Recommendations of the Brainstorming Workshop
on
Review of National Ambient Air Quality Standards (2009)
Held on 17th October at New Delhi

Objectives

1. Review the NAAQS based on experiences gained through NAMP, EIA Study, compliance monitoring by industry, research carried out by academic institutions and the recent lockdown - COVID-19 pandemic.
2. Incorporate in NAAQS, the knowledge gained from health effect studies, the background air quality, the dominance of meteorological factors.
3. Review the existing method of measurements prescribed in NAAQS-2009 in view of the technological advances made in past two decades.
4. How to get good quality data by eliminating variations and bias
5. Extend scientific support to the decision makers for revision of NAAQS 2009.

The Workshop was organized on 17th October 2020. The list of speakers is attached as Annexure I. The Proceedings of the workshop are attached as Annexure 2. The recommendations are listed below:

A. Policy Related

1. NAAQS should be categorized into three components
   i. Essential Parameters (for NAMP): $PM_{2.5}$, SO_2, NO_2, O_3 and CO.
   ii. Specific Parameters (For critically polluted areas, chemical industry zone, etc): VOC, PAH in PM and Metals in PM (in addition to essential parameters)
   iii. EIA Study Parameters (for sector specific baseline data generation for EIA study purpose)

2. **Defining Scope, Applicability and Limitations of NAAQS:** NAAQS should clearly define the scope and applicability of all parameters, averaging times, numerical values, and monitoring methods.

3. **Stringent NAAQS for Sensitive Areas in the country:** The pristine and sensitive areas like Ecologically Sensitive Zones, Mountain ranges (seven) including glaciers, Wetlands identified under Ramsar convention, National Park

and Wildlife Sanctuaries and Biosphere reserves should have stringent NAAQS, so that the good quality of air in such areas could be preserved.

4. **Measuring only $PM_{2.5}$ as Essential Parameter in NAAQS:** Measuring $PM_{2.5}$ is adequate to meet the objective of air pollution control because $PM_{2.5}$ is more harmful to human health.

5. **Need to redefine NAAQS for $PM_{2.5}$ by considering the baseline concentrations observed during countrywide lockdown:** COVID-19 pandemic and subsequent lockdown (Phase-1: 25th March to 14th April 2020, Phase-2: 15th April to 3rd May 2020) has given us opportunity to observe minimum values of $PM_{2.5}$ all over the country These are the baseline values of $PM_{2.5}$ when all activities were stopped in the country and only essential services like power plants, steel plants, cement plants, oil refinery, etc. was operating. Data generated by CPCB during lockdown period should be appropriately used to frame the revised NAAQS.

6. **Define Air-shed based on Ventilation Coefficient:** The numerical values in NAAQS should be fixed based on the micro-meteorological conditions of a defined air-shed. Airshed should be identified based on the ventilation coefficient, which is the product of mixing height and average wind speed, Data of mixing height and wind speed (at 10 m height) for all representative sub-regions of the country is available with IMD. IMD should be engaged to provide the ventilation coefficient data of different air-shed of India.

7. **Air shed based NAAQS particularly for $PM_{2.5}$:** The dust contributing to fine particles is primarily a mixture of natural suspended soil, re-suspension of road dust, anthropogenic carbon soot and particles. The natural soil dust is least harmful to human health. Therefore, a higher limit can be defined for $PM_{2.5}$, particularly in the Northern Plains of Punjab, Haryana, Delhi, Rajasthan, Uttar Pradesh, Bihar). For other regions including hilly and coastal states, a different set of values of $PM_{2\ 5}$ can be defined primarily based on the baseline values observed during COVID pandemic.

8. **Increase the number of National Air Quality Monitoring Stations in sensitive and rural areas**: All 793 NAMP stations covers 344 towns and cities. 27% of India's land mass is covered by pristine areas. Therefore, the existing NAMP stations do not represent the correct picture of country. More NAMP stations are required in sensitive and rural areas, which could serve as the background data.

9. **NAAQS for Critically Polluted Areas:** In polluted industrial areas, monitoring of some "Specific Parameters" are required under NAAQS. Parameters like VOC, Benzo(a)Pyrene and Heavy metals in PM may be considered separately as "Project Specific Parameters".

10. **NAAQS for EIA Study Purposes**: Based on the sector specific EIA Study prescribed under the EIA Notification, "EIA Specific Parameters for Baseline Data Generation". Monitoring guidelines for section of locations, frequency, parameters, methods and assessment of results are required under NAAQS.

11. **CAAQMS of Industries:** The CAAQMS network established by various Industries should be brought under the purview of NAMP by increasing the Quality Assurance / Quality Control protocol and routine surveillance.

12. **Relax NAAQS of CO:** Existing Indian NAAQS of CO is very stringent compared to International standards. (given in Table below).

	Country	**Unit**	**1-hour mean CO**	**8-hour mean CO**
1	WHO	mg/m^3	Not prescribed	Not prescribed
2	**India**	**mg/m^3**	**4**	**2**
3	USA	mg/m^3	40 (35 ppm)	10 (9 ppm)
4	Australia	mg/m^3	-	10 (9 ppm)
5	Canada	-	Not prescribed	-
6	European Union	mg/m^3	-	10
7	China	mg/m^3	10	-
8	New Zealand	mg/m^3	30	10
9	Qatar	mg/m^3	40	10

B. Methodology Related

1. **Promote development of air quality monitoring instruments in the country:** Following four types of monitoring techniques could be included in NAAQS - CAAQMS (Conventional), Manual Monitoring (Conventional), Satellite based monitoring, Sensor based monitoring.

2. **Ensure Quality Assurance / Quality Control through a standardized protocol:** QA & QC and calibration of quality monitoring analysers should be integral part of the NAAQS.

3. **Add Electrochemical Sensors for measurement of Carbon Monoxide:** Electrochemical sensor-based technology using a logger-based monitoring instrument to record values at least at every five-minute interval for 1 – 8 hours could be another method for CO monitoring.

4. **Sensor based instruments:** Low cost sensors of various kinds are increasingly used to provide quick status of $PM_{2.5}$, O_3, VOC and CO, etc. Standard protocol (USEPA, QAL1, MCERTS) with robust QA/QC procedures is required for application of low-cost monitors as a monitoring instrument.

5. **Meteorology:** Diurnal and seasonal variations of metrological situation is necessary for quantification of air pollution impacts. Temperature lapse rate, Wind speed at different height, Mixing height and ventilation coefficient should be integrated with assessment of ambient air quality.

C. Management Aspects

1. **Staff:** Due to staff shortage in many SPCBs, the primary objective of NAMP gets compromised. SPCBs /PCCs should recruit qualified staff for routine operation and maintenance of NAMP stations and also establishing new stations.

2. **Training**: Training of monitoring staff (of laboratories belonging to SPCB, private, institutional and industry) is required so that quality of data generated should be satisfactory and acceptable. Suitable organizations and institutions for training should be identified. SOP for training and capacity building of staff involved in air quality monitoring should be developed.

3. **CAAQS Guidelines:** Guidelines for CAAQMS stations should be developed. The guidelines should specify the criteria for selection of location, monitoring parameters, frequency and QA/QC protocol, and SOP for O & M.

4. **Public Comments:** The draft NAAQS once finalized by CPCB through its expert Peer and Core Committee should be published for public comments. Regional workshop should be organised to obtain comments and suggestions of various stakeholders on draft standards in a time bound manner.

5. **NAAQS revision Protocol:** The protocol for review and revision of NAAQS needs to be documented.

Annexure 1: List of Speakers

1. Dr. Rakesh Kumar - Director, NEERI (online)
2. Er. Sundeep, Director – CP, MOEFCC (online)
3. Dr. B. Sengupta - former Member Secretary, CPCB
4. Dr. J.S. Sharma - Member EAC, Industry 2, MOEFCC & Former Group GM-ONGC)
5. Dr J.K. Moitra - Director, EMTRC Consultants Pvt Ltd & NABET/ QCI Accredited EIA Expert
6. Prof Manju Mohan - Centre for Atmospheric Sciences, IIT Delhi
7. Dr S.D. Attri - Additional Director General of Meteorology, IMD
8. Prof Umesh Kulshrestha- Dean School of Environmental Sciences, JNU,
10. Er.JS Kamyotra - Former Member Secretary CPCB
11. Dr. S.K. Goyal - Chief Scientist & Head, Zonal Office Delhi, NEERI & EIA Expert
12. Mr Parthaa Bosu- Environment Defence Fund
13. Dr S.K.Jain - Former GM-EMG, NTPC Limited
14. Dr. Abhijit Pathak - Scientist D, CPCB
15. Dr. Rajendra Prasad - Ecotech Instruments
16. Dr. S.K.Tyagi - Former Addl Director, CPCB
17. Er Namita Gupta - Airveda Technology
18. Prof. Madhoolika Agrawal - Dept of Botany, BHU, Varanasi
19. Prof Sagnik Dey - Centre for Atmospheric Sciences, IIT Delhi
20. Prof. Arun Arya - Former Head, Dept of Botany, MS University Baroda
21. Er Nihar R Sahoo - Chief Environmental Engineer, Odisha SPCB (submitted paper)
22. Dr Dipankar Saha - Former Addl Director, CPCB & Expert Member, EAC Infra2
23. Dr Utpal Mukherjee - Former Sr Environment Specialist, Government of Qatar
24. Dr R.S.Saini – Founder, Green Initiatives, Chandigarh
25. Prof. Rajeev K Srivastava - Chairman, Expert Appraisal Committee, Uttarakhand & Head Dept of Environmental Sciences, Pt GB Pant University, Pantnagar
26. Dr Poornima Prabhakaran - Head Environ Health, Public Health Foundation of India
27. Prof Arun K Sharma - Dept of Community Medicine, UCMS, Delhi (submitted paper)

In addition to above following distinguished guests were present during the event

1. Dr. A.L.Agarwal, - Former Dy Director NEERI
2. Dr.P.B.Rastogi - Former Advisor MOEFCC
3. Dr. Prashant Gargava – Member Secretary, CPCB (he wished workshop all success & requested to send the proceedings and recommendations.
4. Dr. Sunil Gulia, Sr Scientist, CSIR-NEERI

Annexure 2: Proceedings of the Workshop

The views and suggestions of speakers are given below:

1 Dr. Rakesh Kumar, Director CSIR-NEERI

Dr Rakesh Kumar greeted the organizers of the event and other experts of the IAAPC. An important issue is how we have handled our standards and the way we have handled our conversation with the public. Two extreme directions: one set of panellists have a perception that everything is bad in Air Quality in India while a set of experts believe we are doing the best to control the Air Quality in India.

During the Lockdown period, CSIR-NEERI DZC analyzed the data from more than 44 cities wherein it is observed that the AQI did not achieve the values as prescribed by WHO. It is also observed that India is among the few countries to impose stringent rules on lockdown.

Some of his Key Observations were-

1. About 17-44% reduction was observed during the lockdown for PM. We need to consider the regional, local background concentrations.

2. The issue is the availability of CAAQMS in the residential, industrial, mixed area and all of these stations are classified as Ambient AQI data. This is not the correct way and we need to reclassify the stations based on the location/ environment. We need to refine the AQI Standards on the basis of residential, industrial, kerb sites, roadsides, and regional background stations. He also suggested the possibility for research monitoring stations to analyse and predict the upcoming trends.

3. He raised the question of the need for either region-based standard or air shed based standard. He also discussed the possibility of Air shed based monitoring, standards, and controls for air pollution.

4. He concluded with the roles of CPCB and SPCB regarding the communication regarding air pollution with the public and other options to increase awareness among the masses. He told being a tropical country the weightage being given to PM / Dust for AQI calculation is unjustified.

5. He concluded by emphasizing the need for standardizing the equipment for monitoring for the uniformity and validation of secondary data.

2. Er. Sundeep, Director – CP, Ministry of Environment Forests & Climate Change (Inaugural remarks – online)

As the workshop is to review the National Ambient Air Quality Standard – 2009, I assume that the discussion will explore the potential, possibilities and scope to bring comprehensive improvement by incorporating different perspectives expressed by the experts and researchers from varying background – Monitoring, analysis, data management, health, policy, regulation, technology, socio-economic aspects. This will pose challenge for the collating team to balance the many contrary propositions arising from various research and practical challenges.

However, before we ponder about review, let us place our gratitude to the team for suggesting and getting implemented the NAQS standard in past viz. 1982, 1994 and 2009. The implementation of past standard has provided opportunity and experiences to assess their efficacy and limitation and therefore a steppingstone for further improvising on it.

The standards are made based on the knowledge and expertise available at the time of provisioning. Further, experiences gained on challenges in implementation and achievement of objectives, the standards necessitate for review. We, as a policy have started taking preliminary work for review of the existing NAAQS, and hope with the help of CPCB and our technical partners will be working it out as early as possible.

My understanding suggests, fixing standard for Ambient Air or Water, is one of the most complex scientific prescription for environmental health. NAAQS is basically an effect standardization, in environmental parameters terms, derived and accepted after balancing the critical consideration of acceptable health risk and the present or foreseeable status of socio-economic development. Some of the points which I feel, needs to be kept under consideration while evolving guidelines for framing the standard are

1. Air Quality Standard is aimed to provide a uniform basis for the protection of Public Health and its eco-system from the adverse effects of air pollution and also to reduce the exposure of identified pollutants having potential to be hazardous.

2. NAAQS is a legal commitment made based on the comprehensive assessment of scientific, economic, social and health impact knowledge available at the time of its development.

3. WHO – suggests health-based Air Quality Guidelines (AQG), which forms basis for national and international standard. Simply adopting the AQG of WHO will lead to non-achievable standards by default, considering the Indian baseline conditions and other factors.

4. Unlike past, today we are rich with monitoring data, available using different technologies of varying geographical locations and climatic condition including COVID pandemic, which has given an opportunity to differentiate between achievability and non-achievability.

5. In general, following factors needs to be debated with absolute data and research outcomes while setting the stage for review of NAAQS:

- Technical feasibility of air quality monitoring
- Analytical methodology for Monitoring
- Monitoring strategy vis-à-vis availability of resources
- Cost – effectiveness of adopting specific parameters as standards
- Climatic and background conditions
- Socio-economic consequences
- Public perception
- More important – Possibility of compliance (Implementation)

6. Strength and weakness analysis of various methodology adopted by other countries with due diligence of their background status, provide very essential inputs in deriving the standard. But due caution is required while reviewing the practices that it is more concentrated towards similar countries having similar climatic, background and socio-economic conditions. Adopting experiences from contrast environment leads to challenges in attainment.

7. Consideration which may be required to be discussed may include

- Regional station – for background
- Different standard for different Geographical consideration
- Relevance and regulatory impact analysis in selecting the Parameters
- Metrological information as a metadata for NAAQS for normalisation for a varying climatic and geographical country like India
- Providing guidelines for future direction,
- Adopting Good options instead fixing target of failure embedded Better option.
- Defining the hierarchy for parameters based on frequency, health effect, objectivity, relevance, technology, feasibility, and achievability, and other criteria for NAAQS
- Conditions where monitoring both PM_{10} and $PM_{2.5}$ are essential, conditions where monitoring any one is adequate for making targeted action plan.
- Rationale for introduction of new or removing existing parameters

- Consideration of NAAQS for Critically / Severely Polluted areas /Industrial Areas, Pristine Areas (Himalayas and other mountain ranges, Western Ghats, Nilgiris, Eastern Ghats, and NE States of India), and Metro Cities (having population above 5 million).
- Concept of adverse meteorological conditions and its application in NAAQS, availability and representation of meteorological information as metadata for Air quality reporting
- Prescribing methodology for monitoring or opening it for other methods with defined rationale and objectives
- Should standard be limited to ambient or Indoor quality also needs to be prescribed, as studies exposure time of indoor air quality is more than ambient.

7. Ambient Air quality standard are reference point and provides base to set emission norms and its control and abatement strategies

8. Research works carried out on air pollution management aspects in India and brainstorming session like this provide scientific knowledge base support to the law makers in devising its country specific guidelines for formulation of standard.

3. Dr B. Sengupta, Former Member Secretary, CPCB

1. NAAQS is used in declaration of non-attainment cities (presently 126 NA Cities), used in identifying critically polluted areas and severely polluted areas, used for calculating the Environmental Compensation charges from polluters, used for formulation of clean fuel policies, used for introducing major policies like FGD / DeNOx in TPP, used in formulating BS(VI) standards for vehicles.

2. Thus, huge amount of tax payer's money are allocated and spent by Government to implement the above policies which are developed using present poor air quality monitoring data and compared with air quality standards.

3. Out of 12 parameters only PM_{10}, SO_2, NO_2 are generally monitored in majority of manual air quality monitoring stations. Poly-aromatic hydrocarbon (PAH), benzene, ozone, $PM_{2.5}$ etc. are not monitored in more than 95% of the manual stations and PAH, benzene, lead, nickel, vanadium are not monitored in more than 90% of CAAQMS. Therefore, monitoring capabilities in SPCBs / other agencies to be developed and proper sampling and analysis methodology specially for PAH, benzene, ozone (manual method) to be provided by CPCB.

4. In the stations maintained by SPCBs and Industries, the calibration of analysers, QA/QC aspects are not given enough attention resulting poor quality data are generated.

5. The personnel of SPCBs who are supposed to maintain and operate the CAAQMS / manual stations are not properly trained. In many places, it is managed by non-qualified personnel.

6. As CAAQMS are mostly imported, the availability of spare parts, calibration gases accessories, permeation tube, are always a major issue.

7. The huge data collected by SPCBs/PCCs are not analysed properly & conclusions are not drawn due to insufficient manpower.

8. NAAQS should be formulated based on effect of air pollution on human health, on agriculture / vegetation / property. NAAQS should consider Land use, Micro meteorological conditions (for example ventilation coefficient which is *mixing height x average wind speed*), airshed based approach, especially for areas having low ventilation coefficient.

9. Available Indian health affect data generated by AIIMS, Patel Chest Institute, Chittaranjan Cancer Research Institute, ICMR, Sri Ramachandra Medical College, PGI Chandigarh, PHFI, PSPRI, etc. should be collected and analysed for use in developing air quality standards.

10. Finding of source apportionment studies should be analysed for better understanding about sources of pollution and also the EC / OC / metal content of PM.

11. Existing air quality to be considered and stringent standards to be kept in pristine areas like North-Eastern States, Coastal Cities, Forest Areas, etc. to maintain high quality of air.

12. Air quality during lockdown period to be examined for understanding the background level of pollutants.

13. Air shed based approach specially for Ganga Basin States and Critically Polluted areas.

14. Due consideration of solar / wind power (zero emission) in energy sector (175000 MW of power by 2030 and electric vehicles in vehicular sector to be considered as it is anticipated that large reduction of pollution load will be reduced in urban areas due to above)

15. Commitment to treaties given by the Government like Paris Convention, Climate Change Convention, etc.

16. Number of parameters to be kept considering monitoring capabilities of SPCBs and other agencies.

17. Following techniques for AQM may be considered:- CAAQMS (Conventional), Manual monitoring (Conventional), Satellite based monitoring, Sensor based monitoring and monitoring methodology as approved by CPCB under Air Act, 1981 should be part of the standards.

18. QC/QA and calibration of analysers of air quality monitoring data should be part of the standards to be followed.

19. Capacity building of regulatory authorities is required.

20. It should be clearly understood that meeting ambient air quality standards is the responsibility of regulatory authorities *[(SPCB/PCC/CPCB/MOEF) (refer Air Act, 1981 and E(P) Act,1986)]* for which implementable action plan to be prepared based on emission inventory, air quality monitoring, air quality modelling and source apportionment studies, etc.

21. Various orders issued by Hon'ble NGT and Hon'ble Supreme Court on air quality improvement / air pollution control should be carefully examined while revising the NAAQS.

22. The revised AAQS should be based on findings of recent studies on health effects of air pollution, source apportionment studies (carried out by IIT/ NEERI/ CPCB), present land use pattern, ventilation coefficient of the area to be provided by IMD / IITM, policies of GOI on EV, Solar Power / Wind Power, hydrogen fuel, etc.. Also policies of usage of clean fuel in urban areas to be considered.

23. The draft NAAQS once finalized by CPCB through its expert Peer and Core Committee should be published for public comments. Regional workshop should also be organised by CPCB / MOEF&CC to obtain comments / suggestions of various stake holders on draft standards in a time bound manner.

24. The clarity on type of instruments to be used for monitoring air pollutants *(CAAQMS, manual samplers, satellite based monitoring, sensor based low cost monitoring) and protocol of calibration for QA/QC of sampler should be part of air quality standards)*.
25. The procedure for type approval of air quality monitoring instruments should be introduced (as already exist for new vehicles). The certified model and make as approved by CSIR / NPL should only be used for monitoring.

4. Dr. J.S. Sharma (Member Expert Appraisal Committee, Industry 2, MOEFCC & Former Group GM-ONGC)

1. Agencies to develop AQ goals and interim, short term and long-term emission reduction targets based on science, scientific data, risk exposure, technology etc. including strategies to achieve them.
2. Experts / agencies is to come out on periodicity of revision on AAQS including developing a standard PROTOCOL for revision of AAQS.

3. Region based AAQS (based on geographical area) is the need of the hour (coastal cities, Himalayas and Eco–sensitive areas and Metro cities, North East India, etc).

4. CAP-&-TRADE SYSTEM can be practiced for prescribing AAQS for Critically polluted areas, severely polluted areas and non-attainment cities in term of emission reduction and cost-effectiveness after studying carrying capacity / Assimilative capacity (as being practiced in US).

5. Ground level Ozone is an emerging issue and could be more challenging in future. The coupling of climate mitigation + air pollution control exhibits significant co-benefits that can lead to a win-win opportunity.

6. Benzene needs short term standards instead of annual, since benzene is not being monitored on annual basis throughout the country.

7. Consider only PM2.5 in standard instead of both PM2.5 & PM10. (if PM2.5 is controlled indirectly several pollutants can be controlled)

5. Dr J.K. Moitra (EMTRC Consultants Pvt Ltd, NABET/ QCI Accredited EIA Expert

1. Out of 793 NAMP stations covering 344 towns / cities, only 1 location is sensitive area (Taj). 27% of India's land mass is covered by forests, water bodies and glaciers. 90.7% of the total land mass in India represents rural character, supporting 66% population. Therefore, the existing NAMP stations, are urban-centric, and not representing true picture of India. The entire country is marked as polluted in the social media, resulting in tourism loss. CPCB should add more NAMP stations covering sensitive area and rural areas of India.

2. WHO air quality guidelines; Global update 2005 are based on health effects of air pollution and thresholds for health-harmful pollution level (PM_{10}, O_3, NO_2 and SO_2). Technical Report by WHO titled "Review of evidence on health aspects of air pollution" (2013) compiles heath-harmful pollution data from all over the world. The accumulated scientific evidence on health-harmful pollution level is meant to provide reliable evidence to policy makers. Large team of renowned international experts collected the scientific evidence from all parts of the globe. WHO is the custodial agency for three air pollution-related Sustainable Development Goals (United Nations, of which India is a signatory including 194 member countries): Mortality from air pollution, ii) Access to clean fuels and technologies and iii) Air quality in cities. India may consider harmonising the NAAQS, by considering the five parameters (PM_{10}, $PM_{2.5}$, O_3, NO_2 and SO_2). as Key Pollution Parameter, as recommended by WHO (2018). The balance seven parameters may be kept as project specific monitoring parameter. The numerical values of five parameters should be fixed based on India's ability and priority to regulate the ambient air quality.

3. Existing Indian NAAQS of CO is too stringent compared to International standards. The revised CO standard should match the international standards.

4. In revised NAAQS the scope and applicability for including the parameters, averaging times, numerical standards and method of monitoring in EIA process should be clarified. The Standard TORs issued by MOEFCC in April 2015 for EIA Study various types of projects should be revised.

5. Measuring PM_{10} or $PM_{2.5}$ should be adequate to meet the objective of EIA Study, that is preparing management plans for prevention and control of air pollution. $PM_{2.5}$ is integral part of PM_{10}. Measures adopted to reduce either PM_{10} or $PM_{2.5}$ will reduce both PM_{10} and

$PM_{2.5}$. Point, area, or line source emissions are not measured as PM_{10} or $PM_{2.5}$. About 50 countries (out of 194 member countries of WHO) have prescribed only one parameter. Developed nations like Canada, Australia & New Zealand have prescribed NAAQS only for $PM_{2.5}$ or PM_{10}.

6. Prof Manju Mohan (Centre for Atmospheric Sciences, IIT Delhi

1. It is recommended to add ventilation index (to be worked out based on ventilation coefficient) to reflect dispersive capacity of the atmosphere and be displayed along with the Air Quality in order to appropriately interpret Air Quality Index status in terms of emissions or meteorological factors.

2. Regional airsheds shall be prepared based on chemical transport modeling to account for the emission, meteorology and long-range transport.

3. Harmonization of the monitoring techniques especially wrt to the most critical pollutants (PM_{10} and $PM_{2.5}$) shall be taken up.

4. Low cost sensors of various kinds are often being used to provide Air Quality Status. There shall be a standard protocol with robust QA/QC procedures for low cost monitors and displayed appropriately along with the reporting of AQI values.

5. Policy relevant background monitoring stations to represent air quality (in the absence or minimal exposure to anthropogenic influences) be set up over regional and city levels to plan and gauge the efficacy of regulatory measures.

6. There are several toxic elements and substances (for example Cadmium, Nickel, Fluoride etc.) with multiple routes of exposure viz., air, water, and food necessitating integrated health risk assessment for setting up standards and control strategies. A national level study (covering major states of the country) on integrated risk assessment for multiple exposure routes be taken up for toxic substances.

7. Along with AQI and other information, concentration of toxic elements shall also be reported at select representative sites in all cities.

8. In addition to industrial, residential and commercial areas, each city shall monitor all the detailed parameters on meteorology, toxic substances and air quality at representative

academic institutions and hospitals as test bed sites for greater insight in the air quality management issues.

9. Air Quality and emission standards shall be reviewed once in three years and revised at least once in five years.

10. To facilitate wider coverage with good quality, cost-effective and accurate air quality measurements in the country, indigenous development of environmental instruments shall be promoted within “Make in India’ programme.

7. Dr S.D. Attri (Additional Director General of Meteorology, IMD

1. It is the weather that triggers an air pollution episode by amplifying emissions at particular place. Meteorological measurements are critical in deciding monitoring criterion and interpreting data, adequacy of air pollution control strategies, efficiency of air pollution control equipment and assessing the geographical elements of planning.

2. Accurate measurement of meteorological parameters depends on exposure and siting conditions, state of art monitoring systems and quality control following the international standards.

3. Number of air quality stations and periodicity of measurement in a particular industrial situation is government by meteorological conditions/ parameters which need to be continuously recorded by self recording instruments.

4. Diurnal and seasonal variations of metrological situation need to be assessed for quantification of air pollution impacts on receptors

5. Mixing height and ventilation coefficient should be integrated in industrial setting planning.

6. Air quality models should incorporate the requisite site-specific meteorological conditions to predict impacts due to developmental activities.

8. Prof Umesh Kulshrestha, Dean School of Environmental Sciences, JNU and Member EPCA

1. **Need to redefine particulate standards:** The `New Normal’ scenario of COVID-19 has given us an opportunity to observe minimum values of criteria pollutants such as NO_2, SO_2, $PM_{2.5}$, PM_{10} and O_3. These are the background values of the pollutants during the

lockdown. These values will serve the purpose of baseline data of the region and its subregions. The problem of violation of National Ambient Air Quality Standards (NAAQS) norms especially in case of particulate matter, will be resolved by using these background ambient concentrations. At present, due to high soil-dust influence, values of particulate matter are often noticed above prescribed NAAQS levels. For example, the 24 hrs NAAQS limit for PM_{10} is 100 $\mu g/m^3$ but the average is reported as 251 $\mu g/m^3$ while that of NAAQS limit is 60 $\mu g/m^3$ but the recorded average is 129 $\mu g/m^3$ in the NCR. The recorded values are most of the time crossing the prescribed levels because of dusty ambient conditions of the region. The dust contributing to fine particles is primarily a mixture of suspended soil, road dust, carbon soot and other particulate matter. The natural dust which has been prevailing for centuries in this region, is less harmful to human health. The natural soil-dust is highly rich in $CaCO_3$ in India which has been found a significant scavenger of atmospheric SO_2. According to CPCB, the lockdown has cut off 50% in particulate matter. Even after considering the crude figures of half reduction, the `New Normal' values of PM_{10} and $PM_{2.5}$ are higher than the defined in NAAQS. Therefore, a slightly higher limit as compared to the present NAAQS values can be defined for particulates.

2. **Need to differentiate particulate type:** While doing the new exercise, beside reporting mass concentrations, the particulate matter can be reported into three categories e.g. $PM_{2.5(M)}$ for metallic content, $PM_{2.5(C)}$ for its carbon content and $PM_{2.5(O)}$ for its organic content. This will be helping in providing realistic alert about possible health effects to the citizens. This will also help in controlling the industrial emissions from different sectors.

3. **Need separate particulate standards for North India:** Since, the influence of crystal dust in northern India is higher than south India due to proximity of Thar desert, the particulate standards can be set different for northern states including the Punjab, Delhi, Rajasthan, Uttar Pradesh, Bihar, Madhya Pradesh and Gujarat while for other states including hilly and coastal states, a different set of values of PM_{10} and $PM_{2.5}$ can be defined primarily based on pandemic baseline values.

4. **Need to include new pollutants:** Some new parameters can be included in the pollutants list for example, HCl / Cl_2 measurements in most of the urban areas in developing countries can provide the impact on air quality due to plastic burning and pyrolysis factory emissions. Mercury metal (Hg) is also reported in air which can also be included in the list of NAAQSs.

9. Dr. S.K. Goyal (Chief Scientist & Head, Zonal Office Delhi, NEERI

1. The monitoring method for SO_2 and NO_2 involve use of toxic substances / salts of Mercury and Arsenic, which often find their way in drains after analysis, causing significant environmental damage. It can be reduced to a great extent (upto 70%) with reduced monitoring requirement without affecting the purpose of AQM.

2. Need to differentiate between requirements for different monitoring objectives e.g. NAMP and EIA Studies.

3. There is a need for review of AQM requirements (wrt the number of monitoring stations, monitoring period, parameters, sampling duration, data reliability, data utilization etc.) in EIA studies (pre & post-EC) to optimize the efforts and expenses required to understand the air quality of a region.

10. Mr Parthaa Bosu (Environment Defence Fund

1. Air pollution has synergies with climate pollution. Precursor to criteria pollutants – OZONE – Methane emission is responsible for half of tropospheric ozone.

2. Ozone is generated from sources which are ubiquitous - Sewage and waste water, Garbage dumps/ biomass burning, Production & transportation of coal, natural gas and oil, Up-flow anaerobic sludge blanket reactor in ETPs, Natural methane emission from cattle & livestock.

3. Low cost monitoring strategy should be developed to manage surface ozone

11. Dr S.K.Jain (Former GM-EMG, NTPC Limited)

1. NAAQS applicable to pan India should include only basic criteria pollutants, $PM_{2.5}$/PM_{10} (either of the two), SO_2, NO_2, O_3.

2. Additional parameters can be added for a specific region/ location depending on the type of activities and specific industry.

3. Only measurements/ monitoring of the of the required parameters shall be the legal requirement for compliance by the industries.

4. In a region where number of industries of same type / different type the number of monitoring stations shall be distributed “keeping the entire area as one entity” rather than imposing each industry to monitor at three or four or more locations.

5. The NAAQS review committee shall consist of all concerned stakeholders including independent experienced industry environment professionals of major polluting industries, health professionals, scientific professionals, planning professionals, and regulators.

6. Any action plan to mitigate the pollution issues shall not only consider the source apportionment studies based on the prevailing / existing environmental monitoring but also take into account the future development plans along with carrying capacity / assimilative capacity study of the area under consideration.

7. Based on the various studies reported, inclusion of the secondary pollutants in NAAQS shall be considered.

12. Dr. Abhijit Pathak (Scientist D, CPCB)

1. The proposed nomenclature of National Ambient Air Quality Standard (NAAQS) may be changed to National Ambient Air Quality Goal (NAAQG) with a targeted compliance framework (5 years)

2. The protocol for revision of NAAQS/NAAQG needs to be documented and make available for public

3. The country may think to have regional standards instead of National single standard / goal. The zonation may be based on analysis of databank available with CPCB

4. As the ultimate achievable goal is now identified after analysis of data of complete lockdown period, at least the standards set for Particulate matters (PM_{10} and $PM_{2.5}$) may be reviewed for revision.

5. The monitoring technology prescription needs review in light of new technology evolution and experiences on existing technologies.

6. As the present NAAQS has sufficiently wide coverage it is recommended not to make it more bulky by adding new parameters

7. The need to open new areas in ambient air monitoring prescription with short term Ambient Air Quality Critical Values (AAQCVs) for important and relevant HAPs may be linked with NAAQS / NAAQG applicable for metro cities and chemical industrial hubs or CEPI areas having related air quality issues.

8. The issue of inclusion of parameters related to SLCPs and GHGs may be kept out of NAAQS / NAAQG

9. The country should have different air quality monitoring modes as under:

Non-regulatory Survey mode:

a. The Satellite based air quality mapping (as developed by IIT Delhi and CPCB) should give first hand baseline data
b. The gaps in spatial representativeness in air quality monitoring network (such as rural areas) may be partially filled with survey mode monitoring using sensors (qualified to have acceptable accuracy level (75-80% against FRM or FEM)

Regulatory Mode:

a. Restricted to only NAMP and CAAQMS Network

EIA Mode:

- Qualification criteria for acceptance of EIA data may be reviewed as the target to always meet NAAQS by proponent invites data manipulation. EAC may review the TOR prescription depending on site as well as proposal in case to case basis.
- The NAAQS/NAAQG notification shall have more clarity and tagged with the respective protocols as under to keep all things legally bonded:

a. Applicability of NAAQS/NAAQG limits
b. Defining the scope (the air quality assessment for EIA, Survey (Satellite and Sensor), Study and Source Apportionment) of NAAQS/NAAQGs
c. Categorization of stations based on inventory/activities and prescriptions of parameters for respective station required to be monitored
d. Network plan
e. Site Selection
f. Monitoring methodologies and SOPs

g. Quality Control and Quality Assurance (QA/QC)
h. Data validation
i. Data dissemination for Research purposes (Both Real time and quarterly/half yearly validated data)
j. Data dissemination for Public Awareness (AQI)

13. Dr. Rajendra Prasad (Ecotech Instruments)

1. If $PM_{2.5}$ standard is recommended, we do not require PM_{10} standard, as both are interlinked.
2. High volume sampling of PM_{10} for regulatory monitoring should be withdrawn.
3. Loss on ignition giving insight of the collected sample need to be reported.
4. Parameters like NH_3, Benzo(a)pyrene should be dropped or made area specific.
5. SO_2 levels in ambient air are low all over India, so monitoring frequency should be reduced
6. Heavy metals Pb, As & Ni should also be re-thought and if needed for urban areas due to vehicular emissions should be at reduced frequency.
7. Benzene may be changed to total VOC with redefined PID based technology and data logging based monitoring.
8. Benzene soluble fraction of dust also lead to give type of contributors should be reported
9. CO being unstable in air get converted into CO_2 in ambient air, why advance technology NDIR is needed. Electrochemical sensor based technology with frequent calibration should be enough for its monitoring using a logger based monitor to record values at least at every five minute interval for 24 hrs.
10. $PM_{2.5}$, O_3 and NO_2 need to be given more emphasis and Hg should be added in the list due coal based thermal power station in country which are big contributor in raising the levels of it in their close vicinity.
11. Gaps observed in regulation / method /technology / training / policy/ implementation is major cause to be bridged by standard.

14. Dr. S.K.Tyagi (Former Addl Director, CPCB)

1. Inclusion of short term (24-hour) standards for benzene, BAP and metals

2. Inclusion of some AAQM stations (real time/Manual) Rural and Background stations at Himalayan Region and Islands

3. Inclusion of monitoring network of air toxics, ozone and its precursors (BTEX/VOC, BAP/PAH, in whole country (Urban, industrial and background.

15. Er Namita Gupta (Airveda Technology)

1. Hub & Spoke model of AAQ monitoring network, comprising a reference station at hub and low-cost sensor at spoke can create efficient and cost-effective networks in partnership with reference monitors. High density local networks at spokes can identify hotspots + enable citizen alert systems.

2. Sensor based AAQ monitoring instrument are not only cost efficient but also easy to deploy. Hyperlocal networks are efficient tools for citizen alert, hotspot detection and initiating quick corrective actions for minimizing air pollution.

16. Er J. S. Kamyotra, Former Member Secretary, CPCB and Expert Appraisal Committee Member Industry-1, MOEFCC

We have gained adequate knowledge in the last 40 years, therefore, we should develop our own guidelines instead of following WHO guidelines. The standards should meet our needs.

The country wide lockdown during Covid pandemic (25th March 2020 to 20th April 2020) gave us the baseline data on air quality. We should use such baseline to fix NAAQS. Otherwise we could never achieve the NAAQS.

We have taken lot of actions to improve the air quality of Delhi. Relocation o industries, shutdown coal fired thermal power plans, shut down red category industries, introduce CNG, introduced BS-IV and leapfrogged to BSVI, but the air quality of Delhi did not improve. Therefore we should study the impact of policies

17. Prof. Madhoolika Agrawal (Dept of Botany, BHU, Varanasi)

1. The major policy intervention for future prevention and control of food security lies in reducing background O_3 concentration through a reduction in emissions of O_3 precursor gases by implementing stringent emission control measures specifically for NO_x.

2. Ozone monitoring sites should be increased and high O3 risk areas should be identified to avoid significant yield losses in agricultural production. This will also help in understanding the long-range transport of O_3 precursors, thus controlling O_3 concentrations in India.

3. The NAAQS, 2009 needs to be revisited to include food security and vegetation to improve the air quality for the protection of the delicate environment.

18. Prof Sagnik Dey (Centre for Atmospheric Sciences, IIT Delhi)

1. The prescribed WHO "guidelines" are aimed to achieve the lowest concentrations possible for maximum health benefit.

2. Interpreting the Indian standards in the global context implies that achieving the Indian standards should be our first target, but by no means, that can be considered 'safe'. Since the transition from high to low concentrations is not abrupt but gradual, the WHO has set interim targets.

3. In India, the 20-30% reduction target set by the NCAP is in some way analogous to the WHO interim targets, but the target should be based on absolute level (and not relative level) to link with the health benefits. For example, a city with 100 $\mu g\ m^{-3}$ and another city with 60 $\mu g\ m^{-3}$ are both non-attainment and after they both successfully reduce PM level by 30% will end up at 70 and 40 $\mu g\ m^{-3}$. Hence, a relative interim target does not satisfy the criteria by which targets are supposed to be set up.

4. Finally, in the existing framework, there is no vision of how the standards should be further revised and how they can be linked to health benefits. Most importantly, once the annual standard is met, the next steps of reducing the standard further down must be clearly outlined.

19. Prof. Arun Arya (Former Head, Dept of Botany, MS University Baroda)

1. Singrauli, Neyveli, Talcher, Jharsuguda, Korba, Kutch, Chennai, Ramagundam, Chandrapur and Koradi are the major SO_2 emission hotspots in India. The monitoring of SO_2 in ambient air should be continued.

2. The Fungal and viral diseases of plants, animal and human beings can be enhanced if the resistance of organism is weakened by harmful air emissions. Aeromycoflora, pollen grains and fungal spores are major allergy causing agents. There is a need to set standards for bio-pollutants so that many deaths due to asthma and aspergillosis like lung infections could be prevented.

3. Plants like tobacco, mango, drumstick and lichens are sensitive to air pollutants and can be used to monitor abiotic as well as bio-pollution caused by air borne fungal pollutants.

20. Dr Dipankar Saha (Former Addl Director, CPCB)

1. Strengthening the Standards

(i) Regulation: In case of revising the standard, no relaxation to be given for long-term monitoring networks and no parallel organization may be allowed to take part in measurement of listed pollutants in the notified standards for maintaining uniformity in the measurement system or protocol, which CPCB and SPCBs/PCCs have established with energy, investment and efforts since past many years. Standard should also be prescribed with site selection criteria along with and rationality of establishing network as was prescribed by CPCB in 2019 so as to achieve maximum outputs form minimum sets of data.

(ii) Focus on seasonal measurements: Increase monitoring frequency in winter months and strengthen our public perception on air quality.

(iii) Inclusion of Black Carbon parameter: Black Carbon or Carbonaceous particulates contributes to overall $PM_{2.5}$. Add one burning or combustion related marker pollutant as Black Carbon (BC), which can represent representative measurement value / concentration, like total combustion product floating in atmospheric air.

(iv) Seasonal Ionic Profile: The inorganic water-soluble secondary particles (ammonium sulfate, ammonium nitrate, ammonium bisulfate and sodium nitrate). Add seasonal analyses of inorganic aerosols to understand the natural neutralization capacity in different season.

(v) Strengthening VOC measure capacity: Include weekly or fortnightly or monthly monitoring of VOCs at selected locations. Side by side development of regional sophisticated facilities may be thought of along with proper training for collection of samples, its preservation and transportation to regional facilities.

Final feasible options

i. Notification may be also prescribed with site selection protocol and networking rational for better understanding and implementation across the country.
ii. All manual station may collect only particulate matter (PM_{10}) monitoring and toxicity composition (Lead, Nickel, Arsenic and BaP) / studies and data may be utilized only for health impact studies. The measurement frequency may be reduced in lean season and may be increased in critical season.
iii. Estimation of seasonal secondary aerosol may also be added to understand seasonal carrying capacity.
iv. Monthly VOCs sampling and analyses in regional laboratory for extensive research investigations at regional scale including health impact studies.
v. Measurement of BC and CO_2 may be added in all CAAQMS:
vi. Deletion of lead parameter from AQI (absence of online measurement system)
vii. Compliance to protocol and QAQC should be made mandatory including creation of data validation team
viii. Development technique to normalize the measurement values with meteorological parameters and then reproduce the data in the public domain.
ix. Redesigning AQI taking into consideration of Background values (post winter lockdown values or rainy season values)
x. AQI reporting may done only from CAAQMS only.

21. Dr Utpal Mukherjee (Former Senior Environment Specialist, Ministry of Environment, Government of Qatar)

1. Acceptability of data quality by policy makers - Gap analysis in required on generated data through operating network having nearly 1000 stations. Data of last ten years prior to pandemic situation under NAMP project, can be considered for assessing its quality, suitability of station's location, sample collection, Training / qualification of manpower including team leader, QA/QC protocol, data validation, restructuring of the existing network and reasons for not measuring all parameters. This practice will identify ineffective, non-attaining station, and good performing stations and the cost of each data generated under NAMP, for which fund has been utilized.

2. Gap analysis - It should be performed by independent, experienced and qualified third party by using a comprehensive special Standard Operation Procedure (SOP) with concurrence of CPCB. For Gap analysis of each station of the network,

updated information on emission reduction from all sources at upwind, meteorology, health related hospital admission at downwind and adequacy of available technologies, can be considered. Team leader should be answerable and funding for operation can be temporarily stopped, if unacceptable / wrong data were found generated by wrong methodology / practices but can be resumed with suitable rectification.

3. Permanent Standards Revising Committee (PSRC) - Similar to USEPA, the NAAQS standards of CPCB can be reviewed at an interval of every five years by a qualified PSRC and justify the suitability of scientific basis of revisions. The committee should comprise suitable representatives from Environmental research institutes, Universities, Reputed Medical research Institute (for Health related information and Respiratory illness/ cardio vascular specialization and research background). Currently NAAQS has twelve regulatory parameters; it is not advisable for additional parameters at this stage without a complete gap analysis. In order to avoid any confusion, NAAQS standard should have full proof foot notes on each parameter and monitoring frequency /data validation protocol with QA/QC regime.

4. Station Definition - A particular monitoring station should be representative of neighborhood scale (an area of relatively uniform land use) or urban scale similar to USEPA definition. Similar definition pattern can be adopted for all operating stations.

5. Five additional numbers of stations can be introduced in the network for background air quality monitoring preferably located inside forest of Northern, Southern, Eastern, Western part and one at Northeastern part of the Country.

6. Additional number of stations can introduced at ecologically sensitive areas of the Country.

7. Emissions of NO_2 lead to the formation of other NOx species and react with ammonia, moisture and other compounds to form small particles, which penetrate deeply into the lungs. Therefore controlling NO_2 can reduce all species of gaseous NOx, and co-benefit of reduction of ozone formation and fine particles. In the forthcoming NAAQS review one hourly NO_2 limit should be introduced at near road stations and ecologically sensitive areas.

8. R&D- In future CPCB can generate necessary health related information by jointly working with reputed medical research institute for reviewing compliance of NAAQS.

22. Dr R.S.Saini (Green Initiatives, Chandigarh)

He is in favour of following studies:

- Any new parameters to be added, If yes which and why
- Monitoring requirements of stakeholders / end use of data
- Test methods for parameters
- Complexity or operationality issues
- Benchmarking

23. Prof. Rajeev K Srivastava (Chairman, Expert Appraisal Committee, Uttarakhand & Head Dept of Environmental Sciences, Pt GB Pant University, Pantnagar)

1. Increase the number of monitoring stations within a city and to extend in rural areas to get the accurate status of ambient air quality across the nation.

2. Relax *annual* particulate matter standard, especially for fine particulates over highly industrialized region so that attaining the standard is technically feasible.

3. According the EIA notification, an industry needs to measure and report all the ambient quality parameter notified within the CPCB guidelines. This essentially escalates associated cost of air quality measurement. Restrict measurement only to those air pollutants which are emitted from the industry.

4. $PM_{2.5}$ is often considered as exposure metric for air pollution related epidemiological studies. PM2.5 standard for ecologically sensitive areas required to be more stringent considering the sensitivity of the ecosystem. The annual standard of PM2.5 for sensitive areas therefore, may be reduced (to 30 μg m^{-3}) keeping no change in 24 hours standard.

5. Toxicity of particulates is driven by its size, composition and source type. Fine particulate (PM2.5) or its fraction emitted exclusively from the combustion processes *viz*. combustion of wood, residential oil, coal and petroleum are essentially more toxic. There

should be some means of understanding the nature of prevailing fine particulates, like understanding the fraction of carbonaceous fraction of particulate to relate its health impact more realistically.

6. Introduce 1-hour average standard of NO_2 and SO_2. A similar kind of 1-hour standard for NO_2 and SO_2 is already in place in China, Korea and in European Union.

7. The effectiveness of considering lead (Pb) as regulatory ambient air quality parameter are questionable considering complete phase out of leaded gasoline from Indian automobile sector.

8. There should be inclusion of more particulate-bound metals in air pollution standard for only industry specific projects which are responsible for its emissions to recognize source contribution and associated health impacts.

9. Standard of some air quality parameters like Benzene, Benzopyrene, Ni and As are presented only in annual basis. However, for most of the EIA, often monitoring is done for a particular season (except monsoon) which is not comparable against the annual standards. Therefore, provisions should be there for 24 hourly standards to compare seasonal means of these pollutants against NAAQS .

10. Low-cost air quality sensors are therefore, the need of the hour so that it can be readily included in air quality monitoring.

24. Er Nihar R sahoo, Chief Environment Engineer, Odisha State Pollution Control Board, Bhuwaneshwar. (Paper submitted)

1. A lot of advancement has taken place in the area of air quality monitoring technology after notification of NAAQS 2009. The High Volume Samplers and the Respirable Dust Samplers are being substituted by Continuous Ambient Air Quality Monitoring Stations and other Sensor-based monitors. These monitors have the capacity to measure and communicate air quality data continuously and in real-time. Such technology should be supported and developed.
2. Regulator uses the NAAQS as the reference for source reduction strategy and Policy-maker uses the NAAQS to formulate AQM strategy. The WHO Guidelines 2006 does not expect the countries to achieve the ultimate goal in a single step, rather recommends a

few interim targets to be achieved depending upon the priority and capacity of each country (WHO, 2006). India can also set such interim targets for PM_{10} and $PM_{2.5}$.

3. Limit the exceedance frequency to 1%, which translates to 3.65 days in the regime of continuous monitoring (instead of 98 percentile value).
4. Setting region-specific standards requires in-depth understanding of region-specific source profile of air pollutants and meteorology. Such data is not available on a regional scale. Therefore, in-depth studies should be undertaken for fixing region-specific NAAQS.

25. Dr Poornima Prabhakaran, Head Environmental Health, Public Health Foundation of India)

1. Strengthening State Pollution Control Boards
2. Address the acute human resource and leadership needs in SPCBs (e.g. through training programs, revising pay structures etc.)
3. Strengthen center-state and inter-departmental interactions
4. Expand monitoring capacity to effectively use data for compliance and accountability
5. Mobilize significant financial resources to invest in SPCBs
6. Strengthen the local evidence base for air pollution and health effects
7. Engage health sector stakeholders and make air quality data available in public domain for building the evidence base for health effects studies specific to India

26. Prof Arun K Sharma, Dept of Community Medicine, University College of Medical Sciences, Delhi (paper submitted)

1. Ambient air pollution is one such risk factor where behavioural modification at individual level is not a pragmatic approach, it should come from various stakeholders, namely industries, energy sector, public transport and other civic bodies.

2. NAAQS should be revised from time to time to be at par with achievements made and the need for making more intense efforts to achieve the WHO standards, sooner or later.

3. Indian standards are still very relaxed, and we need to work towards achieving the international standards. The adverse health effects can be minimized only when we work towards achieving the international standards.


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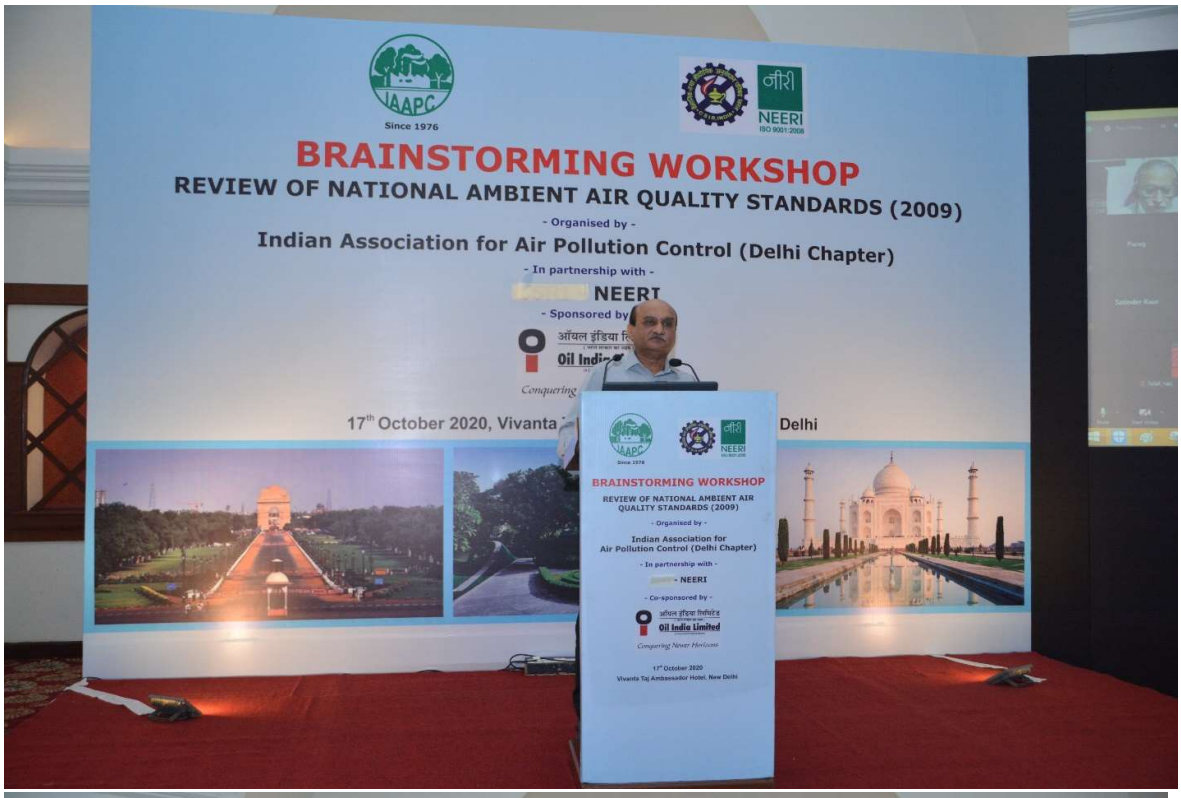
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NAAQS / EMISSION STANDARDS
Section 2(a) : Definition of air pollutant in Air Act, 1981-
Section 16(2)(b) : Plan and cause to be executed a nation wide programme for the prevention ,control or abatement of air pollution
Section 16(2)(h) : CPCB to lay down standards for the quality of air
Section 17(1)(g) : SPCB to lay down, in consultation with the Central
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