter of flue gas from stacks is comparable to high sulphur and high CV coal used in other countries. Furthermore, sulphur dioxide (SO₂) emissions from thermal power plants are a major contributor to fine particulate pollution through the formation of secondary particulates, which has been ignored in this study. In the atmosphere, SO₂ undergoes chemical transformation into sulphate aerosols and pose severe health risks. Flue Gas Desulphurisation (FGD) systems are effective in significantly reducing SO₂ emissions and thereby help limit PM_{2.5} formation. While FGD operations do result in some additional CO₂ emissions—estimated at around 2% of the total CO₂ emissions from a coal-based power plant—this contribution is negligible when weighed against the substantial air quality and public health benefits achieved by curbing SO₂ and PM_{2.5} pollution. Hence, the small carbon cost of FGD should not be seen as a barrier to its implementation. One needs to note that the increase in CO₂ emissions even in the extreme case of all TPPs running FGD is equivalent to 1.9 percent of the current CO₂ emissions (2023-24) from TPP operations. Notably, by 2030, it will drop to 1.5 percent of the total CO₂ emissions from TPP operations. Strikingly, by 2040, it will drop further to 0.9 percent of the total CO₂ emissions which is despite the addition of new coal capacity. To contextualize this, the study presumed the total capacity of TPPs as 262 GWs as per the 20th National Electricity Plan. The increased emissions resulting from the installation and operation of Flue Gas Desulphurisation (FGD) systems would be equivalent to the emissions from operating 4.16 GW of coal-based TPPs or a mere 1.5 percent of the total coal-based TPP capacity. Therefore, the rising CO₂ emissions from FGD operation even in the extreme case scenario are extremely disputable.

8.19 A view was also expressed that the exemption is likely to worsen air quality in Delhi NCR if applied to nearby TPPs. Several of the exempted plants (under category C)—such as Harduaganj TPS, Rajiv Gandhi TPS (Haryana), Yamuna Nagar TPS, and Guru Hargobind Singh TPS—are within the regional air-shed and significantly influence pollution levels in Delhi and surrounding areas.

8.20 The Committee has been informed that there was a directive from the Hon'ble Supreme Court of India (order dated 22ndFebruary, 2017), which mandated all State Governments to establish online, real-time continuous monitoring systems for displaying emission levels, with data to be made public via State Pollution Control Board (SPCB) portals or other accessible platforms within a six-month deadline (by August 2017).Subsequently, the Hon'ble National Green Tribunal (NGT), in its order dated 3rdAugust, 2018, directed the Central Pollution Control Board (CPCB) to ensure compliance with the Supreme Court's order and to form a two Member Monitoring Committee with representatives from CPCB and the Ministry of Environment, Forest and Climate Change for monthly implementation reviews. While some SPCBs have since started sharing real time emission data, issues remain regarding the availability of historical data from Continuous Emission Monitoring Systems (CEMS) and the overall credibility of the data.

8.21 The Committee is of the view that there is an urgent need for dissemination of real-time emission data from thermal power plants (TPPs) and industries to ensure transparency, accountability, and effective environmental governance. The Committee, therefore, recommends that CPCB and CAQM should make the installation of tamper-proof Continuous Emission Monitoring Systems (CEMS) across all thermal power plants and industries mandatory, with data streamed in real-time to a dashboard to ensure transparency.

CHAPTER – 9

MANAGING THE POLLUTION FROM DUST

9.1 Dust generated during Construction and Demolition (C&D) activities contribute significantly to air pollution. The Ministry of Environment, Forest and Climate Change informed the Committee that besides directing for effective implementation of the C&D Waste Management Rules, 2016 notified by the Ministry and "Guidelines on dust mitigation measures in handling construction material and C&D wastes, 2017" issued by the CPCB, CAQM issued Statutory Directions Nos. 11-18 dated 11.06.2021 for Remote monitoring of dust control measures at construction and demolition sites in NCR through a web-portal.

9.2 During its meeting with the Committee, the representative of CSE also stated that dust in itself is not a pollutant but when it gets coated with other pollutants, it also becomes a source of pollution. Thus, Rajasthan being full of sand and dust is pollution free but Delhi NCR is not. There are two major sources of dust in Delhi NCR. First is the sand blown by wind from the arid regions which settle down on roads and the second is the dust produced during Construction and Demolition (C&D) activities.

9.3 The effective management of C&D waste hinges on two critical strategies: implementing good practices during construction to minimize dust and managing the resulting waste to process and recover valuable resources for recycling and reuse. Dust generation from activities like excavation, truck movement, and demolition significantly impacts air quality, necessitating comprehensive control measures. These essential strategies include covering loose materials, installing perimeter barricades and windbreakers, paving site roads, and mandatory water sprinkling. Regulatory frameworks like the Graded Response Action Plan (GRAP) and policies from the CAQM and DPCC have further strengthened these efforts by mandating the registration of large projects, requiring real-time air quality monitoring, and enforcing the use of anti-smog guns and wind fencing.

9.4 Delhi has been a pioneer in C&D waste recycling in India, establishing its first plant in 2009. The Government of NCT of Delhi informed the Committee that

a web portal for the mandatory registration of Construction and Demolition sites of 500 square meters and above plot area was launched by DPCC in September, 2021 and as on the 3rd July, 2025, around 1,476 construction sites are registered on this portal. It is also proposed to launch a Beta version of an AI-enabled C&D web portal 2.0 with advanced features such as site mapping with geo-tagging and an automated alert system. Currently, there are four C&D waste processing plants in Delhi with a total capacity of 5150 TPD for disposal and processing of about 6000 TPD of C&D waste generated. A new 1000 TPD facility at Okhla is likely to be completed by December, 2026. To ensure the uptake of these recycled products, the Government has made it mandatory for its own departments to use them in construction projects.

9.5 During its interaction with the Committee held on 15th July 2025, the Ministry of Housing and Urban Affairs informed the Committee that a systematic approach from collection to recycling of C&D waste has been established. A widespread network of collection points ensures easy disposal and prevents illegal dumping. Delhi has 106 designated C&D waste collection centres, Noida has 14, Greater Noida has 6, Ghaziabad has 5 and Gurugram has 1 operational centre. The processing capacity across the region has been significantly expanded to handle the vast quantities of waste generated. Delhi has the largest capacity, with five recycling plants processing 5,000 Tonnes Per Day (TPD) against a daily generation of approximately 6,000 TPD. These plants are located in Bakkarwala (1,000 TPD), Rani Khera (1,000 TPD), Shastri Park (1,000 TPD), and Jahangirpuri/Burari (2,000 TPD), with a new 1,000 TPD plant proposed at Okhla. In the other cities, Noida has a 400 TPD operational plant and has collected over 7.93 lakh metric tonnes since 2019; Greater Noida has a 300 TPD capacity against 150 TPD of generation and has processed 1.29 lakh MT; Ghaziabad collects 325 TPD at its plant; and Gurugram has a 300 TPD facility against a generation of 1,000-1,500 TPD. Faridabad reports a generation of 300 TPD and has a matching processing capacity, though the plant is currently non-operational.

9.6 The Government of NCT of Delhi informed the Committee that in compliance with CAQM directions, 12 Dust Control & Management Cells (DCMCs) have been constituted by Road Owning/Maintaining/Construction agencies. For direct road dust control, about 84 Mechanical Road Sweeping Machines (MRS), 218 Water Sprinklers (WS), and 109 Anti-Smog Guns have been

deployed. The Delhi Cabinet has approved a proposal for engaging 250 integrated Water Sprinkler and Anti-Smog Gun machines and 70 integrated Mechanical Road Sweeping machines. Furthermore, directions have been issued for the mandatory installation of Anti-Smog Guns on high-rise buildings (G+5 and above), with 171 such buildings deploying them last winter. A plan to pave and green all roadways and central verges is being undertaken. As on the 30th June, 2025, 2,448.1 kilometers of roadside has been paved and 1,809.61 km of central verges has been greened. A Comprehensive Road Redevelopment Action Plan has been prepared, identifying 1,841.88 km of road for redevelopment at an estimated cost of Rs. 2,817.82 crore.

9.7 The Ministry of Housing and Urban Affairs informed the Committee that a multi-pronged strategy is being employed across Delhi NCR to control dust, a major contributor to air pollution. The measures are implemented by various Urban Local Bodies (ULBs) and agencies, focusing on mechanical sweeping, water sprinkling, and the use of advanced technology. A key initiative is the widespread deployment of Mechanical Road Sweepers (MRS) to clean major roads. For instance, the Municipal Corporation of Delhi (MCD) uses 52 MRS to cover 6,730 kilometers of roads, while Noida deploys 14 MRS for 340 kilometers. Other cities like Gurugram, Ghaziabad, and Faridabad also have significant MRS fleets. Water-based suppression systems are extensively used. This includes a large fleet of water sprinklers and anti-smog guns (ASGs). The New Delhi Municipal Council (NDMC) uses 53 ASGs and 18 water sprinklers, while Noida operates 75-80 ASGs and 120 mobile sprinklers. Fixed mist spray systems are also being installed on electric poles in areas under MCD and the Delhi Development Authority (DDA) to settle dust particles. Regulatory and infrastructural measures form another critical pillar. Agencies are mandated to register construction sites larger than 500 sq. m. on a dedicated web portal for monitoring. The DDA has established a Dust Control and Management Cell (DCMC), and cities like Noida are creating "Dust-Free Zones" by paving roads and redeveloping industrial sites. Furthermore, greening initiatives, such as planting trees and shrubs along central verges and creating parks, are undertaken to stabilize soil and absorb dust.

9.8 The Committee notes that the current system effectively monitors construction, but the demolition process remains largely unregulated, leading to wasteful and polluting practices. Therefore, the Committee recommends strengthening the regulatory framework for demolition activities and mandating the use of recycled materials. The Committee recommends introducing a mandatory demolition permit system that incorporates resource recovery and recycling plans, ensuring that valuable materials are salvaged and directed towards recycling facilities. Furthermore, to create a stable market for recycled C&D products, the mandate for their use should be expanded beyond Government departments. A regulation should be enacted requiring all construction projects, including those in the private sector, to incorporate a minimum percentage of recycled C&D materials, such as aggregates, in their building processes. This will ensure a consistent demand and improve the economic viability of recycling plants.

9.9 The Committee also recommends that the collection, transportation, and processing network for C&D waste must be expanded and integrated with technology. While Delhi has a robust network of collection centres, other cities in the NCR have significantly fewer, with Gurugram operating only one centre. Efforts should be made to establish a denser network of collection points across all ULBs to prevent illegal dumping and ensure convenient access. The transportation of waste from these centres to processing plants should be modernized through a GPS-enabled vehicle fleet, providing real-time data for efficient logistics management. The proposal for an AI-enabled web portal with geo-tagging is a welcome step. However, this system should be expedited and integrated across the NCR to provide a unified platform for

monitoring compliance, tracking waste movement, and sending automated alerts for violations.

9.10 The Committee further recommends that the mechanized infrastructure for dust control must be scaled up and maintained with a focus on permanent solutions. The deployment of Mechanical Road Sweepers, Water Sprinklers, and Anti-Smog Guns should be intensified, particularly in other NCR towns beyond Delhi, to match the scale of the problem. The plan to pave and green road shoulders and central verges is a critical long-term solution to prevent dust accumulation. The Comprehensive Road Redevelopment Action Plan should be scaled up and implemented on a mission mode. Greening initiatives through Miyawaki forests and verge plantations must be continued aggressively to naturally stabilize dust and improve air quality.

9.11 The Government of NCT of Delhi informed the Committee that in compliance to the CAQM Direction No. 21 issued vide date 11.06.2021, 12 "Dust Control & Management Cells" (DCMCs) i.e., in MCD, PVVD, DSIIDC, DDA, NCRTC, I&FCD, NDMC, DCB, CPWD, NHAI, DMRC and DJB, have been constituted by Road Owning /Maintaining/ Construction agencies for monitoring and effective implementation of dust control measures in the National Capital Region. Monthly/ quarterly action taken report is being sent to CAQM. Various measures taken for road and open area dust control by 12 DCMCs are explained below.

9.12 Enhancement of Road Dust Mitigation through Machines: For road dust control, about 84 Mechanical Road Sweeping Machines (MRS), 218 Water Sprinklers (WS), 109 Anti-Smog Guns (52 mobile and 57 static) in double / three shifts for road dust control with special emphasis on 13 identified hotspots have been deployed. Delhi Cabinet *vide* decision dated 05.06.2025 has approved proposal on engagement of:

(I) 250 number of Water Sprinkler Machine integrated with Anti-Smog Gun;

(II) 70 number of Mechanical Road Sweeping (MRS) Machine integrated with 210 Water Sprinkler Machine and Anti-Smog Gun, 18 Dump Vehicle and 18 Water Tanker,

9.13 For abatement of air pollution by Public Works Department, GNCTD, under the Plan Scheme "Pollution Control and Emergency Measures" of Department of Environment & Forest, GNCTD, under OPEX Model, funds of about Rs 2388 crore have been approved for implementation of the proposal.

9.14 Anti-Smog Guns on High Rise Buildings: For controlling particulate matter in ambient air during episodic air pollution conditions, directions u/s 5 of the Environment (Protection) Act, 1986 on mandatory installation of Anti-Smog Guns on high rise buildings (all commercial complexes, malls, hotels and office buildings, educational institutions/universities (G+5 and above)) has been issued on 29.05.2025. Last winter, Anti Smog Guns were deployed on about 171 number of High Rise Buildings.

9.15 Installation of Mist Spray/similar system/technology agnostic spraying system on Electric Poles/other Poles: With an aim to control particulate matter levels at major traffic intersection points, road owning/ maintaining agencies have been directed to install mist spray/similar system/technology agnostic spraying system on electric poles/other poles in the central verge along the road stretch in Delhi.

9.16 Plan to pave/green all Roadways/Central verges: For ensuring no suspension of roadside dust, greening and paving of central verges and road sides is being undertaken by road owning and maintaining agency. As on 30.06.2025, 2448.1 km of roadside has been paved and 1809.61 km of central verges has been greened. Balance of 746.094 km roadside is targeted for paving and balance of 156.75 km of central verge is targeted to be greened.

9.17 Under NCAP, DPCC has transferred ₹19.3375 crore to MCD for undertaking activities as per Annual Action Plan 2024–25. The funds are to be utilized for end-to-end paving of roads along with black-topping and maintaining potholes free roads and greening of traffic corridors, open areas, gardens, community places, schools and housing societies

9.18 Comprehensive Road Redevelopment Action Plan: As per direction from CAQM, a comprehensive road redevelopment action plan with a strategy to map all roads required to be re-developed and to prepare a detailed action plan as per framework for implementation of the paving and greening measures in Right of Way with financial estimate had been prepared, which is being revised. Summary on the proposed comprehensive Road Redevelopment Action Plan is as mentioned below:

S. No.	DCMC	Total Length (km)	Total Length of Road in Good Condition (km)	Length of Road Proposed for Redevelopment (km)	Estimated Cost (Rs. in Cr)
1.	CPWD	4.2	4.2	0	0
2.	DCB	15.8	15.8	0	0
3.	DDA	453.13	172.40	105.29	174.26
4.	DJB	51.82	29.64	22.23	26.25
5.	DMRC	11.014	11.014	0	0
6.	DSHDC	535.30	369.21	47.81	255.87
7.	IFCD	360.15	332.744	27.406	120.06
8.	MCD	6127.78	5536.76	591.02	755.00*
9.	NCRTC	0	0	0	0
10.	NDMC	126	126	0	0
11.	NHAI	976	203	0	0
12.	PWD	1400	957	1048.12	1486.38
Total		10061.19	7757.77	1841.88	2817.82

*Total Estimated Cost also includes Estimated Cost for Surface Parking (Area Approx. 135840 sqm):42.80 cr.

9.19 The Committee enquired with the Ministry of Housing and Urban Affairs that how will it accelerate the replacement of manual road sweeping with mechanized alternatives. The Ministry informed the Committee that Solid waste management is a State/ULB subject. The Ministry of Housing and Urban Affairs is

implementing Swachh Bharat Mission Urban 2.0 under which Additional Central Assistance (ACA) for mechanical road sweepers (MRS) has been provided to the ULBs in Delhi NCR. Under the Mission, States are empowered to select and prepare project as per their priorities within the scheme guidelines. In Ghaziabad, 12 nos. of MRS have been approved to strengthen dust management practices. As reported by the ULBs in Delhi NCR, a total of 113 nos. of mechanized road sweeping machines are operational in MCD (52 nos.), NDMC (4 nos.), Noida (14nos.), Greater Noida (6 nos.), Ghaziabad (13 nos.), Faridabad (8 nos.) and Gurugram (16 nos.).As per the information provided by Municipal Corporation of Delhi (MCD), 52nos. of MRS are being deployed to carry out sweeping on PWD roads having RoW >60ft. Further, 18 nos., of MRS is under procurement process. As per the Cabinet decision, PWD is also hiring 70 nos. of MRS and 210 nos. of water sprinklers integrated ASGs to deploy on PWD roads. Thereafter, MRS being deployed by MCD on PWD roads will be spared and shall be deployed on Major Municipal roads. In many DDA flats area, unauthorized colonies, JJ colonies roads are narrow and it is not possible to sweep mechanically. Therefore, in these areas' roads are cleaned manually.

9.20 The Committee observes that to address the gap in mechanized road sweeping, a targeted plan for the procurement and deployment of machinery is essential. While the hiring of 70 new Mechanical Road Sweepers (MRS) by the PWD is a positive step, the data indicates that a significant portion of roads, particularly in DDA flats, unauthorized colonies, and JJ colonies, remain reliant on manual sweeping due to narrow roads. Therefore, the Committee recommends that the Ministry of Housing and Urban Affairs, in coordination with the Delhi Government and Municipal Corporation of Delhi (MCD), may actively facilitate and fund the procurement of smaller, more agile mechanical sweepers capable of navigating narrow lanes. The 18 MRS already under procurement by MCD should be prioritized for this purpose. Furthermore, the success in Ghaziabad, where 12 MRS were approved under Swachh Bharat Mission Urban 2.0, should be replicated, with all ULBs in the

NCR encouraged and assisted to submit similar project proposals to maximize Central Assistance.

9.21 The Committee also recommends that the implementation of existing directives must be rigorously monitored and enforced. Similarly, the plan to install mist spraying systems on electric poles at major traffic intersections needs a clear implementation timeline from the respective road-owning agencies, with progress reviewed monthly by the CAQM. The "Comprehensive Road Redevelopment Action Plan" must be finalized and its revision expedited; this plan should be converted into a time-bound, year-wise implementation schedule with clear quarterly milestones, especially for agencies like PWD and MCD, which have the largest lengths of road proposed for redevelopment.

9.22 The Committee also recommends that the greening and paving efforts must be accelerated and expanded. While progress has been made, with 1809.61 km of central verges greened and 2448.1 km of roadside paved, the remaining targets of 156.75 km and 746.094 km, respectively, require a mission-mode approach. The funds transferred under the National Clean Air Programme (NCAP) should be exclusively and expediently used for this purpose, with a focus on achieving 100% paving of roadside and greening of central verges within a strict deadline. This will prevent the suspension of dust and contribute to long-term air quality improvement.

CHAPTER – 10

AFFORESTATION MEASURES IN DELHI

10.1 Forests could act as the vital "green lungs" for mega urban agglomerations like the Delhi NCR region, providing a crucial, natural defense against its severe air pollution crisis. They directly improve air quality by filtering harmful particulate matter from the air and absorbing pollutant gases through their leaves. Beyond this immediate cleansing, forests contribute to long-term ecological stability, helping to mitigate dust storms, regulate local climate, and enhance the region's overall capacity to withstand and recover from pollution.

10.2 The Committee was surprised to note that neither the Ministry of Environment, Forest and Climate Change nor the State Government of NCT of Delhi, mentioned anything, in their Background Notes submitted to the Committee or Presentation made before the Committee, on the role of forests or afforestation measures taken by them.

10.3 The Committee enquired with the Ministry of Housing and Urban Affairs that whether it has considered developing large scale Miyawaki forests in Delhi NCR and how effective are they in mitigation of air pollution. The Ministry informed the Committee that Miyawaki technique is a unique methodology which comprises of pre-determined steps and procedures of planting trees. Since the Miyawaki forests are dense in comparison to the normal plantations, they are able to mitigate noise and air pollution more effectively. Also, dust particles are less likely to sieve through a dense forest, as compared to normal plantations. Forests grown through Miyawaki technique absorb more carbon dioxide than a plantation that is grown conventionally. Miyawaki plantation was adopted by Ghaziabad Municipal Corporation enabling successful plantation of 34,461 saplings. Similarly, Greening projects are being executed in Faridabad Municipal area which includes Miyawaki forests using native species for rapid ecological restoration, effective carbon sequestration and ambient temperature regulation. Horticulture Department of MCD has also developed Miyawaki at 11 sites in Delhi.

10.4 The Committee also enquired with the Ministry regarding DDA's plans to develop more city forests and biodiversity parks like Yamuna Biodiversity Park in

Delhi NCR. The Ministry informed that after successful development of Yamuna Biodiversity Park, a network of 07 Biodiversity parks across various landforms of Delhi has been established, these include:

1. Aravalli Biodiversity Park
2. Northern Ridge Biodiversity Park
3. Tilpath Valley Biodiversity Park
4. Neela Hauz Biodiversity Park
5. Tughlaqabad Biodiversity Park
6. Kalindi Biodiversity Park

10.5 These parks serve multiple ecological functions: carbon sequestration, groundwater recharge, conservation education, habitat restoration, and public recreation. Some of these Parks fall under designated forest areas. Northern Ridge Biodiversity Park replaced invasive *Prosopis juliflora* and *Lantana Camara* with native flora, reviving local biodiversity including leopards, birds, and reptiles. Hydrological interventions were done for harvesting rainwater into the site.

10.6 The Ministry also informed the Committee that 12 major restoration projects covering 1,600 hectares along the Yamuna floodplains are underway, including expansions, new biodiversity parks, ghats, and eco-trails. Parks like Sanjay Van and Jahapanah City Forest serve as an urban oasis with extensive walking tracks and dense greenery. Spanning approximately 727 acres in the South-Central Ridge near Mehrauli and Vasant Kunj, Sanjay Van is one of Delhi's thickest wooded areas. It shelters a rich array of birdlife—peacocks, kingfishers, orioles, and migratory species—alongside fauna like nilgai, jackals, and butterflies.

10.7 CII during its deliberations with the Committee also raised the issue of plantation of decorative trees like Champa tree and Palm tree in Delhi instead of native species of the city like Neem, Mango and Jamun trees. CII remarked that native species are more suitable for absorbing pollution in Delhi NCR. CII also

suggested that Government should expedite the plantation of Miyawaki forests in the city.

10.8 The Committee also referred the India State of Forest Report 2023 published by the Ministry of Environment, Forest and Climate Change. The Report mentions that Delhi had 194.23 sq. km. of forest in 2021 which decreased to 194.15 sq. km. in 2023. Thus, there is a decrease of 0.08 sq. km. The Committee also noticed that in 2013, the forest cover of Delhi was 180.32 sq. km. The tree cover which is defined as total area of land that is covered by trees has increased from 118 sq. km. in 2013 to 176.03 sq. km. in 2023. The Report also contains the following data:-

Number of Trees and their Volume for Top 5 Species in Recorded Forest Area

S. No.	Species	No. of Trees (in '000)	Volume (Million m³)
1	Prosopis juliflora/Neltuma juliflora	544	0.2
2	Acacia lenticularis/Senegalia lenticularis	139	0.01
3	Azadirachta indica	62	0.03
4	Cassia fistula	55	0.02
5	Leucaena leucocephala	55	0.01

Major Invasive Species in the State inside the Recorded Forest Area in Delhi

S. No.	Species	Estimated Extent (km²)
1	Prosopis juliflora	9.21
2	Lantana camara	6.22
3	Cassia tora/ Senna tora	1.35
4	Triumfetta rhomboidea	1.35
5	Parthenium hysterophorus	0.69

10.9 The Committee is of the view that afforestation should be integrated as a central pillar of the region's air pollution action plans, moving beyond treating it as a peripheral environmental concern to recognizing it as vital public infrastructure. The Committee observes that although the forest cover in Delhi has increased since 2013, it marginally fell down from 2021. Moreover, the forest cover is only 13 per cent of Delhi's total land area. The Committee recommends that Government should take proactive measures to increase the forest cover in the city.

10.10 The Committee notes the proven efficacy of the Miyawaki method in creating dense, fast-growing native forests. The Committee recommends the Ministry to launch a dedicated mission to grow Miyawaki forests, specifically for Delhi NCR. The Committee has also taken note of the alarming dominance of invasive species like *Prosopis juliflora*, which constitutes the highest number of trees in Delhi's forests but offers minimal ecological value and actively harms biodiversity. The successful model of the Northern Ridge Biodiversity Park, which replaced *Prosopis juliflora* and *Lantana camara* with native flora, should be replicated across the city. This programme should involve systematic mapping of invasive species extent, phased scientific removal, and immediate replanting with pollution-absorbing native species such as Neem, Jamun, and Mango to prevent reinvasion and restore ecological function.

CHAPTER – 11

CONCLUSION: THE IMPERATIVE FOR A COLLECTIVE RESPONSE

11.1 The analysis presented in this Report unequivocally demonstrates that the air pollution crisis in Delhi NCR is a complex and persistent challenge with severe consequences for public health, the economy, and the environment. The problem is multifaceted, stemming from a confluence of factors including vehicular emissions, industrial pollution, construction dust, and the seasonal influx of agricultural residue burning. No single policy or quick-fix solution can untangle this deep-rooted issue. The recurring cycle of hazardous air quality underscores that while numerous plans and policies have been formulated, their implementation has to be strengthened. The situation demands a paradigm shift from reactive, seasonal measures to a proactive, sustained, and holistic strategy.

11.2 History shows that cities geographically trapped like Delhi can indeed achieve clean air. Beijing, surrounded by mountains, successfully tackled its toxic air pollution through a determined war on pollution, implementing strict anti-pollution laws, shutting down heavy industries, and enforcing clean vehicle standards. Likewise, Los Angeles, another city confined by its topography, cleared its legendary smog through decades of determined action, driven by strong regulations and innovations like the catalytic converter. Even London, whose weather often traps pollution, eliminated its deadly smog by passing groundbreaking clean air legislation. These powerful examples demonstrate that difficult geography does not have to be destiny. With sustained political will, smart policies, and technological investment, a future of clean air is an achievable reality.

11.3 Ultimately, resolving Delhi NCR's air pollution is not a task for one Government or agency alone; it is a challenge that can only be met through the unwavering participation and coordinated action of all stakeholders. This requires a synergistic approach where every Ministry and Department of both the Central Government, and every State Government in the region, works in harmony. The Union Ministries of Environment, Forest and Climate Change; Power; Road Transport and Highways; Agriculture and Farmers Welfare; and Housing and Urban Affairs must align their policies to create a unified front, transcending political and jurisdictional boundaries. Simultaneously, the State Governments of Delhi, Haryana, Punjab, Uttar Pradesh, and Rajasthan must enforce regulations consistently and invest in shared infrastructure for clean energy, public transport, and waste management.

11.4 However, Government action alone is incomplete without the active partnership of the region's citizens. Public participation is the cornerstone of this endeavour, encompassing a shift in individual behaviour—adopting public transport, reducing personal waste generation, and reporting violations—and a collective demand for cleaner alternatives. When Governments, industries, and citizens recognize their shared responsibility and act in concert, the daunting challenge of clean air becomes an achievable goal. The path forward is clear: only through a united, coordinated, and persistent effort can we hope to reclaim the right to breathe clean air and secure a sustainable future for Delhi NCR.

RECOMMENDATIONS/OBSERVATIONS — AT A GLANCE

CHAPTER – 1

INTRODUCTION

The Committee would like to point out that air pollution in Delhi is not something new but has been a long-standing problem. This is further illustrated by the fact that this Committee had examined this issue of “Air Pollution in Delhi and National Capital Region” and presented a very comprehensive Report on the subject to the Parliament in August, 2018 and made a number of constructive recommendations in that report. The Committee observes that more efforts are needed to further improve the air quality in Delhi-NCR.

(Para 1.40)

CHAPTER – 2

AIR QUALITY STANDARDS AND MONITORING OF AIR QUALITY

The Committee notes that WHO air quality guidelines are indicative/recommended guidelines and are not enforceable. Countries are advised to set national standards according to their own geography and socio-economic factors. The Committee observes that to achieve the current Air Quality Standards, Delhi NCR needs to work towards significant reduction in each sector of pollution control to meet near zero emissions targets including transport, industry, power plants, waste streams, solid fuels in households and dust sources.

(Para 2.5)

The Committee observes that the National Ambient Air Quality Standards (NAAQS) were last revised in 2009 and the Ministry has informed the Committee that their revision is under process. The Committee recommends that the Ministry of Environment, Forest and Climate Change should expedite the process and come up with the revised National Ambient Air Quality Standards at the earliest.

(Para 2.19)

The Committee observes that apart from 40 CAAQMS, Delhi still has 7 manual air quality monitoring stations, which cannot provide real time updates. The Committee, therefore, recommends that all manual air quality monitoring stations in Delhi NCR, including 7 manual monitoring stations in Delhi, should be upgraded to CAAQMS. The Committee also recommends that all air quality monitoring stations in Delhi NCR should be upgraded with globally best available technology to ensure generation of real-time, accurate and scientific data that identifies the specific sources and components of pollution for effective policy formulation, appropriate corrective approach and public awareness.

(Para 2.20)

The Committee also observes that the distribution of air quality monitoring stations is heavily skewed towards the central and southern parts of the city, which are relatively less populated, greener and affluent than rest of the city. This geographical bias results in a distorted and non-representative dataset, systematically excluding the more polluted, densely populated, and less affluent localities. The Committee further observes that

even most of the 6 new CAAQMS proposed to be setup in the city are situated in relatively greener sites like JNU campus and trans-Yamuna region has again been left out. The Committee, therefore, strongly recommends that the Ministry of Environment, Forest and Climate Change must reconsider the sites for its proposed 6 new CAAQMS. The Committee also recommends that the Ministry should evenly redistribute the air quality monitoring stations not only in Delhi but all across the NCR.

(Para 2.21)

CHAPTER – 3

SOURCES OF AIR POLLUTION

The Committee feels that there is a need for conducting fresh study that maps and quantifies all the emissions sources and pollution load from the sources of air pollution in Delhi NCR and recommends that the Government should commission fresh source apportionment studies in this regard to reflect the changes in the economic activities in the region or to reflect the impact of new major policy developments and implementation. A committee of scientific experts should determine the appropriate frequency for these updates to ensure they accurately reflect changing conditions.

(Para 3.8)

CHAPTER – 4

ADDRESSING HEALTH HAZARDS FROM AIR POLLUTION

The Committee takes note of the steps taken by the Ministry of Health and Family Welfare for mitigation of adverse impact of air pollution on the health of the citizens. However, the Committee feels that given the seriousness and urgency of the situation and the considerable impact of the air quality on human health, much more needs to be done in this regard in the shortest possible time.

(Para 4.23)

The Committee recommends that the Ministry should also rope in the public and private schools of Delhi-NCR to raise awareness amongst the school children on this critical issue.

(Para 4.24)

The Committee finds it contradictory that while Government efforts to mitigate the country's severe air pollution crisis have consistently fallen short, a prohibitive tax is levied on a critical device that citizens are forced to rely on for personal protection. Imposing such a tax effectively monetizes a public health failure. The Committee feels that the citizens of the country should not be penalized for trying to save themselves from a catastrophic situation. Therefore, the Committee feels that the Government should take a sympathetic view and recommends that the Government should either abolish or lower the GST on air purifiers and HEPA filters.

(Para 4.26)

The Committee also observes that certain sections of the society such as delivery riders, traffic police personnel, bike taxi riders, etc. are more vulnerable to the hazards of the air pollution. The Committee recommends that targeted and specific programmes should be launched for protection of these sections. These may include, for instance, directing e-commerce and logistics companies to provide high-quality protective masks (such as N95) to their delivery riders free of cost, and instituting mandatory, company-funded annual health check-ups, with specific provisions for additional check-ups following severe pollution episodes.

(Para 4.27)

Furthermore, the Committee recommends the creation of a dedicated health risk profiling and monitoring system for these workers, the formulation of enforceable Standard Operating Procedures (SOPs) for high-pollution days—which could include limiting continuous outdoor exposure hours and ensuring access to indoor rest areas—and the launch of targeted public health campaigns to educate them on personal protective measures. Additionally, the establishment of specialized, streamlined healthcare access channels, such as dedicated OPD counters for respiratory ailments at major public hospitals should be considered to ensure timely and hassle-free medical attention for these essential frontline workers.

(Para 4.28)

The Committee observes that the situation in Delhi NCR worsens during peak winter months and the elderly and the young, being the most

vulnerable, need immediate relief and cannot afford to wait for Government policies to yield results. Therefore, the Committee recommends that air purifiers should be installed in all public schools of Delhi NCR, especially for the primary wards during severe air pollution. The Committee further recommends the installation of air purifiers in all public hospitals of Delhi NCR especially the ICUs, pulmonology, maternity, neo-natal and geriatric wards. Additionally, the Committee recommends that the Government should make it mandatory to install air purifiers in all Government offices of the region. The Committee also recommends incentivizing private sector for investing in air purification measures in their offices, by allowing companies to claim tax rebates on the purchase and installation of air purifiers/similar equipments in their office establishments.

(Para 4.29)

CHAPTER – 5

CONTROLLING THE VEHICULAR EMISSIONS

Therefore, the ongoing national initiative to expand highway-based CNG/LNG refueling systems and charging infrastructure for electric vehicles needs to be accelerated by putting it on a fast track. This is essential to encourage a substantial shift of long-haul trucking and other commercial vehicles to cleaner gas and electricity over the next five years, building upon the progress already made.

(Para 5.7)

The Committee appreciates the fact that Delhi Government is targeting to replace its entire fleet of public buses to electric and recommends that the target should be met in a definite timeline. The Committee further recommends that Government should further increase its target from 11,000 buses to provide pollution-free transport facilities to the inhabitants of Delhi.

(Para 5.10)

The Committee also recommends the introduction of a premium, scheduled bus service tailored to meet the expectations of commuters seeking a higher standard of comfort and reliability. Modelled on the operational success of some of the private cab aggregators, this service could leverage technology to provide a seamless user experience, including real-time bus tracking and advanced seat reservation via a dedicated mobile application. This initiative could attract a segment of the population that currently relies on private vehicles, thereby serving the dual purpose of generating a new revenue stream for public transit and contributing to a reduction in private vehicle usage and urban congestion.

(Para 5.11)

The Committee, therefore, strongly recommends the establishment of a dedicated fleet of fully air-conditioned electric buses to transport employees from these residential complexes to their respective offices. To ensure cost-recovery and long-term sustainability, a suitable monthly fee could be charged for this service. This strategy would offer a two-fold payoff. Firstly, it will ensure reliable and timely attendance of the employees. Secondly, it will take a significantly reduce the number of vehicles on the roads, especially the polluting private vehicles.

(Para 5.12)

The Committee also recommends that the Government should evolve a policy requiring private companies in sectors with roles amenable to remote work (e.g., Information Technology, Consulting, Financial Services) to activate mandatory Work-From-Home (WFH) protocols during officially declared periods of severe pollution. This measure will serve the dual purpose of safeguarding public health by reducing the population's exposure to hazardous air and diminishing the traffic volume.

(Para 5.13)

To address the commuting footprint of organizations where remote work is not feasible, the Committee recommends creating a structured incentive programme wherein private companies with significant net worth and large headcount will have to mandatory introduce fully air-conditioned, zero-emission electric buses for the transit of their employees. To ensure fiscal viability and align with national priorities, companies should be permitted to claim capital and operational expenditures for such initiatives under their Corporate Social Responsibility (CSR) mandates.

(Para 5.14)

The Committee observes that Hybrid Electric Vehicles remain fundamentally dependent on fossil fuels and continue to emit tailpipe pollutants, unlike true zero-emission vehicles.

(Para 5.20)

The Committee recommends that public incentives, including but not limited to production-linked incentives, purchase subsidies, and tax benefits, must be strategically focused on accelerating the adoption of genuine zero-

emission vehicles like Battery Electric Vehicles and Fuel Cell Electric Vehicles. Plug-in Hybrid Electric Vehicles could be considered as a transitional technology due to their capacity for external charging and extended electric-only range.

(Para 5.21)

The Committee acknowledges the strategic rationale of the Ethanol Blending Roadmap in furthering the nation's energy security objectives. However, there are concerns regarding the potential impact on vehicular emissions and public health, which the Committee believes warrant a more cautious approach to its implementation. The Committee notes that while extant studies indicate a potential reduction in certain regulated pollutants like carbon monoxide, these benefits are accompanied by certain trade-offs. The rise in NO_x emissions from a substantial segment of the vehicle fleet, namely carburetted vehicles, is a matter of concern, given the direct impact of NO_x on air quality. Furthermore, the inherent volatility of ethanol-blended petrol leads to increased evaporative emissions, which are precursors to ozone formation. The fact that India's current regulatory standards for such evaporative emissions are less stringent than those in place in pioneering regions like Brazil and California suggests a regulatory gap. This gap risks undermining the policy's intended benefits by allowing an increase in unregulated and harmful pollutants, including aldehydes, which have known adverse health effects. The Committee also notes that the compatibility of older vehicles, lacking advanced emission control systems, with higher ethanol blends remains a valid concern, both in terms of potential material damage and elevated emissions. The acknowledged fuel economy penalty associated

with these blends further complicates the matter, as it implies a higher volume of fuel consumption to achieve the same mobility, thereby offsetting some of the per-litre environmental advantages.

(Para 5.27)

Therefore, the Committee recommends that Government should undertake a comprehensive review of the nation's vehicular emission standards. This review should specifically evaluate the necessity of adopting more stringent evaporative emission standards, aligned with international best practices, to effectively mitigate the risks associated with higher ethanol blends.

(Para 5.28)

The Committee also recommends that the Government should develop a clear public information campaign regarding the compatibility of older vehicles with new fuel standards.

(Para 5.29)

The Committee wishes to underscore that while ethanol blending may form part of a transitional energy strategy, it should not inadvertently divert policy focus or fiscal support from the paramount objective of transitioning to a zero-tailpipe-emission vehicle fleet. The Committee therefore recommends that the promotion of ethanol blends be carefully calibrated to ensure it serves as a genuine bridge to a cleaner transportation future, without delaying the ultimate adoption of battery electric and hydrogen fuel cell vehicles.

(Para 5.30)

The Committee feels that there is a need to increase the share of Electric Vehicles (EVs) in Delhi and urgent steps need to be taken for augmenting the

adoption of EVs by the public. The Committee recommends that both the Central Government and the State Government of Delhi should take necessary action in this regard and may also consider the suggestions enumerated above to achieve the desired results. To further accelerate this transition, a dual strategy of incentives and disincentives is crucial. On the incentive side, the Government may consider offering subsidized or even free public parking for EVs to make them a more attractive option. Conversely, to persuade a shift away from conventional vehicles, parking rates for petrol and diesel vehicles can be increased significantly. Beyond parking measures, the Committee recommends more direct regulatory interventions to curb the proliferation of polluting vehicles. This may include the introduction of an annual ceiling on the registration of new non-electric vehicles across the entire National Capital Region (NCR).

(Para 5.32)

The Committee observes that a primary barrier to adoption of EVs is the initial purchase price, which necessitates intervention in the credit market. The Committee recommends that the Ministry of Finance should actively persuade Public Sector Banks to introduce dedicated "Green Car Loans" for EVs, offering interest rates that are substantially lower than those for Internal Combustion Engine vehicles. Complementing this, the Reserve Bank of India should be urged to formulate specific schemes, such as creating a priority-sector lending category for EV loans, which would incentivize all commercial banks to offer similarly concessional financing and expand credit flow across the sector. Simultaneously, lowering the long-term cost of ownership is critical. The Ministry of Finance should mandate Public Sector General Insurance Companies to design and offer comprehensive insurance policies

for EVs at significantly cheaper premium rates, reflecting their lower risk profile and maintenance costs. To ensure industry-wide adoption of this practice, the Insurance Regulatory and Development Authority of India should be requested to issue guidelines for standardizing these affordable, EV-specific insurance products, fostering competition and wider consumer choice.

(Para 5.33)

The Committee also recommends that the Ministry of Finance should introduce robust tax incentives under the Income Tax Act. These incentives should include provisions such as a deduction on the interest paid on EV loans and potentially an additional deduction on the principal amount repaid. These incentives should be available under both the old and new tax regimes to reach the widest possible taxpayer base. The Committee further recommends that the Central Government and the State Governments should launch a special scheme that encourages their employees to purchase EVs. This could be achieved by offering them access to interest free or concessional loans, thereby stimulating the market and normalizing EV ownership from within the public sector itself. The Government should also push private sector to offer such incentives to its employees.

(Para 5.34)

The Committee, therefore, recommends that Government should shift its strategy from a sweeping age-based ban to a targeted, performance-oriented system for identifying and retiring unfit vehicles. The success of this new strategy hinges on the rigorous and transparent deployment of advanced testing mechanisms to accurately identify high-emitting vehicles. For commercial vehicles, this entails the full operationalization of the Automated Testing Stations (ATS) as mandated by the Ministry of Road Transport and Highways, supplemented by stringent oversight to prevent the dilution of

standards through repeated testing. For private vehicles, the current Pollution Under Control (PUC) regimen is demonstrably inadequate. The Committee therefore recommends the immediate implementation of remote sensing technology to effectively screen for high-emitting vehicles under real-world driving conditions.

(Para 5.35)

Furthermore, the Committee recommends strengthening the fitness testing protocol for private vehicles by mandating the first fitness test after 10 years, rather than the current 15 years, with particular attention given to vehicles with larger engine sizes such as SUVs. Concurrently, a structured system of fiscal incentives must be implemented to encourage voluntary scrappage. These incentives should be strategically targeted, prioritising high-mileage commercial vehicles and offering enhanced benefits for the replacement of old vehicles with zero-emission electric alternatives, applicable to both commercial and private segments.

(Para 5.36)

The Committee is of the firm view that a holistic policy combining robust, technology-driven enforcement with targeted economic incentives will prove far more effective in renewing the national vehicle fleet and achieving the desired reductions in vehicular pollution across the NCR.

(Para 5.37)

The Committee acknowledges and appreciates the operationalization of the Delhi-Ghaziabad-Meerut Namo Bharat RRTS corridor. However, the Committee notes with concern that even this corridor is not fully operationalized and has missed several deadlines. Moreover, this achievement

is significantly overshadowed by the inordinate and concerning delays in sanctioning and implementing the other critical corridors identified as priorities.

(Para 5.41)

The Committee notes with deep disquiet that the revised proposals for the Delhi-Gurugram-SNB and Delhi-Panipat-Karnal corridors were submitted in March 2025 and remain under examination, representing a critical and unacceptable gap in the strategic response to the region's intertwined transport and pollution crises. The prioritization of three key corridors was established years ago, and the completion of only one to date signals a pace of execution that is not commensurate with the urgency of the crisis. Each day's delay translates into thousands of additional vehicles on the roads, compounding congestion and emitting pollutants that directly impact the health and well-being of the region's inhabitants. The Committee, therefore, recommends that the Ministry of Housing and Urban Affairs should expedite the approval of Delhi-Gurugram-SNB and Delhi-Panipat-Karnal RRTS corridors with the utmost priority. Concurrently, the Ministry should also conduct a comprehensive review of the remaining five RRTS corridors and should expeditiously initiate the process for their approval.

(Para 5.42)

The Committee appreciates the formulation of the Transit-Oriented Development (TOD) Policy for Delhi. The principles enshrined in the policy, which aim to create compact, walkable, and mixed-use neighbourhoods centred around mass transit hubs, represent a critical and necessary paradigm shift in urban planning. The specific provisions for enhanced pedestrian and non-motorized transport infrastructure, reduced private

vehicle parking norms, and the promotion of cycling and electric vehicles are precisely the kind of forward-looking measures required to fundamentally alter the transport dynamics of the region. The potential of TOD to reduce reliance on private vehicles, thereby curbing tailpipe emissions and congestion, is significant. However, the Committee expresses its profound concern that the existence of a policy on paper is insufficient. The Committee notes that till date only TOD project i.e. at Karkardooma, Delhi is under execution on ground. The current pace of the TOD implementation appears inadequate to generate the transformative impact needed within the urgent timeframe demanded by the public health crisis. The Committee recommends that the Ministry of Housing and Urban Affairs and the Government of NCT of Delhi should expedite the implementation of this scheme. Moreover, the Ministry should coordinate with the State Governments of Haryana and Uttar Pradesh to adopt and implement similar TOD projects in cities under their jurisdiction.

(Para 5.44)

The Committee, therefore, recommends that the Government should expeditiously clear all pending approvals for the remaining metro lines. To avoid the delays that have plagued previous phases, the Committee also recommends initiating the planning and approval process for Phase 5 at the earliest. This proactive approach is critical for ensuring that the project remains on schedule and meets the city's future mobility needs.

(Para 5.46)

CHAPTER – 6

COMBATING THE MENACE OF STUBBLE BURNING

6.28 The Committee observes that the transboundary nature of air pollution necessitates a seamlessly coordinated response that transcends individual State jurisdictions. The current fragmented approach, with disparities in enforcement, incentives, and procurement policies, leads to inefficiencies and inter-State and Centre-State disputes, undermining the collective effort. Therefore, the Committee recommends the immediate formulation and implementation of a binding Joint Union and Inter-State Action Plan under the aegis of the Commission for Air Quality Management (CAQM).

(Para 6.28)

The Committee further recommends that the CAQM should be empowered to constitute a Committee on Crop Residue Management comprising the Chief Secretaries of Punjab, Haryana, Uttar Pradesh, Rajasthan, and the GNCT of Delhi, along with senior officials from the relevant Union Ministries (Agriculture, Environment, Power, Renewable Energy). This Committee should meet quarterly, with mandatory meetings in August and September to finalize preparedness, to ensure continuous dialogue and decision-making. The Committee also recommends that the Joint Action Plan must mandate the harmonization of critical policies across the NCR and adjoining areas. This includes:

- a) **Standardized Ban on Varieties:** A uniform and strictly enforced ban on the cultivation of long-duration, high-residue paddy varieties like PUSA-44 across all the States.

- b) Common Enforcement Protocols:** Aligned penalties for stubble burning, standardized procedures for revenue record entries (e.g., 'red entries'), and joint patrolling protocols in border districts.
- c) Unified Incentive Structures:** While States may have additional incentives, a base-level, uniform financial incentive for in-situ management and crop diversification should be established across the region to prevent a "race to the bottom" and ensure a level playing field for farmers.
- d) Integrated Resource Pooling and Machinery Sharing:** A Regional CRM Machinery Pool should be created. This digital platform would allow for the real-time tracking and cross-border movement of CRM machines from Custom Hiring Centres (CHCs) during peak demand periods, optimizing resource utilization and addressing local shortages efficiently.
- e) Collaborative Ex-Situ Infrastructure and Supply Chains:** The Joint Plan should facilitate the development of regional clusters for ex-situ utilization. For instance, States with surplus paddy straw (Punjab, Haryana) should enter into formal agreements with States hosting biomass-based power plants or CBG units (e.g., in Uttar Pradesh or Rajasthan) for a guaranteed supply of bales.
- f) Joint Fiscal Responsibility and Funding:** For pan-region initiatives, such as the proposed Crop Residue Management Incentive Payment (CRMIP), the Joint Action Plan must clearly delineate the share of financial responsibility between the Central Government and the participating States/UTs. This will prevent delays and ensure that critical financial

support to farmers is not held hostage to inter-Governmental fiscal disputes.

- g) Data Sharing and Unified Communication:** A common, publicly accessible platform for sharing real-time data on fire incidents (from all satellites), air quality parameters, and enforcement actions should be established. Furthermore, a unified IEC (Information, Education, and Communication) campaign with consistent messaging should be launched across all States to maintain the uniformity of the campaign.
- h) Dispute Resolution Mechanism:** The Committee should be vested with the authority to swiftly adjudicate any inter-State disputes that may arise concerning the implementation of the Joint Action Plan, ensuring that administrative bottlenecks do not derail the collective mission.

(Para 6.29)

The Committee observes that there exists a critical mismatch between the supply of Crop Residue Management (CRM) machines and the peak demand during the short harvesting window. Operational inefficiencies, logistical bottlenecks in the allocation of machines from common pools, and the prohibitive operational costs for small and marginal farmers indicate that mere numerical availability of machinery is insufficient. Therefore, the Committee recommends that the Ministry of Agriculture and Farmers Welfare, in conjunction with State Governments, should undertake a district-wise audit of CRM machinery, focusing not just on quantity but on operational readiness and logistical deployment plans. The States should enhance the efficiency of Custom Hiring Centres (CHCs), particularly through Farmer Producer Organizations (FPOs) and Panchayats, by ensuring

real-time tracking of machinery and transparent, time-bound allocation, especially to small and marginal farmers. Furthermore, the operational subsidy for hiring machines should be re-examined to make it more accessible to the most vulnerable farmers.

(Para 6.30)

Accordingly, the Committee recommends that the Ministry of Agriculture and Farmers Welfare should support the development of paddy straw supply chain infrastructure. This includes providing targeted capital subsidies for balers, rakes, storage facilities, and transportation networks to entrepreneurs, cooperatives, and FPOs. State Governments should act as facilitators to ensure fair price discovery and formal agreements between biomass aggregators and end-use industries, thereby ensuring that a fair share of the economic value reaches the farmers.

(Para 6.32)

The Committee, therefore, recommends that the Ministry of Agriculture and Farmers' Welfare, in coordination with the Food Corporation of India (FCI) and State Governments, must move beyond merely announcing MSPs for crops like millets, pulses, and oilseeds. It is essential to institute a time-bound, systematic, and guaranteed procurement system for these diversified crops at their declared MSP. This would involve pre-declaring procurement targets for millets and other alternative crops in diversification zones, ensuring adequate procurement infrastructure is in place, and integrating these crops into the Public Distribution System (PDS) and other Government schemes (e.g., Mid-Day Meal, Integrated Child Development Services) to create immediate and reliable demand.

(Para 6.34)

The Committee further recommends that the Commission for Agricultural Costs and Prices (CACP) should explicitly incorporate "environmental externalities" into its MSP calculation formula. Crops that confer positive environmental benefits, such as millets which require significantly less water, improve soil health, and generate minimal residue—should be accorded a premium MSP to reflect their value in water conservation, air quality improvement, and sustainable land management. This would make them financially more attractive than water-guzzling paddy on a per-hectare basis. The implementation of MSP must be coupled with robust investment in the post-harvest value chain for millets and other alternative crops. This includes grants for establishing processing units, branding and marketing support for regional specialties and initiatives to develop a robust export market.

(Para 6.35)

The Committee also recommends that one or two districts in Punjab and Haryana should be identified and developed as "Sustainable Agricultural Transformation Zones" as a pilot project. In these zones, a bundled incentive package should be offered, comprising: (i) the premium MSP for millets/pulses, (ii) the existing crop residue management incentive, and (iii) an additional direct benefit transfer for water saved, measured against a paddy cultivation baseline. This integrated approach would provide a powerful and multifaceted economic signal for change.

(Para 6.36)

The Committee has also taken cognizance of the media reports indicating that a segment of farmers are resorting to tactical evasion, such as small-scale or night-time burning, to circumvent detection by satellites. The Committee is concerned that satellite-based monitoring, while pivotal, can be vulnerable to deliberate evasion through practices like small, scattered fires or burning during nocturnal hours. To counter this, a multi-layered surveillance and enforcement strategy is imperative. The Committee, therefore, recommends that Indian Space Research Organisation (ISRO) should launch a dedicated high resolution satellite capable of 24*7 monitoring of farm fires even during night. Further, ISRO should develop a space application mapped with digital farm land records, which could send real time alerts to the concerned authorities. The Committee also recommends that The "Parali Protection Force" or equivalent bodies should not only patrol but also develop local intelligence networks. A confidential grievance or reporting mechanism, possibly with appropriate incentives for verified information, should be established to encourage community self-policing, making it difficult for evasion tactics to succeed. Further, the practice of micro-management at the village level must be intensified. Nodal Officers should be held directly accountable for any fire incidents within their designated jurisdiction, irrespective of satellite detection, with their performance evaluations linked to on-ground outcomes.

(Para 6.37)

The Committee acknowledges the decision of the State of Punjab to ban the long-duration paddy variety PUSA-44, a significant step given its high yield but equally high residue generation. However, a mere ban is insufficient without robust follow-through. The Ministry of Agriculture and Farmers

Welfare should impress upon the concerned State Governments to strengthen their seed supply chain monitoring to ensure compliance with the ban and prevent the emergence of a black market for PUSA-44 seeds. Enforcement actions against unauthorized sale and distribution of banned seeds must be taken. The Committee also recommends that Ministry of Agriculture and Farmers' Welfare should conduct a thorough review of all such varieties of seeds prevalent in the market and ban their use country-wide under The Seeds Act, 1966.

(Para 6.38)

The Committee recognizes the seminal role of the Punjab Preservation of Sub-Soil Water Act, 2009, in combating the critical issue of groundwater depletion by legally mandating delayed paddy transplantation. However, the Committee also finds that this well-intentioned legislation has had the significant, albeit unintended, consequence of exacerbating the stubble burning crisis. By compressing the window between the harvesting of paddy and the sowing of wheat to just 20-25 days, the Act creates a time-bound compulsion for farmers to clear their fields through the quickest and cheapest method available i.e. burning. The Committee feels that the Act has done more harm than good. The Committee observes that the recent notification by State Government of Punjab for staggered sowing across three phases is a commendable and necessary policy intervention. By scheduling sowing based on canal water availability—starting with the well-irrigated western districts, followed by the northern Kandi belt, and finally the central districts—it aims to distribute harvest times, ease market congestion, and extend the field preparation window for individual farmers. The Committee recommends that this approach should be rigorously enhanced and enforced. Nevertheless, the

Committee also feels that staggering sowing alone is insufficient and long-term sustainability necessitates a gradual shift in cropping patterns. The Committee recommends that the State Government of Punjab must encourage diversification away from water-intensive paddy in over-exploited zones through assured procurement and attractive compensation packages for alternative crops like maize, pulses, and oilseeds.

(Para 6.39)

CHAPTER – 7

CURBING THE INDUSTRIAL POLLUTION

The Committee observes that the primary focus of the Government must be on accelerating the transition of industries to cleaner fuels. Therefore, the Committee recommends that the remaining non-compliant industrial units in the NCR must either be made to switch to cleaner fuels or be systematically closed without further delay. The Committee also recommends that to enhance the economic viability of transition of industries to cleaner fuels, Government should actively consider bringing natural gas (including CNG and LPG used in transportation sector) under the Goods and Services Tax (GST) regime, as suggested by industry and research bodies. This would reduce the cost disparity between natural gas and other, dirtier fuels, making compliance more attractive.

(Para 7.31)

The Committee further recommends a focused Government intervention to curb the use of illegal fuels like pet coke and furnace oil in the unorganized sector. The Committee also feels that enforcement and

monitoring capabilities require a substantial upgrade. The challenge of monitoring a vast number of small, unorganized units in non-conforming areas demands a strategic shift from purely punitive measures to a facilitative and technology-driven approach. The Committee recommends that a system of independent third-party audits should be mandated to verify industrial emission controls, complementing the efforts of under-resourced State Pollution Control Boards.

(Para 7.32)

The Committee further recommends that the expansion of Online Continuous Emission Monitoring Systems (OCEMS) must be expedited beyond the current 400 red category units in Haryana to cover all significant air pollution emitting industries across NCR, with data in real-time to ensure accountability.

(Para 7.33)

The Committee also recommends that dedicated and accessible financing mechanisms, including soft loans and grants, need to be established to help industries, especially small and medium enterprises, to upgrade their technologies for cleaner environment.

(Para 7.34)

CHAPTER – 8

POLLUTION FROM THERMAL POWER PLANTS

The Committee notes with concern that some thermal power plants in the vicinity of NCR require compliance with SO₂ norms and lack emission control systems like FGDs considering their significant role in contributing to

Delhi-NCR's air pollution. The Committee is of the view that repeated extensions may not be given to these thermal power plants for meeting their compliance norms. The Committee recommends that the Ministry of Power and the Ministry of Environment, Forest and Climate Change must ensure that FGDs are installed in these TPPs as per the 11 July, 2025 Notification.

(Para 8.15)

The Committee also recommends that CAQM, together with the Ministry of Environment, Forest and Climate Change and the Ministry of Power, should conduct a monthly review to monitor the progress of FGD installation and operationalization for each non-compliant unit.

(Para 8.16)

The Committee is of the view that there is an urgent need for dissemination of real-time emission data from thermal power plants (TPPs) and industries to ensure transparency, accountability, and effective environmental governance. The Committee, therefore, recommends that CPCB and CAQM should make the installation of tamper-proof Continuous Emission Monitoring Systems (CEMS) across all thermal power plants and industries mandatory, with data streamed in real-time to a dashboard to ensure transparency.

(Para 8.21)

CHAPTER – 9

MANAGING THE POLLUTION FROM DUST

The Committee notes that the current system effectively monitors construction, but the demolition process remains largely unregulated, leading to wasteful and polluting practices. Therefore, the Committee recommends

strengthening the regulatory framework for demolition activities and mandating the use of recycled materials. The Committee recommends introducing a mandatory demolition permit system that incorporates resource recovery and recycling plans, ensuring that valuable materials are salvaged and directed towards recycling facilities. Furthermore, to create a stable market for recycled C&D products, the mandate for their use should be expanded beyond Government departments. A regulation should be enacted requiring all construction projects, including those in the private sector, to incorporate a minimum percentage of recycled C&D materials, such as aggregates, in their building processes. This will ensure a consistent demand and improve the economic viability of recycling plants.

(Para 9.8)

The Committee also recommends that the collection, transportation, and processing network for C&D waste must be expanded and integrated with technology. While Delhi has a robust network of collection centres, other cities in the NCR have significantly fewer, with Gurugram operating only one centre. Efforts should be made to establish a denser network of collection points across all ULBs to prevent illegal dumping and ensure convenient access. The transportation of waste from these centres to processing plants should be modernized through a GPS-enabled vehicle fleet, providing real-time data for efficient logistics management. The proposal for an AI-enabled web portal with geo-tagging is a welcome step. However, this system should be expedited and integrated across the NCR to provide a unified platform for monitoring compliance, tracking waste movement, and sending automated alerts for violations.

(Para 9.9)

The Committee further recommends that the mechanized infrastructure for dust control must be scaled up and maintained with a focus on permanent solutions. The deployment of Mechanical Road Sweepers, Water Sprinklers, and Anti-Smog Guns should be intensified, particularly in other NCR towns beyond Delhi, to match the scale of the problem. The plan to pave and green road shoulders and central verges is a critical long-term solution to prevent dust accumulation. The Comprehensive Road Redevelopment Action Plan should be scaled up and implemented on a mission mode. Greening initiatives through Miyawaki forests and verge plantations must be continued aggressively to naturally stabilize dust and improve air quality.

(Para 9.10)

The Committee observes that to address the gap in mechanized road sweeping, a targeted plan for the procurement and deployment of machinery is essential. While the hiring of 70 new Mechanical Road Sweepers (MRS) by the PWD is a positive step, the data indicates that a significant portion of roads, particularly in DDA flats, unauthorized colonies, and JJ colonies, remain reliant on manual sweeping due to narrow roads. Therefore, the Committee recommends that the Ministry of Housing and Urban Affairs, in coordination with the Delhi Government and Municipal Corporation of Delhi (MCD), may actively facilitate and fund the procurement of smaller, more agile mechanical sweepers capable of navigating narrow lanes. The 18 MRS already under procurement by MCD should be prioritized for this purpose. Furthermore, the success in Ghaziabad, where 12 MRS were approved under Swachh Bharat Mission Urban 2.0, should be replicated, with all ULBs in the NCR encouraged and assisted to submit similar project proposals to maximize Central Assistance.

(Para 9.20)

The Committee also recommends that the implementation of existing directives must be rigorously monitored and enforced. Similarly, the plan to install mist spraying systems on electric poles at major traffic intersections needs a clear implementation timeline from the respective road-owning agencies, with progress reviewed monthly by the CAQM. The "Comprehensive Road Redevelopment Action Plan" must be finalized and its revision expedited; this plan should be converted into a time-bound, year-wise implementation schedule with clear quarterly milestones, especially for agencies like PWD and MCD, which have the largest lengths of road proposed for redevelopment.

(Para 9.21)

The Committee also recommends that the greening and paving efforts must be accelerated and expanded. While progress has been made, with 1809.61 km of central verges greened and 2448.1 km of roadside paved, the remaining targets of 156.75 km and 746.094 km, respectively, require a mission-mode approach. The funds transferred under the National Clean Air Programme (NCAP) should be exclusively and expediently used for this purpose, with a focus on achieving 100% paving of roadside and greening of central verges within a strict deadline. This will prevent the suspension of dust and contribute to long-term air quality improvement.

(Para 9.22)

CHAPTER – 10

AFFORESTATION MEASURES IN DELHI

The Committee is of the view that afforestation should be integrated as a central pillar of the region's air pollution action plans, moving beyond treating it as a peripheral environmental concern to recognizing it as vital public infrastructure. The Committee observes that although the forest cover in Delhi has increased since 2013, it marginally fell down from 2021. Moreover, the forest cover is only 13 per cent of Delhi's total land area. The Committee recommends that Government should take proactive measures to increase the forest cover in the city.

(Para 10.9)

The Committee notes the proven efficacy of the Miyawaki method in creating dense, fast-growing native forests. The Committee recommends the Ministry to launch a dedicated mission to grow Miyawaki forests, specifically for Delhi NCR. The Committee has also taken note of the alarming dominance of invasive species like *Prosopis juliflora*, which constitutes the highest number of trees in Delhi's forests but offers minimal ecological value and actively harms biodiversity. The successful model of the Northern Ridge Biodiversity Park, which replaced *Prosopis juliflora* and *Lantana camara* with native flora, should be replicated across the city. This programme should involve systematic mapping of invasive species extent, phased scientific removal, and immediate replanting with pollution-absorbing native species such as Neem, Jamun, and Mango to prevent reinvasion and restore ecological function.

(Para 10.10)

CHAPTER – 11

CONCLUSION: THE IMPERATIVE FOR A COLLECTIVE RESPONSE

The analysis presented in this Report unequivocally demonstrates that the air pollution crisis in Delhi NCR is a complex and persistent challenge with severe consequences for public health, the economy, and the environment. The problem is multifaceted, stemming from a confluence of factors including vehicular emissions, industrial pollution, construction dust, and the seasonal influx of agricultural residue burning. No single policy or quick-fix solution can untangle this deep-rooted issue. The recurring cycle of hazardous air quality underscores that while numerous plans and policies have been formulated, their implementation has to be strengthened. The situation demands a paradigm shift from reactive, seasonal measures to a proactive, sustained, and holistic strategy.

(Para 11.1)

History shows that cities geographically trapped like Delhi can indeed achieve clean air. Beijing, surrounded by mountains, successfully tackled its toxic air pollution through a determined war on pollution, implementing strict anti-pollution laws, shutting down heavy industries, and enforcing clean vehicle standards. Likewise, Los Angeles, another city confined by its topography, cleared its legendary smog through decades of determined action, driven by strong regulations and innovations like the catalytic converter. Even London, whose weather often traps pollution, eliminated its deadly smog by passing groundbreaking clean air legislation. These powerful examples

demonstrate that difficult geography does not have to be destiny. With sustained political will, smart policies, and technological investment, a future of clean air is an achievable reality.

(Para 11.2)

Ultimately, resolving Delhi NCR's air pollution is not a task for one Government or agency alone; it is a challenge that can only be met through the unwavering participation and coordinated action of all stakeholders. This requires a synergistic approach where every Ministry and Department of both the Central Government, and every State Government in the region, works in harmony. The Union Ministries of Environment, Forest and Climate Change; Power; Road Transport and Highways; Agriculture and Farmers Welfare; and Housing and Urban Affairs must align their policies to create a unified front, transcending political and jurisdictional boundaries. Simultaneously, the State Governments of Delhi, Haryana, Punjab, Uttar Pradesh, and Rajasthan must enforce regulations consistently and invest in shared infrastructure for clean energy, public transport, and waste management.

(Para 11.3)

However, Government action alone is incomplete without the active partnership of the region's citizens. Public participation is the cornerstone of this endeavour, encompassing a shift in individual behaviour—adopting public transport, reducing personal waste generation, and reporting violations—and a collective demand for cleaner alternatives. When Governments, industries, and citizens recognize their shared responsibility

and act in concert, the daunting challenge of clean air becomes an achievable goal. The path forward is clear: only through a united, coordinated, and persistent effort can we hope to reclaim the right to breathe clean air and secure a sustainable future for Delhi NCR.

(Para 11.4)