ANIL AGARWAL DIALOGUE 2020

ANNUAL MEDIA CONCLAVE ON THE STATE OF INDIA’S ENVIRONMENT
National air quality trends
What we know so far from the last reported NAMP data
More cities in grip of critical level of PM10

- Cities with critical level of PM10 (more than 1.5 times the standards) increased from 60% in 2007 to 75% in 2018.
- No cities in low pollution category (i.e. 50% below the standard)

Source: CSE’s analysis of CPCB air quality data from ENVIS centre for million plus population cities
More extensive data on PM10 levels in different climatic regions

Indo-Gangetic plain

Hot & Dry (North)

Source: CSE’s analysis based on CPCB Envis centre and data submitted to Lok Sabha
PM10 in different climatic regions

Hot & Dry (South)

<table>
<thead>
<tr>
<th>City</th>
<th>Annual Average PM10 Concentration for 2018 in microgramme per cum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyderabad</td>
<td>105</td>
</tr>
<tr>
<td>Indore</td>
<td>88</td>
</tr>
<tr>
<td>Jabalpur</td>
<td>119</td>
</tr>
<tr>
<td>Madurai</td>
<td>84</td>
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<td>Nagpur</td>
<td>103</td>
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<tr>
<td>Nashik</td>
<td>85</td>
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<td>Ranchi</td>
<td>122</td>
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Average for climatic zone, 101
Annual Standard, 60

Moderate

<table>
<thead>
<tr>
<th>City</th>
<th>Annual Average PM10 Concentration for 2018 in microgramme per cum</th>
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<tbody>
<tr>
<td>Bangalore</td>
<td>90</td>
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</table>

Average for climatic zone, 98
Annual Standard, 60

Source: CSE’s analysis based on CPCB Envis centre and data submitted to Lok Sabha
PM10 in different climatic regions

Warm and Humid (including Coastal)—PM10 levels have gone up to 2 times the standard in case of Mumbai

Source: CSE’s analysis based on CPCB Envis centre and data submitted to Lok Sabha
PM2.5 and health

Health is a leveler

Source: The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the Global Burden of Disease Study 2017
60% of non attainment cities under National Clean Air Programme (NCAP) in North India

Source: Based on data available with CPCB
What is our new study talking about?

Source: CSE's analysis of CPCB air quality data
National Clean Air Programme (NCAP) target for 122 cities:

Reduce particulate pollution by 20-30 per cent by 2024 from 2017 levels……..

What does it mean?
PM10 reduction target

Uttar Pradesh cities

Himachal Pradesh, Madhya Pradesh and Rajasthan cities

Source: CSE’s analysis based on CPCB Envis centre and data submitted in Lok Sabha
Reduction target for PM2.5

Source: CSE’s analysis based on CPCB Envis centre and data submitted to Lok Sabha
PM10 reduction target

Punjab and Uttarakhand cities

Source: CSE’s analysis based on CPCB Envis centre and data submitted in Lok Sabha
How will cities based on the ever expanding monitoring network (manual and realtime) know if pollution levels are going up or down?

-- Do we have explicit official method to report long term trend in air quality and to report compliance against targets and national ambient air quality standard?
In India, there are 207 real-time monitoring stations spread across 114 cities, and 793 manual monitoring stations spread across 344 cities; 800 real-time and 1,250 manual monitors will be added to the network soon.

PM2.5 manual monitors = 274 in 134 cities
PM2.5 realtime monitors = 215 in 114 cities
How is data reported now?

CPCB puts out annual average data based on manual monitoring stations. – latest reported for 2018 (in December 2019)

City-wise average for million plus cities reported periodically to the Parliament based on manual monitors; latest reported for 2018 (in June 2019)

Cities with both manual and realtime monitors report annual average trend based on manual monitors

CPCB has protocol for manual monitors that require minimum monitoring of 104 days or twice a week

Thus, compliance with national ambient air quality standards is assessed based on data for a minimum of 28.5% of the days in a year; This is valid

But 73% of PM2.5 manual monitors did not meet regulatory requirement of 104 days of monitoring in 2018
Massive data gaps
Manual PM$_{2.5}$ monitoring Network in select cities

As low as 10 days of monitoring in Kozhikode, Kerala

54% of the manual PM$_{2.5}$ stations (148 stations) in the country report pollution exceeding the standard.

These stations are distributed across 66 cities (133 cities have manual PM$_{2.5}$ monitors)

What about realtime monitoring?

Under NCAP realtime monitoring of PM2.5 is expanding: 41 cities have realtime PM2.5 monitors.
- Many cities have both manual and realtime monitors
- Cities without PM2.5 monitoring stations are setting up only realtime monitors for PM2.5
- Rajasthan does not have any manual PM2.5 monitors; only real time
- In UP new cities like Moradabad, Bagpat, Hapur, Muzaffar Nagar etc have only realtime PM2.5 monitors
- Maharashtra – Pune, Sholapur, Nasik, Aurangabad, Kalyan, Thane etc
- West Bengal – Siliguri, Asansol, Haldia
- Karnataka – Vijaypur, Chikmagalur, Chikbadlapur, etc

How will cities report compliance based on both manual and realtime monitors? Realtime monitors have high data availability
Data reporting

Protocol for manual and realtime monitoring established by CPCB

Protocol for quality control and assurance is in place

CPCB reports annual average for manual stations - averaged for cities; Will that continue?

Realtime data is used for spatial averaging of 24 hours to report against National Air Quality Index with a rider – *Spatial averaging is not the most scientific way to do such reporting*

Annual average data from realtime data can be generated from the CPCB portal

One limited reporting based on realtime data in Delhi to the Parliament; not anorm yet

No method to identify primary monitors for reporting trend and compliance

No method to address data gaps and data completeness
• CSE reviews global method for air quality trend and compliance reporting as well as method for addressing data gaps

• There is no one absolute method
Globally governments have detailed methods

USEPA – very elaborate method

For trend and compliance reporting

• Method for reporting air quality trend based on spatial averaging
• Method for reporting compliance with the national air quality standards based on worst trend to protect vulnerable groups
• Establish primary monitors for reporting
• Assess trend based on moving three year annual averages (design value) and not one year data
• Stations represent cities as well as air basin - much larger than the city;
• Compliance needed across air basin based on the worst performing station
• Number of air quality monitors are determined based on the gravity of the problem – In the US number of PM2.5 monitors are not numerous – ozone monitors are expanding
• Realtime and manual monitors treated at par – minimum requirement of manual monitors is every sixth day – even less than India;
Globally governments have detailed methods

**USEPA**

**Method for addressing data gaps**

- **Specifying minimum data availability** – minimum 75% for each quarter
- **Specified data substitution test for data gaps** – 50-75%; below 75% etc
- **Address data gaps based on co-located stations:** Data from primary monitors augmented by collocated monitors (if primary monitor does not produce valid value for a particular day, but value is available from collocated monitor it can be considered valid for combined site data record)
- There are instances of reporting trend even when data is missing for one whole year due to emergency situation (e.g., Corcoran-Patterson in San Joaquin Valley)

**European Union**

- Minimum data availability – 90%
- Realtime and manual monitors treated at par – method for comparison
- Strong quality control and assurance regime

**China** – Beijing has 40 monitors – but have identified 13 stations for legal reporting on trends
Applying methods to Delhi....
Delhi’s air quality data

Delhi has 38 realtime stations and six manual stations

• Air quality data sourced from CPCB’s online portal "Central Control Room for Air Quality Management - All India" for the period 2010-2018.

Realtime raw 15 minute average data accessed. Final cleaned dataset has 3.16 million data points (outliers and erroneous entries removed)

Applied USEPA method to address data gaps and data completeness (station-wise and quarter-wise for each year)

Oldest five stations – IHBAS, ITO, Mandir Marg, Punjabi Bagh and RK Puram – (for which realtime data is continuously available since 2012) considered for assessing long term trend

Earlier years have quarters with more noise and missing data – Accordingly data substitution method used.
Caveats

Consultation with the USEPA:

While applying the USEPA method need to consider a few caveats as infrastructure and data availability in US is different

• Eg, when India develops its own method of data availability and completeness the thresholds may change. This will influence results. Threshold will differ between manual and realtime.

• If there is large variability in data, as in India, a statistical test on the location with more complete data is needed to establish the threshold etc.

• And more…..
Graph 1: Timeline of and data availability at air quality stations in Delhi

2014 cross checked with DPCC
The change
Quarter drop in spatially averaged PM2.5 level
Need another 67% cut to meet the standard
(Based on three-year rolling average)

Graph 2: Trends in PM$_{2.5}$ concentrations in the five oldest stations

Source: CSE analysis of CPCB real-time PM$_{2.5}$ data using the USEPA method
The change based on worst monitoring location
Need another 75% cut to meet the standard
(Based on three-year rolling average)

Graph 3: Long-term PM$_{2.5}$ trends based on the worst station

Source: CSE analysis of CPCB real-time PM$_{2.5}$ data using the USEPA method
Change is certain:
SAFAR estimates based on realtime data from SAFAR stations
Annual PM2.5 levels have declined since 2014 - by 20%
Official estimate of decline based on realtime data (2016-18)
MOEF&CC to Lok Sabha
PM2.5 levels in Delhi have declined by

15%

<table>
<thead>
<tr>
<th>Year</th>
<th>PM2.5 in μg/m³</th>
<th>PM10 in μg/m³</th>
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<tbody>
<tr>
<td>2016</td>
<td>135</td>
<td>291</td>
</tr>
<tr>
<td>2017</td>
<td>124</td>
<td>266</td>
</tr>
<tr>
<td>2018</td>
<td>115</td>
<td>243</td>
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**Percentage Reduction in 2018 compare to 2016**
- PM2.5: 14.8
- PM10: 16.5

**Percentage Reduction in 2018 compare to 2017**
- PM2.5: 7.3
- PM10: 8.6

**Percentage Reduction in 2017 compare to 2016**
- PM2.5: 8.1
- PM10: 8.6
SAFAR: emissions reductions in key sectors of Delhi

### DELHI EMISSIONS 2010 → 2018

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<tr>
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<tbody>
<tr>
<td>Transport</td>
<td>41%</td>
<td>32%</td>
<td>+40% (Increase)</td>
</tr>
<tr>
<td>Industry</td>
<td>22.3%</td>
<td>17.3%</td>
<td>+48% (Increase)</td>
</tr>
<tr>
<td>Power</td>
<td>3.1%</td>
<td>3.0%</td>
<td>+16% (Increase)</td>
</tr>
<tr>
<td>Residential</td>
<td>5.7%</td>
<td>18.5%</td>
<td>-64% (Declined)</td>
</tr>
<tr>
<td>Re-suspended Dust</td>
<td>18.1%</td>
<td>27.8%</td>
<td>-26% (Declined)</td>
</tr>
<tr>
<td>Rest Others</td>
<td>11.7%</td>
<td>1.3%</td>
<td>NEW Sources</td>
</tr>
</tbody>
</table>

**TOTAL (All Sectors) GROWTH in 2018 wrt 2010 (8 years) = +15%**

Ref.: Beig et al. (2018), SAFAR-Technical Report, MoES.
People’s perception vs results
Rapid citizen’s perception survey
Is there a change in pollution trend?

- Improving: 22%
- No change: 53%
- Worsening: 25%

Factors influencing perception in order of importance:
1. Smog episodes during winter months – especially this winter
2. Media reportage
3. Limited mention of reported data
Citizen’s perception of severe winter pollution aligns; but not perception of annual trends

Graph 4: Classification of 24-hour PM$_{2.5}$ average based on AQI

- Almost 50% increase in number of days meeting 24-hr PM$_{2.5}$ standard
- Number of Very poor days declined

Source: CSE analysis based on real-time data from CPCB online portal
Media attention to air pollution aligns with pollution levels
Are people aware of action in Delhi?
Does Delhi have “Clean Air Action Plan” and “Graded Response Action Plan (GRAP)”

- Graded Emergency Action Plan: 20% No, 80% Yes
- Clean Air Action Plan: 38% No, 62% Yes

More awareness about short term action
**Action on vehicular pollution**

- **Vehicle Ban (10 yr diesel, 15 yr petrol)**: 98% Yes, 2% No
- **H CNG in Bus**: 85% Yes, 15% No
- **CNG in transport**: 97% Yes, 3% No
- **Delhi has implemented BSIV**: 50% Yes, 50% No
- **Commercial vehicles (Passenger and...)**: 66% Yes, 34% No
- **Environment cess on big diesel cars and SUVs**: 58% Yes, 42% No
- **Environment cess on diesel fuels**: 62% Yes, 38% No
- **RFID based Pollution Checks**: 77% Yes, 23% No
- **Introduction of two expressway for large...**: 68% Yes, 32% No
Industry and Power plant

Transport Contd....

- Pedestrianisation of... 25% Yes 75% No
- Notification of Parking rules... 34% Yes 66% No

INDUSTRIAL AND POWER PLANT EMISSIONS

- Delhi has shut down coal based power... 41% Yes 59% No
- Approved Fuel Notified and Dirty Fuel... 35% Yes 65% No
- Expansion of natural gas in industry 29% Yes 71% No
- Big polluting industries taken out of the... 28% Yes 72% No
One year after NCAP:

To achieve 30% reduction in particulate pollution by 2024, 122 cities need to report at least 6% cut annually for five years

Lesson from Delhi: Needed decade long change to cut pollution by about 20-25%

What more will Delhi do? Can we even gauge the scale of action needed?
Action across sectors

-- Air quality management and monitoring strategies
-- Industry
-- Power plants
-- Vehicle and transportation strategies
-- Open burning
-- Construction activities
-- Diesel Generator Sets
-- Solid fuel burning (cooking and open eateries)
-- Road dust
-- Greening
Air quality monitoring and assessment

**Delhi: Status of air quality monitoring**

- **Delhi**: 38 real time monitoring stations, daily AQI reporting
- Forecasting system in place for emergency action
- Source assessment done
- Need scale across NCR

**National: What more needs to be done**

- Expansion of air quality monitoring grid (including rural monitoring)
- National Air Quality Index (AQI) for public information system
- SOP for source apportionment and emission inventory studies
- Satellite monitoring
- Need method to establish air quality trends and compliance with national ambient air quality standards or NCAP targets
Action on industry

Delhi

- **Approved fuel notification** (29.06.2018) lists clean fuels that can used
- **Bans dirty fuels of coal, petcoke, furnace oil**, -- Petcoke and furnace oil banned in 4 states. November 17, 2017, Petcoke import also being restricted.
- **SOx and NOx standards for industry**: SC order of May 2, 2017, directed NOx and SOx standards for 34 groups of industries. MoEF&CC and CPCB issued Notification on January 29, 2018, for 16 groups of industries. Needs implementation
- **Expansion of piped natural gas (PNG) network to industrial places in Delhi**. Out of 1467 units 1150 moved to gas. Incentives given to move to gas and removing tax on gas.
- **50% of brick kilns in NCR moved to zigzag technology**
- **Challenge**: Small scale units, unauthorised units, access to clean fuels etc

National

- National CEPI programme being reformed; CAP detailing pollution action on stack emissions, fugitive emissions, load based management, Fuel change in small scale industry;
- CPCB’s 2017 notification on improved kiln for brick kilns
- Smart monitoring of industries etc. Need implementation
Challenge of enforcement

CAG review of several SPCBs show several challenges:

- Failure to take action against polluting industrial units
- No database on pollution sources and pollution load in the state
- No mechanism to monitor validity period of consent and operation
- Consent for establishment and operations to highly polluting industries without mandatory inspections – even to red and orange categories
- “Ease of doing business” policy subvert environmental governance: Automatic consent is supposed to prevent halting of industrial operations – inspection and audit not carried out for deemed consent
- Weak inspection: Massive shortfall in number of inspection (could range from 41 to 49%). This weakens enforcement
- Action on approved fuels very weak
- Not exercising available powers
Pollution hotspots in Delhi
Delhi: Seeking local solutions

Mundka Plastic recycling plants: massive plastic burning
Immediate action to link with controlled incineration
Industrial pollution control

- **Kolkata**: Boiler standard tightened eight times; industries converted coal fired boilers and ceramic kilns to oil or gas fired; State reimbursed 50% cost of conversion. About two third of coal fired boilers and coal fired ceramic kilns converted in small-scale units reduced emission by 98%.

  Free distribution of LPG to open eateries to replace stoves on solid fuels

- **Bhiwadi and Alwar Panipat**: Agro based boilers reducing SOx, NOx emissions.

- **Jhajjar China Light and Power Plant**: Low NOx burner, full fly ash utilisation, compact plant, FGD installed, also plans to use *parali*

- **Patna**: Almost 80% brick kilns adopted cleaner kiln technology with much lower emission levels

- **State of the art coal handling technology in Maharashtra**: (TATA Power etc)
Power plant

- **Delhi:**
  - Shut down all coal power plants
    - Indraprastha (405MW): Closed in September 2009
    - Rajghat (135 MW): Closed in May 2015
    - Badarpur thermal power station (705MW): Closed in October 2018
    - **Total generation capacity of 1245MW shut down**
    - Flyash utilization initiative underway including ecopark on flyash yard.
    - **Natural gas made available for Bawana power plant**

- **NCR and National**
  - Comply with the new power plant standards by 20202; earlier in NCR
  - Effective penal action for non-compliance
  - Retire old plants
  - Fly ash management
  - Transition to clean fuels – address fuel pricing
Vehicular emissions

- **Vehicular emissions**
  - **CNG** for public transport expanded
  - **BS VI fuels** with 10 ppm sulphur introduced in 2018
  - **Old vehicles ban**: 10 year old diesel & 15 year-old petrol vehicles banned
  - **Favourable taxation for clean fuel** introduced; also expansion of CNG stations. About 500 CNG stations have been opened
  - **EPC on big diesel cars and SUVs** (more than 2000 cc). Diesel cars sales dropped
  - **Pilot on Hydrogen-CNG buses** (CNG with 18 per cent Hydrogen blend)
  - **Pilot on remote sensing technology** for on-road emissions monitoring
    - Enforcement of PUC improved across NCR.
  - **Installation of stage I and Stage II vapour recovery system** expanded. Environmental compensation of Rs 1 crore imposed on oil companies: IOCL, HPCL and BPCL for non-compliance with directions on vapour recovery

- **Trucks**
  - **EPE-WPE**, 60,000 trucks have been diverted from Delhi.
  - **ECC (2015)** on - to deter non destined trucks
  - **Restriction on entry of 10 year old trucks**
  - **Introduction of RFID at 13 entry points for cashless payment**
Impact on truck numbers

- LGV: 900
- Truck 2-axle: 871
- Truck 3-axle: 585
- Truck >3-axle: 652

Avg numbers per day of goods carriers (Survey during June-July 2015)

Avg numbers per day of goods carriers (Based as per ECC data Dec 2019)
Impact of action on pollution load

Sources: Estimations 2019 based on data of CSE Survey in June-July 2015 and data submitted by the SDMC in Dec 2019
Remote sensing monitoring in Kolkata

Delhi: ICAT pilot; MORTH-ARAI to develop guidelines
To develop threshold limit to pull out gross polluters
How to use this for compliance

Source: CSE field visit
Big gap: Mobility transition
Hourly pollution pattern follows traffic pattern irrespective of the city

Average weekday (27-31 January, 2020)
Public transport: The big gap

Public Transport

- Average daily ridership of DTC buses - initially stagnated and then increased by two lakhs compared to 2016-17. The average ridership of DTC buses is 42.03 lakh.
- Ridership in the metro increased from 1259000 in 2010-11 to 2708376 in 2018-19. The operational route has increased from 165.5 km in 2010-11 to 373 km in 2018-19; Rolling stock has increased from 844 in 2010-11 to 2194 in 2018-19.

Vehicle restraint
- Parking policy as a demand management tool has been notified.
- Pilot schemes on parking area management plans initiated.
- Multi-modal integration plan for 70 stations
- Street pedestrianisation started (Ajmal Khan etc)
Move towards pedestrianisation

Car-free Ajmal Khan Rd of Delhi: Exposure to PM2.5 on nearby heavy traffic road 35% higher than pedestrian street
Spurs decision to pedestrianise 22 commercial streets/areas in Delhi
How will other cities augment public transport ridership?

CSE investigates falling bus ridership in 17 cities

Combined Daily Bus Ridership in Indian Cities
( Ridership of 17 major cities in India)

<table>
<thead>
<tr>
<th>Year</th>
<th>Ridership</th>
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<tr>
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<td>2014-15</td>
<td>2,44,77,860</td>
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<td>2015-16</td>
<td>2,32,60,911</td>
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<td>2016-17</td>
<td>2,18,29,134</td>
</tr>
<tr>
<td>2017-18</td>
<td>2,08,96,219</td>
</tr>
</tbody>
</table>

(source: CSE/RTI)
Sign of schange only in a few cities

Bus reforms

- **Bhubaeswar**: Bus reforms, One - single unified web-portal for the city including the transit information. Smart Janpath - 5 km road network of Complete Street Principle. Public Bicycle Sharing System
- **Hubli-Dharwad** BRT, Hubli-Dharwad, – 2018
- **Amritsar** BRT, Amritsar, Punjab – 201
- **Kolkata**: Largest EV bus fleet
- **Pune** Mahanagar Parivahan Mahamandal Limited, Pune, Maharashtra
- **Himachal** Road Transport Corporation (HRTC) – EV buses
- **Guwahati** first in NE to operate EV: first NE state to operate EV bus.
- **NMRCL** - Bus Services, Noida, Uttar Pradesh - Jan' 2019

Intelligent Public Transit System (IPTS):
Sitilink, Surat, Gujarat (Fare integration among BRT and City Buses)

Traffic Management: Hyderabad, Telangana for Hyderabad Traffic Integrated Management System (H-TRIMS)
Parking as a restraint measures in other cities

Kolkata: Demand management strategies: Restricted legal on-street


Restricted parking provision, Aizwal, 2019:

Proof of Parking, 2010, Sikkim and Mizoram, Rajasthan cities
National action: Vehicles

Vehicle technology
• BS-VI norms from April 2020
• PUC revised norms –
• Faster Adoption and Manufacturing of Electric Vehicles in India (FAME-II) scheme to be implemented over a period of three years, with effect from April 1, 2019.

Public transport
• Reform based funding for public transport – Funding for electric buses for selected cities; Metro funding linked to reforms
• Transit oriented development policy
• No strategy for smaller towns
Solid Waste Management Rules and Regulations 2016 notified
Delhi byelaws amended based on these rules and notified in January 2017. To be implemented
The city has over 2,300 waste dumps.
The status of segregation in the city is not more than 10 per cent and is restricted to a few institutions and colonies only. 12 wards from different MCDs in Delhi have been selected as model wards. To prevent littering 6,000 roadside twin bins have been procured.

Need immediate steps to strengthen action on waste
Challenge of developments outside municipal governance
Checklist for dust control at construction sites. According to the latest Economic Survey, DPCC has since January 2018, has imposed fine to the tune of Rs 3,55,50,000 in respect to dust control. Fines on construction projects who have taken environmental clearance (for built up area more than 20,000 sq meter).

The Construction and Demolition Waste Management Rules, 2016 notified and BIS rules modified in 2014 to allow use of recycled C&D waste in building construction

Environmental compensation of Rs 1 crore has been imposed on Municipal bodies (New Delhi, South, East, North and Cantonment Board) over open dumping/burning of garbage and C&D waste vide directions dated January 16, 2019

City has expanded recycling capacity of its C&D waste recycling plant at Burari from 500 MTD to 2,000 MTD.

City has also added two more recycling plants to combined capacity of 650 MTD

There are 60 mechanized road sweeping machines in Delhi

Implementation – a big challenge
Desperate measures during winter

October 12, 2018 to March 15, 2019 - Very Poor category action implemented
• Badarpur coal power plant closed (Now permanently)
• Diesel generator sets not allowed
• Industrial units on coal and biomass shut; Brick kilns shut

November 1-12, 2018
• Ban on construction activities, hot mix plants and stone crushers

November 4-12, 2018
• Industries using coal and biomass as fuel shut

November 8-12, 2018
• Truck entry ban

December 24-26: Emergency action
• Industries closed in hotspots
• Construction ban
• Enforcement on waste burning and construction (enforcement challenges)

January 4-5, 2019
• Truck entry ban
Strengthen national action
area sources

Waste

- Notifications for dust mitigation measures during construction and demolition activities.

Clean household fuels

- Pradhan Mantri Ujjwala Yojana launched in 2016, under this scheme LPG connections given to BPL families

Stubble burning

- Central Sector Scheme on ‘Promotion of Agricultural Mechanization for in-situ management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi’ 2018-19 and 2019-20
Towards regional air pollution control
Why Delhi will not see clean winter?
Graph 5: Heat map of pollution—annual trends in daily PM$_{2.5}$ levels

Source: CSE analysis based on real-time data from CPCB online portal
Winter pollution says different stories

Source: CSE analysis of PM2.5 data from CPCB, meteorological data from IMD and fire count data from NASA
NCR Pollution: Well synchronised (Dec 2018-Nov 2019)

Source: Based on data available on CPCB
Graph 12: Heat map of pollution—daily PM$_{2.5}$ in select urban centres in the Indo-Gangetic Plain (2019 figures)

Source: CSE analysis based on real-time data from CPCB online portal
Selected cities from UP and Bihar

Source: Based on data available on CPCB
Kolkata-Howrah have winter high pollution problem

Howrah on average looks more polluted than Kolkata, but high pollution episodes are synchronised.

Ghusuri in Howrah is the worst among the twin-city network.

Bidhannagar, Jadavpur and Rabindra Sarobar look relatively cleaner but these are new stations and don’t have enough data.
Rajasthan has no specific high pollution season, whole year is polluted outside monsoon

Jodhpur and Bhiwadi have most high pollution days in the state.
Within Jaipur station at Police Commissionerate recorded most number of high pollution days.
Bengaluru has no specific high pollution season

High pollution sporadic and localised in nature.
BMT Layout, BWSSB and Peenya have recorded most polluted days among the city network.
Chennai has no specific high pollution season but experienced city-wide episode in Nov 2019

Manali is the most polluted station among the city network.

High pollution sparse but citywide in nature.
Hyderabad has high pollution season that starts in November and tapers off in February

High pollution episodes are city-wide in nature. But it hardly hits ‘very poor’ on AQI.

Sanathnagar is the worst among the city network.
Mumbai's peak pollution is recorded around 25th December. High pollution is a city-wide phenomena. All stations except Bandra are new stations and don’t have enough data. Station at Bandra have significant missing data during winter months. Borivali East is the cleanest station of the city network.
Pollution – High and Low

STATE OF AIR POLLUTION

India recorded just nine out of 93 disasters in Asia, but accounted for nearly 48 per cent deaths in 2019. The country also had nearly 46 per cent.
70% of Non-attainment cities have population less than 10 lakh

Source: Based on data available on CPCB
Global action on regional pollution

China

• Adopted unified planning, monitoring and alerting, and unified standards in multiple contagious regions. Combined work plan for Beijing City, Tianjin City, Hebei Province, Shanxi Province, Shandong Province and Henan Province.

• **Target:** "2 + 26" cities to decrease average PM 2.5 concentrations and the number of heavy-pollution days by more than 15% from previous year.

• **Revised the emergency response plan to unify the alerts and grading for heavy air pollution**

• **Combined monitoring and inspection system.** Beijing Environmental Protection Inspection team responsible for 15 provinces

• **Mutually agreed action plans to reduce coal consumption, manage area sources and adjust the industrial structure.**

• **Violations of the Action Plan enforced across the region**

• **Reformed vertical management and accountability systems for monitoring, inspection and law enforcement** of the environmental protection agencies.
Global action on regional pollution

United States:
• **Clean Air Act**: provisions to reduce long-range transport of pollution
• **Each state’s implementation plan** to prevent emission from sources within its borders from contributing significantly to air pollution problems “downwind” – specifically those that fail to meet standards
• **If a state fails** to develop the necessary plan to address this downwind pollution, **EPA can enforce federal plan**
• **Good neighbor provisions** -- identify downwind air quality problems; identify upwind states that contribute enough to those downwind air quality problems for further review and analysis; identify emissions reduction necessary to prevent contributing significantly to downwind air quality problems
• **Air quality monitoring is carried out air basin levels.**
• States to take additional steps to satisfy good neighbor provisions or prove why additional measures are not necessary.
Global action on regional pollution

Europe

European Member States work together to control international air pollution under the Convention on Long Range Transboundary Pollution (the Air Convention).

European states within the European Union have begun to explore the regulatory means of building regional action across different jurisdictions.
India?

NCAP:

- A comprehensive regional Plan to be formulated incorporating the inputs from the regional source apportionment studies.

- No enforcement mechanism yet

- Technically no legal hurdle to introducing this approach. The Air (Prevention and Control) Act, 1981, Article 19 confers power to declare air pollution control areas.

- Under this provision critically polluted areas are declared that are largely industrial areas.

- The scope and ambit of this can be broadened to include more jurisdictions for integrated planning and compliance.
Strengthen legal framework for National Clean Air Programme

NCAP Approach:
• Collaborative, multi-scale and cross-sectoral coordination between central ministries, state governments and local bodies. Dovetailing policies and programmes with NCAP.

NCAP legal framework
• In consonance with Air Act (Prevention and Control of Pollution) Act, 1981, and in particular the provision of Section 16 (2) (b) to execute nation-wide programme.
• Compliance, monitoring and accountability framework for implementation and to meet targets; benchmark effectiveness of action
• Address the current gaps in laws for compliance and enforcement
• Punitive action, deterrence and incentives
• 15th Finance Commission to propose measurable performance-based incentives for States, among others. --- One of the criteria for finalising the states' share in central taxes and grants.
Deepen understanding of what it takes to cut pollution
Need massive transition

Clean fuels and technology transition in industry and power sector:
• Small and medium units; fugitive emissions from industrial processes and material handling etc; effective stack monitoring for enforcement
  Pricing and availability of clean fuels
  Monitoring and compliance in bigger industries and smart monitoring
  Clean fuels for households

Mobility transition
• Need scale in public transport services and non-motorised transport in big and small towns – Need design rich solutions
• Effective vehicle restraint measures
• Zero emissions mandate for electric vehicles and control of real world emissions

Paradigm shift in waste management
• Enormous infrastructure deficit to control waste – address this
• Need scale in decentralised segregation, recycle and reuse
• Episodic fire incidents

Need scale, effectiveness and accountability
Need awareness to build support for difficult solutions
Thank You