



# Clean Air Action Plans for Non-Attainment Cities of Odisha



DRAFT

## COMPREHENSIVE ACTION PLAN FOR CLEAN AIR FOR NON-ATTAINMENT CITIES OF ODISHA

AIR QUALITY MONITORING COMMITTEE, GOVERNMENT OF ODISHA

DECEMBER 2018

ANGUL ✶ BALASORE ✶ BHUBANESWAR ✶ CUTTACK ✶ ROURKELA ✶ TALCHER



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*Air Quality Management: Building  
Strategies for Clean Air,*  
Joint initiative of Department of Forest  
and Environment and State Pollution  
Control Board, Government of Odisha  
and Centre for Science and  
Environment

**Bhubaneswar, June 4, 2019** <sub>1</sub>



# City-wise and cross sectoral action plan

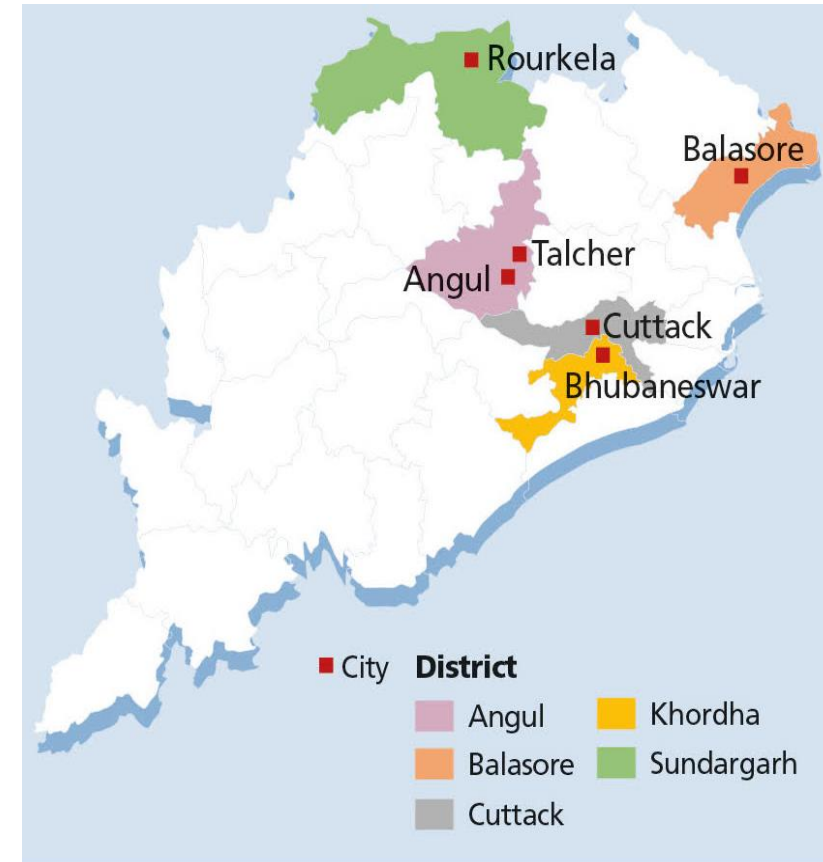


## Non-attainment cities:

- Bhubaneswar
- Cuttack
- Angul
- Talcher
- Balasore
- Rourkela

## Sectoral plans

- Air quality management and monitoring strategies
- Industry and mining areas
- Power plants
- Vehicle and transportation strategies
- Waste burning
- Construction activities
- Diesel Generator Sets
- Solid fuel burning
- Road dust
- Greening

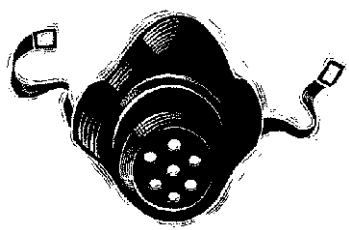




# What is this plan all about?



1. **Comprehensive Plan to meet reduction targets**
  - **Base plan** common. **Additional special measures** for individual cities
  - **Strategies with detailed indicators** instead of broad action items
  - **Integrated existing action plans, aligned ongoing measures in different sectors**
  - **Scope of replication good practices** (Smart City initiatives of Bhubaneswar; industrial pollution control efforts etc)
  - **Addresses issues of big and small cities differently**
  - **Compliance and monitoring strategies**
  - **Institutional arrangement** for implementation
  - **Equitous, affordable, and innovative solutions**
  - **Regional approach to reduce of trans-boundary effect**
2. **Graded Response Action Plan linked to daily air quality for emergency response**



# Current status of air quality monitoring



## Monitoring stations

- Bhubaneswar = 6 manual
- Cuttack = 3 manual
- Angul = 2 manual
- Talcher = 2 manual + 1 real-time
- Balasore = 3 manual
- Rourkela = 4 manual

**Manual monitoring underestimates pollution; not amenable for daily action and public information**



# Official criteria to decide the number of Air quality monitoring stations in each city



- Proposed expansion of monitoring network**

City	Population	Minimum number of monitors required	Existing number of monitors	Additional number of monitors required
Angul	43,795	4	2	2
Balasore	144,373	5	3	2
Bhubaneswar	843,402	9	6	3
Cuttack	610,189	8	3	5
Rourkela	320,040	6	4	2
Talcher	40,841	4	3	1

\*Existing number of monitors includes combination of manual and real time monitoring. Most stations in Odisha are manual and do not provide daily air-quality data

*Source: Census 2011 and Guidelines for Ambient Air Quality Monitoring, CPCB, 2003.*

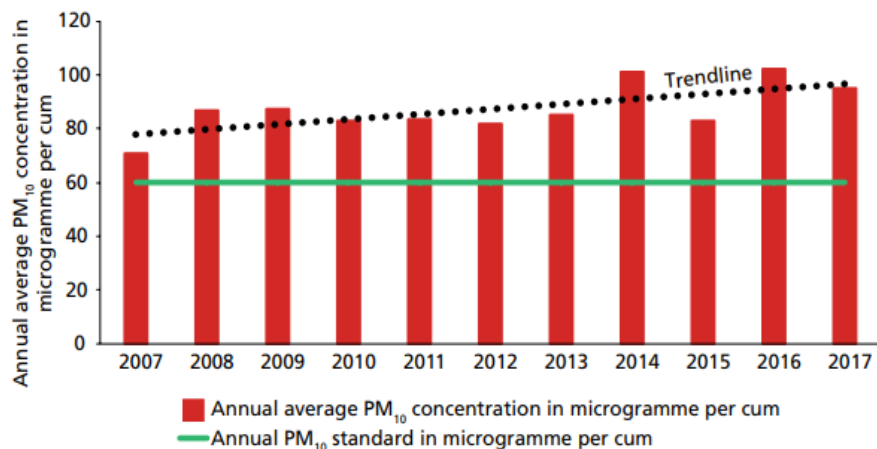
- Based on CPCB guidelines** -- there should be atleast one station for every one million population; Class 1 cities should have a minimum of three stations each; mega cities about nine each; industrial areas about six and capital cities six each.
- Need real time monitors for real time action; manual monitors underestimate problem



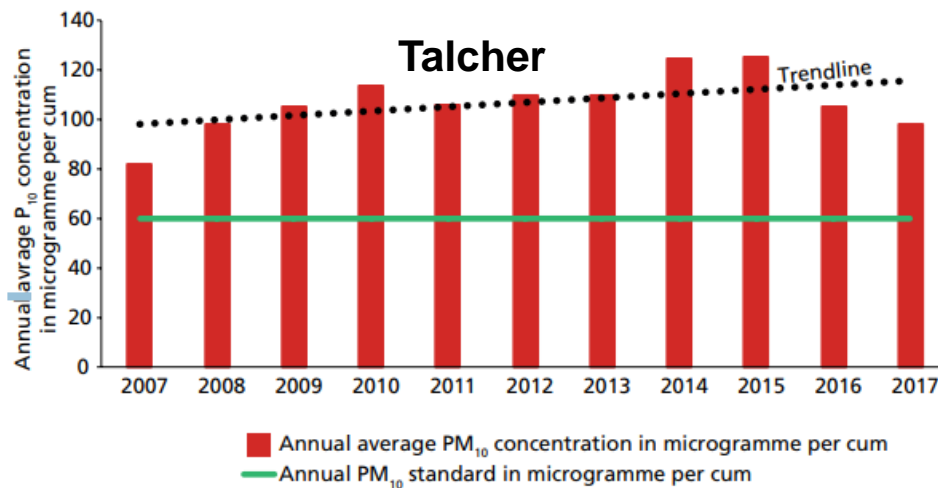
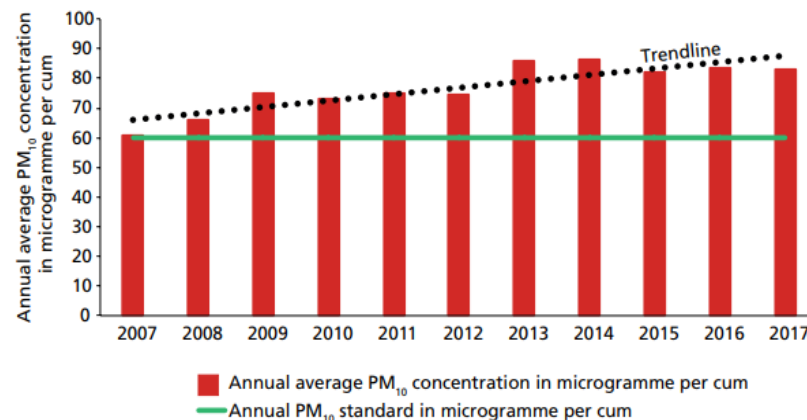
# Rising trend in annual average PM<sub>10</sub>

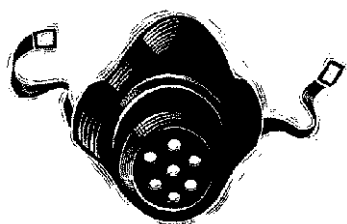


## Bhubaneswar



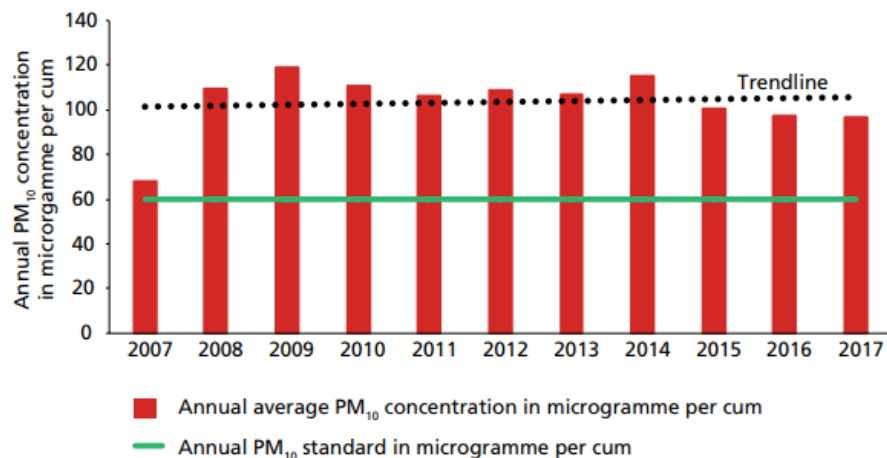
## Balasore



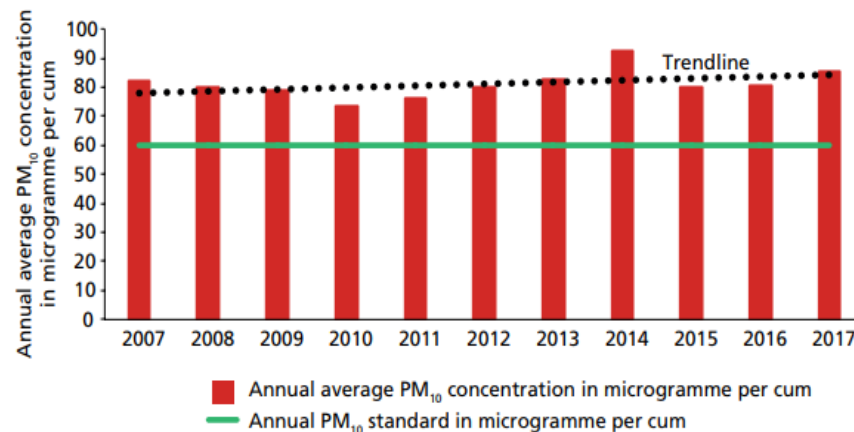


# Stable trend in annual average PM<sub>10</sub>

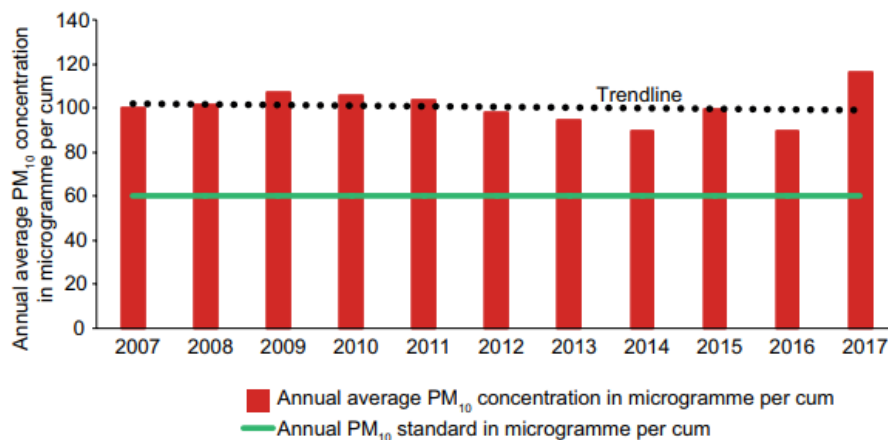
## Angul



## Cuttack



## Rourkela



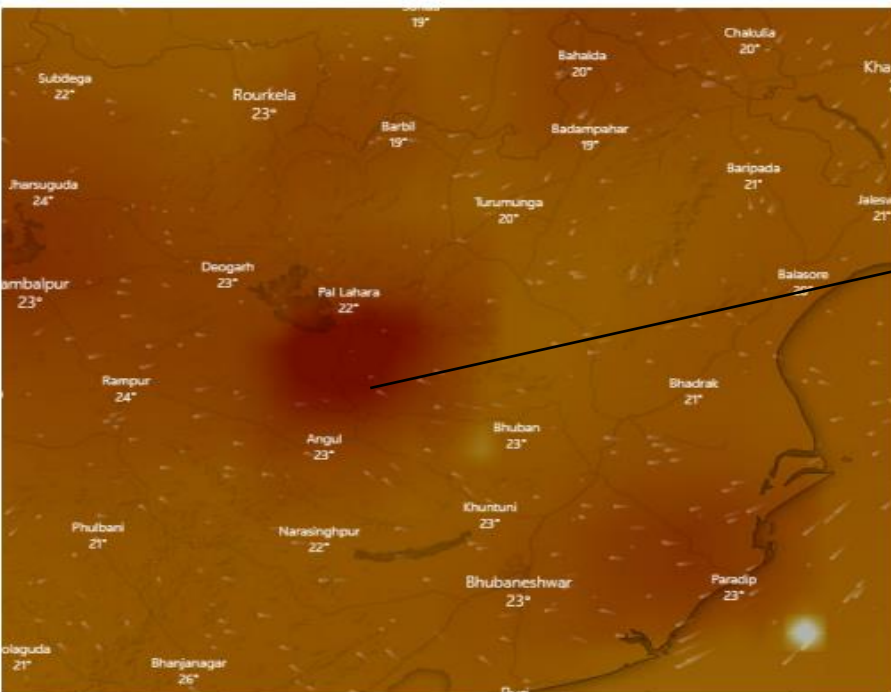




## Regional Trend in NO<sub>2</sub> and SO<sub>2</sub> concentrations

- NO<sub>2</sub> and SO<sub>2</sub> levels below the standard in six cities
- Small increase in NO<sub>2</sub> levels in Angul, Talcher and Bhubaneswar
- But regional build up of SO<sub>2</sub> as seen from satellite mapping
- Potential of secondary particulate

### Satellite imagery of Odisha -- SO<sub>2</sub> build up in the region



Dark Patches— High SO<sub>2</sub> mass



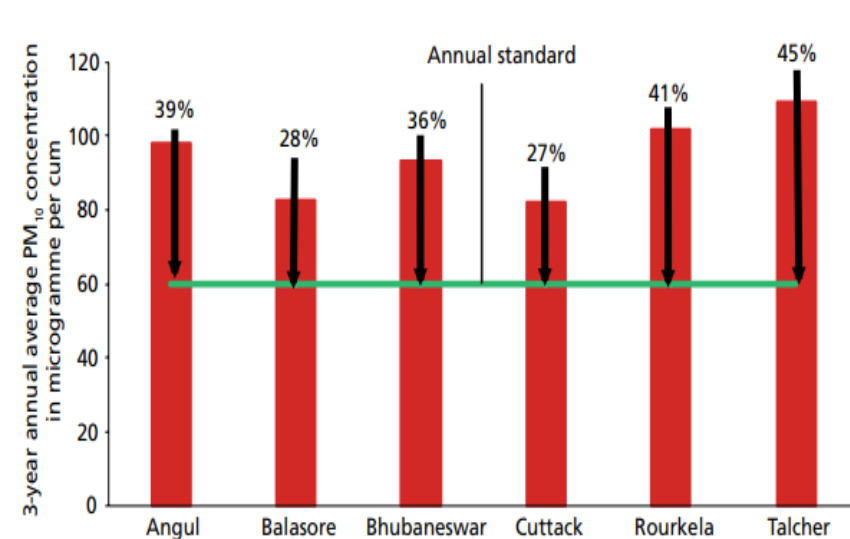


# Set air pollution reduction targets

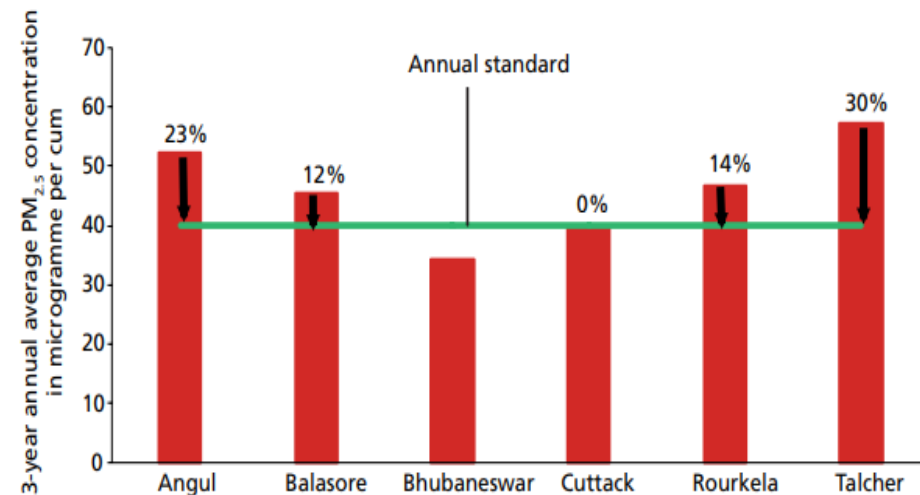


Based on past three years annual average baseline

## PM10



## PM2.5



Source: Based on the annual average station wise data provided by OSPCB.

- Reduction targets decide the level of stringency and the scale of action needed
- Example: Delhi needs to reduce PM2.5 levels by 74% to meet the PM2.5 standards



## Non-Attainment Cities: Percentage of days violating the 24-hour PM10 standard in a year



	Angul	Talcher	Balasore	Bhubaneswar	Cuttack	Rourkela
2008	28.95%	9.65%	3%	25.9%	28%	54%
2009	27.25%	58.65%	9.8%	25%	30.85%	65.75%
2010	47.5%	60.5%	6%	27.3%	22%	69%
2011	49.9%	60.1%	1%	32.5%	29.4%	60.05%
2012	55.75%	69.9%	4.7%	31.36%	24.25%	53.25%
2013	52.4%	57.65%	13.1%	36.14%	37.4%	35.7%
2014	62.95%	62.6%	5%	33.4%	31%	25.9%
2015	50.5%	70.2%	6.7%	24.16%	14.4%	43%
2016	50%	60.4%	13.7%	2.2%	20.5%	16.3%
2017	34.16%	45.1%	6.25%	45.2%	25.95%	45%

Industrial cities such as Angul, Talcher and Rourkela have the maximum violations of the 24-hourly PM10 concentration

Also Bhubaneswar

*Source: Based on data provided by OSPCB*

**High violation of daily or 24-hour average standard indicates that this requires daily emergency responses or graded response action plan (GRAP) especially if the levels go very high**



# Example of daily emergency Action in Delhi



## Winter measure

- Closure of coal power plant
- Closure of all brick kilns without zigzag technologies
- Closure of all hot mix plants
- Closure of all stone crushers
- Closure of all industries using coal and biomass as fuel
- Public transport services asked to intensify – metro to add more coaches and lower fares
- Solid fuels not allowed in open eateries and restaurants
- Intensify traffic management
- Intensify enforcement of non-destined trucks

## November smog episode

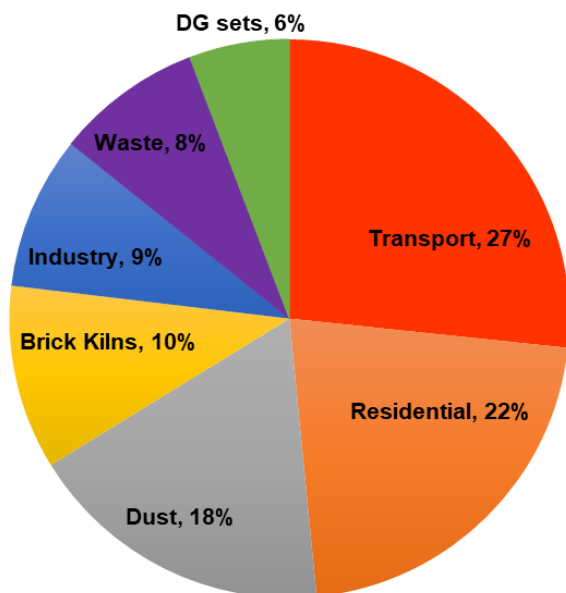
- All trucks stopped from entering Delhi
- Construction activities stopped;



# Bhubaneswar: Emission inventory

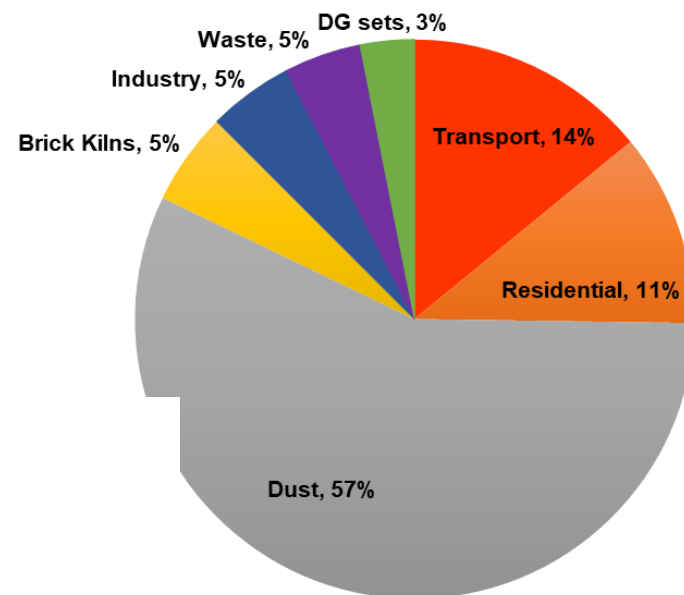


## PM<sub>2.5</sub>

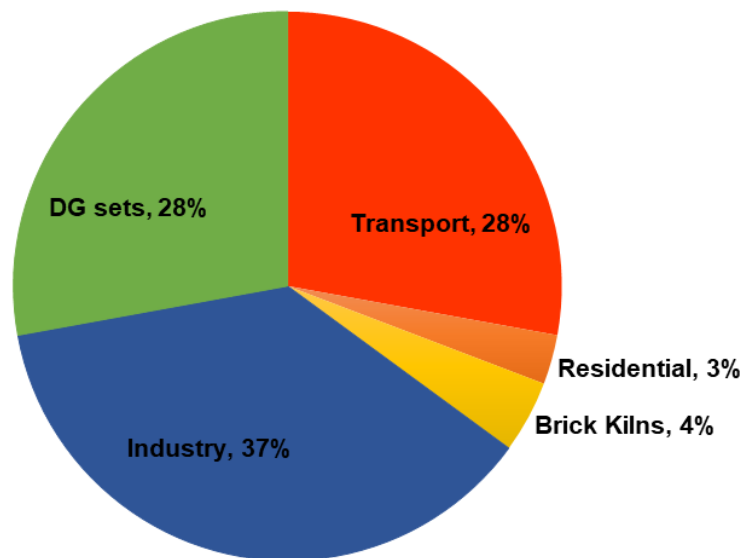


Vehicles are the dominant source as shown by this study

## PM<sub>10</sub>



## NO<sub>x</sub>





# Health Risk in Odisha

- In 2017, state-level disease burden estimates (IHME, ICMR and PHFI): **Air pollution ranks as the second-largest risk factor for premature deaths in Odisha.**
- **A 2018 Lancet report 2017: The number of deaths attributed to air pollution in Odisha -- 31,118.**
- **Death rate per 100,000 population** attributable to air pollution in Odisha -- **65.3**, which is almost same as that of Delhi.
- **If air pollution concentration could be lowered, the life expectancy in Odisha could increase by 1.2 years.**
- Number of deaths due to household air pollution (17,633) is greater than the number of deaths due to ambient air pollution (11,985) in Odisha.
- Disease profile of the state, -- ischemic heart disease and lower respiratory infections have been identified as the leading cause of productive life year's loss in Odisha.



# **What do we do?**

## **Industries and power plants**





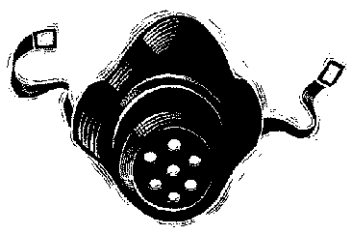
## Profile of industries in different districts of Odisha



- At district level - Angul, Talcher, Rourkela, Balasore and areas around Cuttack have large number of red and orange category industries that influence the urban air quality

S. no.	City	Red category	Orange category	Green category
1	Angul (includes Talcher)	69	94	17
2	Balasore	93	179	27
3	Bhubaneswar	1	20	1
4	Cuttack	75	623	319
5	Rourkela	137	275	61

Source: Based on data from OSPCB



# **Baseline policy action on industrial pollution control**



- **Angul-Talcher Action Plan as part of 24 critically polluted areas specified by CPCB:**
- **OSPCB has prepared Action Plan for Angul-Talcher Area in March 2016**
- **To strengthen the ongoing compliance programme with emissions standards; retrofitment of emissions control system, and siting policy**
- **To promote clean fuels – oil and natural gas**
- **Star Rating Programme for industry**



# Action on dirty industrial fuels



## Petcoke and furnace oil: --

- **SC order -October 24, 2017: Ban on pet coke and furnace oil as fuels in Delhi, UP, Haryana, Rajasthan** – Exemption to cement, calcium Carbide, Lime kilns, Graphite Electrode
- **SC order November 17, 2017:** Requests all States of India to take measures to ban Furnace Oil and Petroleum Coke usage.
- **DGFT Notification 24.8.2018** – Ban import of petcoke; Also MOEFCC to restrain its domestic use to be WTO compliant
- **SC order - December 31, 2017:** SO<sub>x</sub> and NO<sub>x</sub> standards for 34 groups of industry

**Approved Fuels: Delhi Government - Notification of Approved fuels list in Delhi:** Coal, biomass and high sulphur fuels banned (selective use of charcoal)

**SC order to all states in NCR to prepare approved fuel list**



# Industry: A Roadmap



## ❖ *Short to medium term*

- Implementation of **SO<sub>x</sub> and NO<sub>x</sub> standards** notified by MOEF&CC on January 29, 2018 for 35 categories of industries.
- Strengthen Star Rating Programme
- Implement **clean fuel policy**
- CEMS monitoring
- Identification of cumulative impact and prescribe more stringent action for industries
- Identification and implementation of **fugitive emission control measures**
- Enforce restrictions on operations of intensively polluting industries within urban airshed

## ❖ *Medium term*

- **Prepare and implement local area action plan for pollution hotspots and strict enforcement of air pollution control measures in all industries**
- **Strengthen siting policy for industries to be notified in future**
- **Use CEMS data for enforcement and legal compliance monitoring**



# Power Generation

## Baseline policy action



- The state has **seven thermal power plants -- over 24 units** running collectively in **districts of Jharsuguda, Angul and Dhenkanal**.
- **Retrofitment of emissions control system:** TPPs have installed ESPs to cut emissions; Also bag filters and other dust suppression measures at coal circuits for control of air pollution during coal handling.
- As per the status report it was proposed to upgrade/install 32 ESPs to meet a PM emission standard of 50 mg/Nm<sup>3</sup>, out of which as of 2016, 13 ESPs have achieved desired result. Therefore the achievement till 2016 was 40 per cent.



# Power Plant

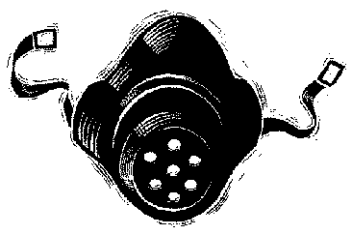


## Thermal Power Standard –

### Implementation of new thermal power plant standards by an early date

- **Supreme Court Order 2018** – Prioritise high density areas - 400 persons per sq km
  - 57 central government units to meet SOx and PM standards by December 2021
  - NOx standards by December 2022
  - Need roadmap of state and private power plants;
  - Ministry of Power to assess use of Merit Order Dispatch to accelerate the process
- **Need phase out plan for very old plants**
- **Chart plant-wise roadmap for cleaner emissions and Incentivize them (Merit dispatch order)**
- **Potential of gas based power plants**
- **Strategies for fly ash pond – bricks, plantation etc**

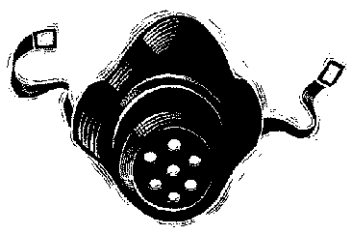




# Brick Kilns



- Number of brick kilns in the state (that produce about 25 lac bricks) is 500 and number of brick kilns (that produce about 5 lac bricks) is 5,000.
- The number of kilns: Balasore is 150, Rourkela—86, Angul—14, Bhubaneswar—55 and Cuttack—68.
- **An order was issued by the CPCB in 2017** under the directions of section 18 (1) (b) of the Air (Prevention and Control of Pollution) Act, 1981 for prevention and control of air pollution, for different types of brick kilns.
- (i) **Must provide consent, failing which brick kilns to be shut;**
- **Must meet the prescribed norm and siting guideline** with immediate effect,
- (ii) **Provide status on conversion of natural draft to induced draft brick kilns,**
- (iii) **Strictly enforce siting guidelines,**
- (iv) **Ensure the area around brick kilns is paved,**
- (v) **Ensure fine dust does not accumulate around brick kilns.**
- **Needs stringent implementation**



# Brick kilns: A Roadmap



## ❖ *Short term action*

- **Enforce restrictions on operations of brick kilns within urban airshed zones** during high pollution periods, allow Brick kilns that comply with zig-zag or improved technology.

## ❖ *Medium- to long-term action*

- **Convert all brick kilns to zigzag technology** —from natural draft kilns to induced—draft kilns (zigzag technology).
- **Prescribe design specifications and ensure compliance checking** to know that conversion has actually taken place
- **Need promotional campaign replace traditional bricks** with hollow and perforated bricks, flyash bricks, concrete blocks with recycled waste, etc

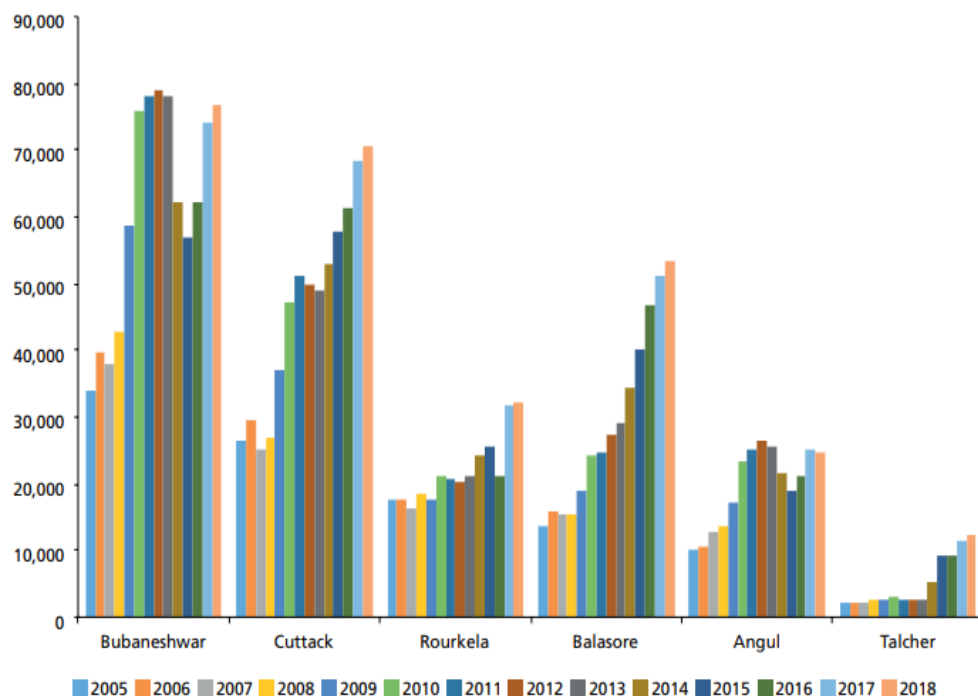


# **Vehicular Emissions and Mobility Management**

(I) Reduce emissions from new and old vehicles



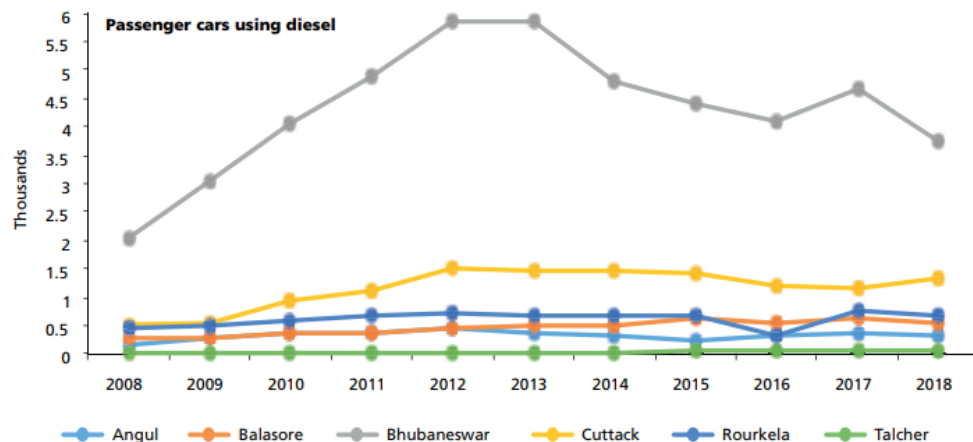
# Annual registration of vehicles (all categories) in cities of Odisha from 2005–18



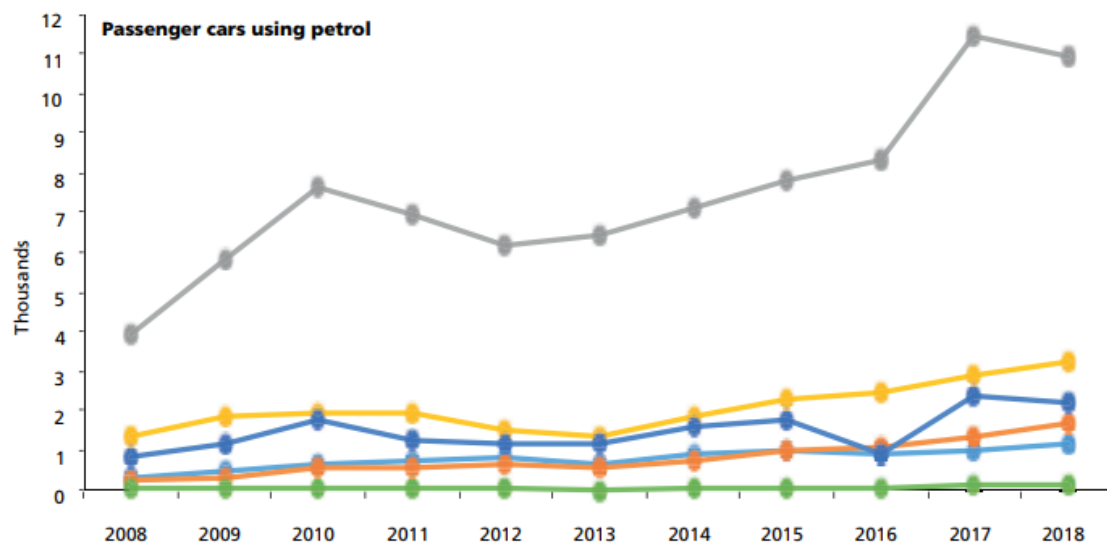
- **Percentage increase in total vehicle registration between 2005 and 2017:**  
**Balasore at 272%**
- **Cuttack– 159%**
- **Angul– 152%**
- **Bhubaneswar– 118%, Rourkela– 80%**
- **2-wheelers:**
- **Balasore– 332% Angul– 233% Cuttack– 195%**
- **Bhubaneswar– 106%**
- **Rourkela– 98%**
- **Highest percentage increase in cars registration between 2005 and 2017 :**
- **Balasore– 657%**
- **Bhubaneswar– 353%**
- **Angul– 286% Cuttack– 191%**
- **Rourkela– 168%**



# Trend in motorization in six non-attainment cities during 2008–18



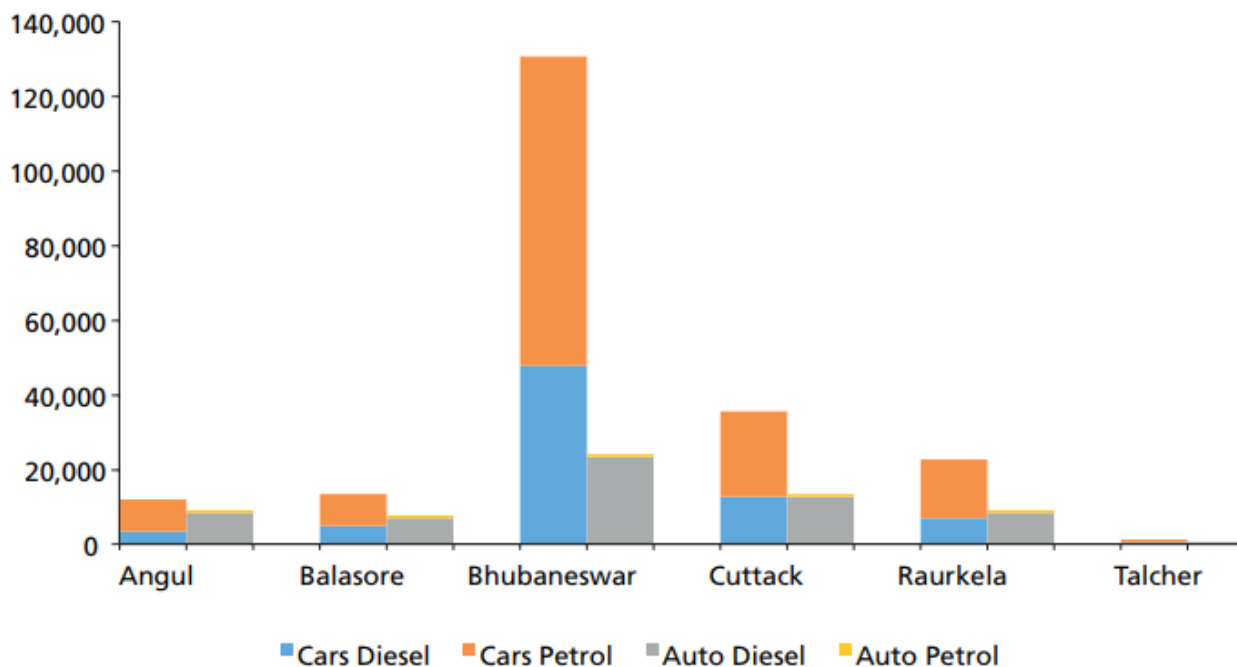
Motorization is highest in Bhubaneswar followed by Cuttack while the trend in other cities are upward



Source: Based on data from RTOs



# Diesel and petrol cars in the six cities



- Fuel-wise breakup of fleet shows that use of diesel cars have grown in all cities and is particularly high in Bhubaneswar. It is also a matter of concern that auto-rickshaws in all cities are predominantly on diesel





# Diesel Autos



- **Under BSIV**, diesel auto legally allowed to emit 1.7 times higher particulate matter and 1.3 times higher NO<sub>x</sub>+HC than a BSIV diesel car.
- **Under BSVI emissions** standards, a diesel three-wheeler will emit close to 6 times higher particulate matter and two times more nitrogen oxide compared to a BSVI diesel car.

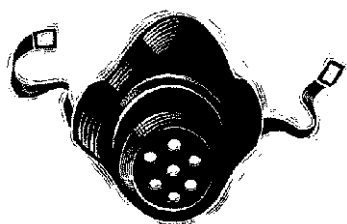


## Reducing tailpipe emissions



### Vehicle technology and fuel quality

- **Leapfrog** to clean emissions standards (BSVI)
- **Introduce clean fuels (CNG)** (CNG programme in Bhubaneswar and Cuttack)
- **Zero emissions mandate** for electric mobility: Bhubaneswar EV policy -- **A target of 20% trips on electric vehicles by 2021 and 30% by 2030.**
- **Ensure vehicles remain low emitting through out their useful life** on road; lower real world emissions
- **Ensure rapid fleet renewal**
- **Need scrappage and end of life policy**

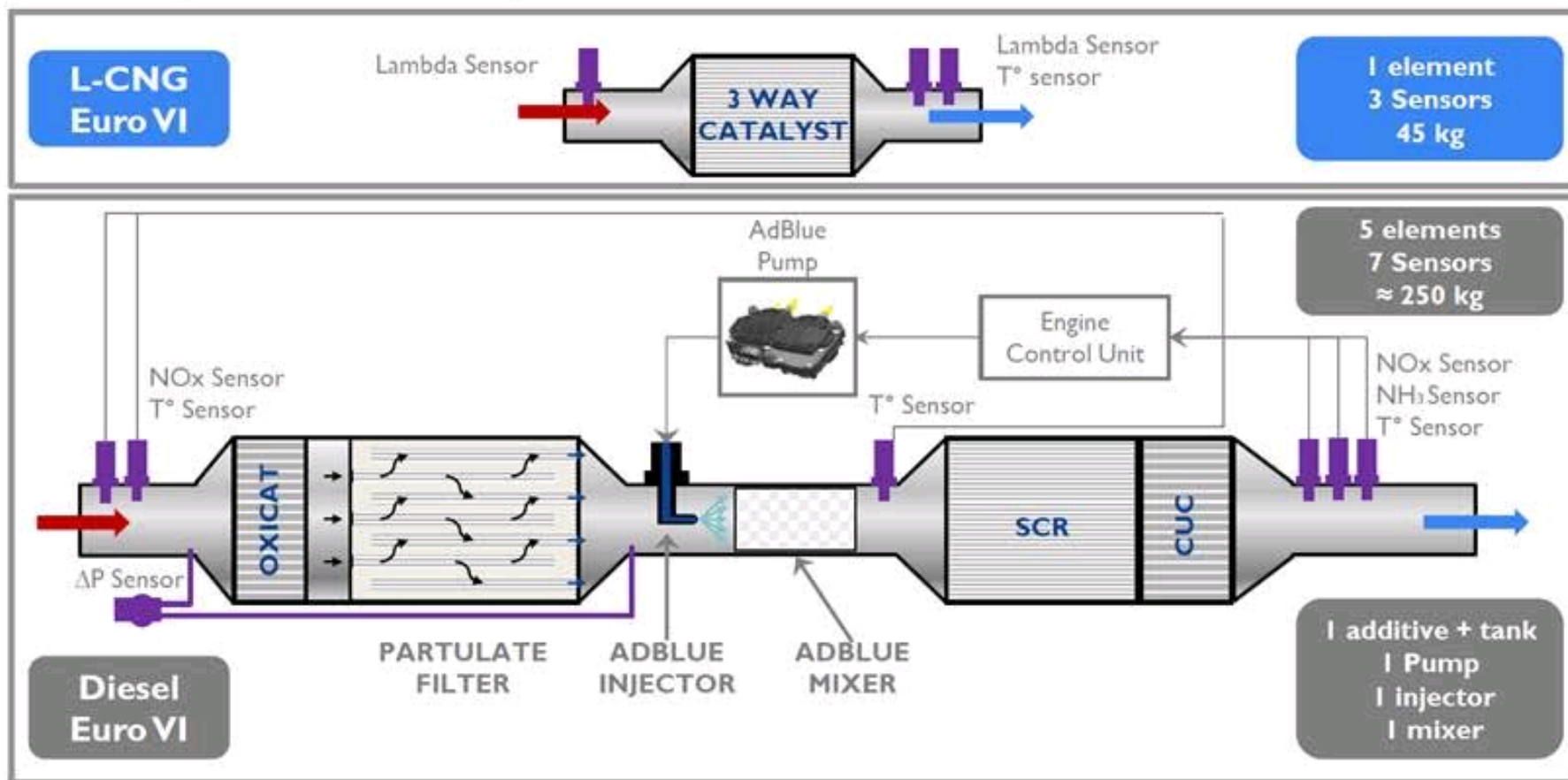


## Need BSVI preparedness



### IVECO Stralis Natural Power

Environmental benefits – Simple EATS





# Improve and move beyond PUC

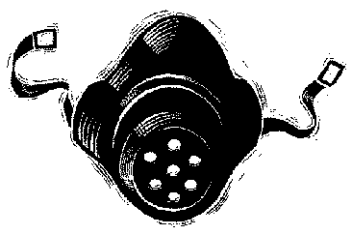


## On-Road Vehicles

- **Link PUC certificates with annual vehicle insurance** to ensure 100 per cent compliance.
- **Auditing of Pollution under Control (PUC) certification centres**
- **Upgradation of in-use emissions testing for diesel vehicles**
- **Enforcement of law against visibly polluting vehicles**
- **Improve annual fitness tests**

## New generation

- **Set up centralised testing centres for both emissions and fitness tests**
- **Remote sensing in Delhi and Kolkata;**
- **Realworld emissions monitoring**
- **Implement an on-board diagnostic system fitted in new vehicles for vehicle inspection**
- **Scrappage policy; managing truck movement, environment compensation charge**



# Need mobility management



**Improve public transport  
& para transit &  
integration**

**Walking, and cycling  
strategy**

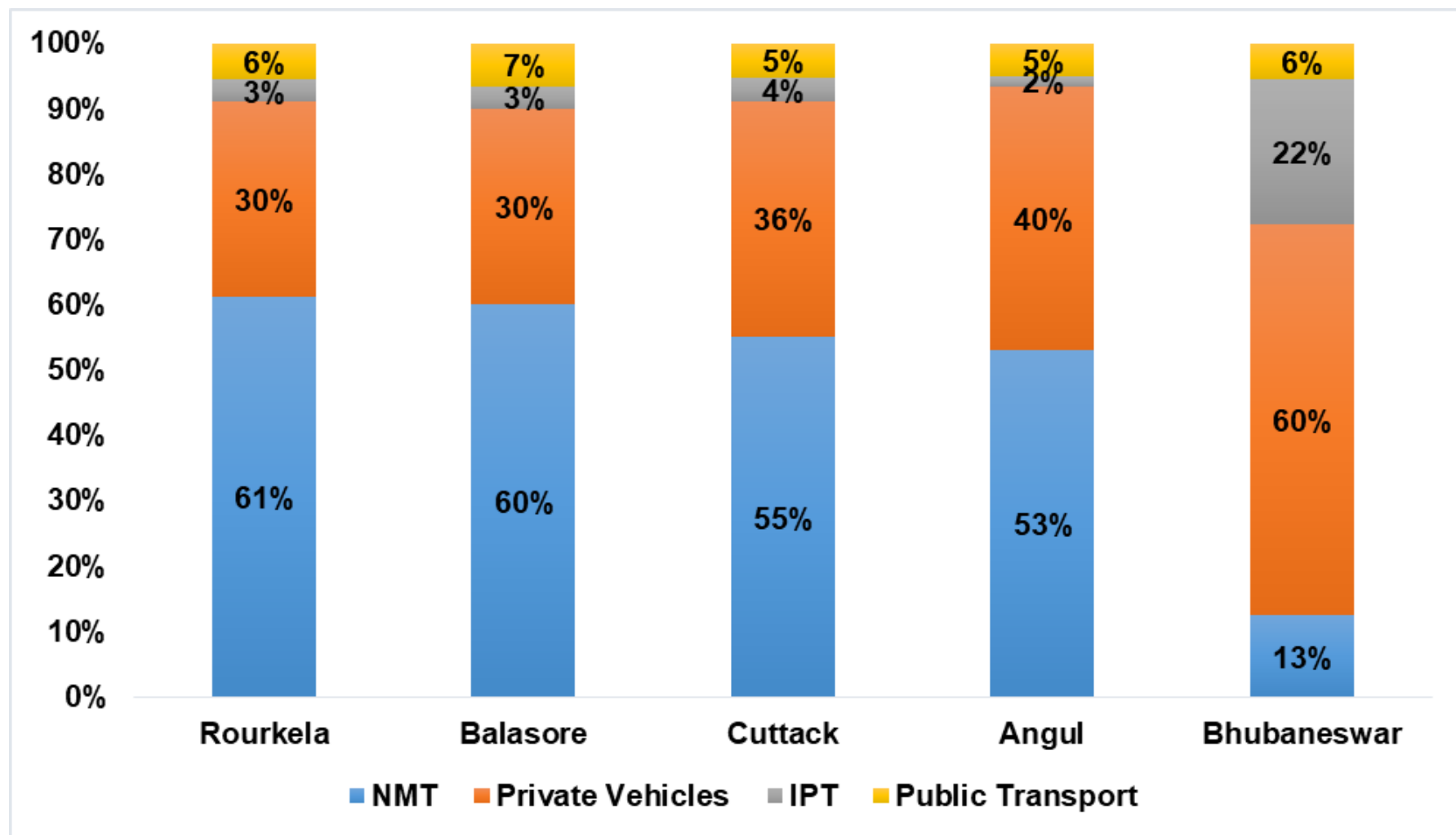
**Link with urban planning  
and design to reduce  
travel needs and  
distances**

**Restraint measures for  
personal vehicles usage**  
– (parking policy, road and  
congestion pricing, low  
emissions zones, tax  
measures etc)





## Modal share of different cities (non-motorized trips included): Build on the strength







# Progressive action in Bhubaneswar



## Legacy

- **City bus operation in Bhubaneswar**- Puri- Cuttack- Khurda sector, increased from 9 routes in 2009 to 23 by 2015. Few routes terminated -- 17 routes operational
- **Significant reduction in ridership since 2014**. From a daily ridership of 42,000 in 2012-13, fallen to a little over 23,000 daily passengers.

## Recent revival:

- **MO Bus services** within Capital Region Urban Transport (CRUT). -- 200 buses plying equipped with GPS tracking, on board public information systems, on board surveillance and free Wifi facilities.
- **Modern bus queue shelters** fitted with all the basic amenities (seating, dustbins, signage) have been constructed.
- **GPS-based public information system (PIS)** mounted on the BQS shows real-time information on MO BUS plying on the routes.
- **PIS is linked to the Bhubaneswar Operations Centre (BOC)**
- **Create locally appropriate template for other cities**: For critically polluted Angul-Talcher, the OSPCB plan has stated that these cities need to procure and deploy buses in a phased manner.



# Bus transport reinvented in Bhubaneswar

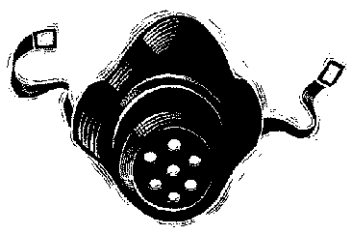






## New Bus stops





# **Bhubaneswar Public transport and multi-modal integration: A Roadmap**



**Introduce a city bus system of appropriate fleet size and desirable bus type**

**GPS tracking**

**ETVMs for fare collection and Passenger Information Systems**

**Develop passenger information system**

**Implement electric bus programme**

**Multi-modal integration – physical integration, and fare integration**



## **Smaller cities Public transport and multi-modal integration: A Roadmap**



**Reorganise intermediate public transport (IPT) – autos, shuttle, taxis**

**Link electric vehicle programme with IPT**

**Bus system for longer trunk routes**

**High street density with well designed pavements and cycling facilities  
and adequate protection for the pedestrians and cyclists for safe access**



# Car centric road design locks in enormous pollution



Engineering changes once made cannot be reversed easily... It permanently decides our travel choices





**Can  
unsafe  
roads  
promote  
public  
transport?**







Delhi: wrong road design force people to cross in unsafe manner. This compromises public transport usage



Public transport needs safe walk access

In Delhi accidents near foot over bridges have increased





## Street design norms can make streets safe and accessible



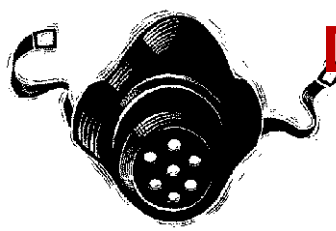
Connaught Place

- Implement street design guidelines

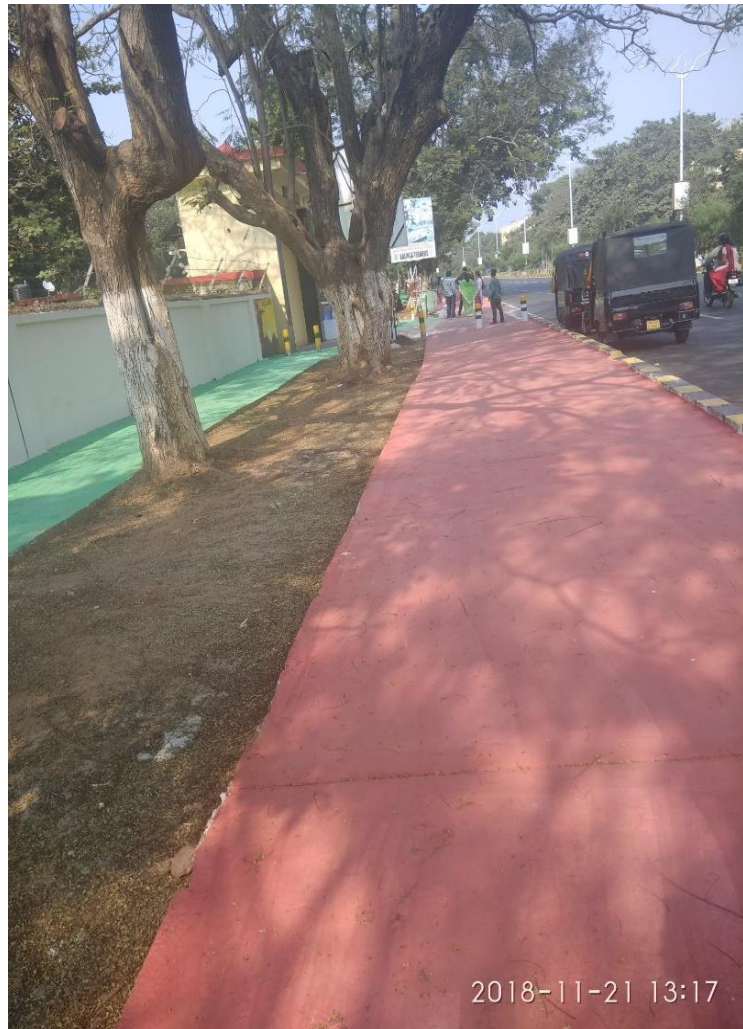


Source: CSE





# Designed footpath and public bike sharing programme in Bhubaneswar: progressive step forward





**Cities have natural pedestrian precincts, by virtue of the sheer volume of pedestrians. This can be further built on to make pedestrian zones.**





# Walking and cycling: A Roadmap



## Baseline policy action on non-motorised transport

- As per the smart city plan, Bhubaneswar Smart City Ltd. has launched several schemes to implement NMT plan and policies.
- Smart Janpath. conceptualized as complete streets.
- Launched cycle sharing with 1500 cycles under Mo Cycle. -- 11km of cycle tracks, painted red to segregate bicycle lanes within the right of way.
- **Need compact city form:** In Bhubaneswar average daily travel trips are below 5.5 kilometers. This means well organized intermediate transport, walking and cycling infrastructure can meet most of the travel demand in the city and reduce use of personal vehicles.



# Need urban design to reduce distances



## *National Habitat Standard Mission of the Ministry of Urban Development*

### *Guidelines for compact mixed land use*

- 95% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 400m walking distance.
- 95% residences should have access to employment and public and institutional services by public transport or bicycle or walk or combination of two or more.
- At least 85% of all streets to have mixed use development.
- Need small block size with high density permeable streets etc

### **UTTIPEC guidelines**

Hierarchy of Facilities	Accessibility Standard from each home/ work place.*
MRTS Station	Approx. 800 m or 10 min walk
Metro feeder/ HOV feeder Stop	Approx. 400 m or 5 min walk
Bus Stop	Approx. 400 m or 5 min walk
IPT/ auto-rickshaw Stand	Approx. 250 m or 3 min walk
Cycle Rickshaw Stand	Approx. 250 m or 3 min walk
Cycle Rental Stand	Approx. 250 m or 3 min walk
Shared private parking garage	Approx. 500 m or 6 min walk





# Need mixed use development



The TOD Building typology :

- Roof of retail used as public space for residents.
- Zero Setbacks.
- Mixed Use (Commercial/ Civic/ Residential within same block)
- Privacy of residents ensured.
- Retail facing the street with homes overlooking, keeps pedestrians (women) safe





# Parked cars on cycle lane NMT policy also requires Parking Policy







# Parking: Insatiable demand



- Unlimited & free parking incites more car ownership and usage
- Wasteful use: 90 to 95% of the time a car is parked; makes enormous demand on land
- Inequitous use of land
- Parking takes away space from other important development, walkways from pedestrians, and green areas





## Need parking management in non-attainment cities



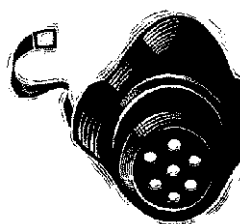
**Enormous pressure on public land: Free and unregulated parking stimulates more demand for parking**

**Parking policy, 2013:** Focused on -- Operational standards/ guidelines to encourage private initiative and Government initiatives in creation of adequate parking spaces through appropriate incentives and enforcement systems. Not focus on demand management.

	Parking requirement in terms of no. of football fields for two-wheelers every year	Parking requirement in terms of no. of football fields for cars every year
Bhubaneswar	99	51
Cuttack	85	13
Angul-Talcher	39	5
Balasore	54	5
Rourkela	34	9

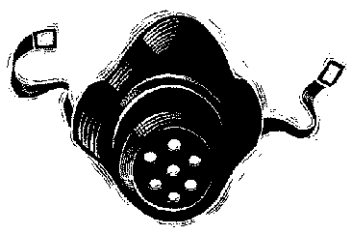






CSE





## Parking and clean air

It is still not clear to many how parking management and restraints can reduce air pollution and give public health benefits

**Boston** froze their parking requirements at a level that is only 10 per cent higher than the 1973 level to meet the Federal clean air standards.

**New York:** very high parking fees and limited parking supply have lowered car ownership far below the average rates in other US cities.

**Amsterdam** -parking fees expanded to meet EU directives regarding NO<sub>2</sub> and PM<sub>10</sub> emissions. Car plate numbers are registered with emissions information. Trucks are allowed to unload for a maximum of 15 minutes in spots where they are not allowed to park

**Zurich** considers total NO<sub>2</sub> emissions when determining the amount of parking to be allowed.



# Effectively priced parking can make a difference



No meters



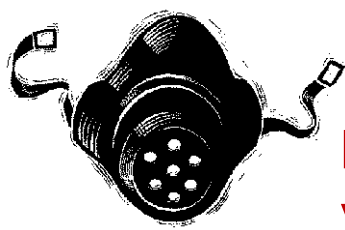
Meters



Prices quadrupled

Grosvenor square, London





# **Parking Policy: A Roadmap**

**Need demand management measures to reduce vehicles miles travelled and emissions**



## **Parking policy as a travel demand management**

### **Implement parking area management plan to**

Identify and demarcate legal parking areas;

Penalise illegal parking;

Introduce variable parking pricing;

Promote shared, priced and public parking

Prevent parking encroachment in green areas etc

Parking revenue for local area development

IT based parking area management and reform of contractual agreement



## Area Sources

- Waste/Biomass Burning
- Construction Dust and Construction and Demolition Waste
- Domestic Emissions/Use of solid fuels
- Diesel Generator Sets
- Road Dust
- Crop burning
- Mining Areas
- Green areas

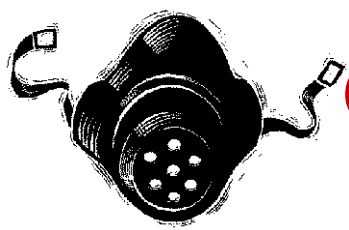


# Waste Burning: A Roadmap



- **Implement Solid Waste Management Rules and Regulations**
- **Household level segregation, decentralised recycling and reuse**
- **Landfill management**
- **Zero landfill policy**
- **Waste to Energy Plants – Only if needed** - Strict implementation of emission norms, use state of the art technology and provide emission data to State Pollution Control Boards.
- **Ensure a robust collection system that focuses on collection of segregated waste.**
- **Develop a siting policy for WTE plants.**



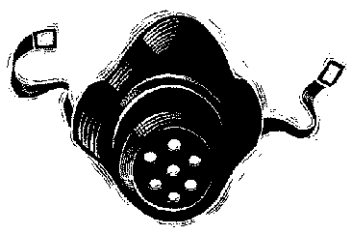


# Construction and Demolition Waste Base line policy action



## Construction and demolition waste (C&D)

- **Guidelines on environmental management of construction and demolition (C&D) wastes 2017**, Bhubaneswar generates approximately 196.8 tonnes per day (TPD). T
- **Bhubaneswar Municipal Corporation (BMC) to set up a C&D waste processing plant** on public-private-partnership mode. Identified two sites for dumping of waste - Patia and Kargil Basti.
- **C&D charges have been fixed for construction:** For a structure > 80 sq m area Rs. 50/- per month; Rs. 100/- charged for 120 sq. metre. Beyond 120 sq. metre, Rs. 200/- ; Stacking of construction/ demolition debris Rs. 1500/- per tractor trip Rs. 3000/- per truck trip.
- **Disposal of waste at regional Landfill** of non-bio-degradable and inert material site at Brajrajnagar/ Jharsuguda



# Construction and Demolition Waste: A Roadmap



## ❖ *Short-term action*

- Ensure dust pollution from construction.
- Undertake control measures for fugitive emissions from material handling, conveying and screening operations
- Enforce restrictions on construction activities within urban airshed zones during high pollution period

## ❖ *Medium- to long-term action*

- Provide a network of decentralized C&D waste segregation and collection sites across the city.
- For material handling, construction and demolition, it should be obligatory on part of the developers to provide evidence of debris on-site recycling and/or disposal at designated sites.
- Promote recycling of construction and demolition waste.
- Implement provision of Central regulations for construction and demolition waste management rules 2016.
- Set-up facilities for recycling of C&D waste



## Domestic Solid Fuel Baseline policy action



### Ujjwala Yojana

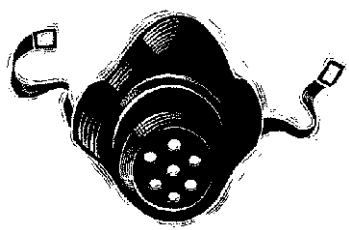
**Biogas plants:** About 2.41 Lakh biogas plants for domestic cooking and lighting from Odisha Renewable Energy Development Agency (OREDA), Department of Science and Technology, Odisha.



**Unnat Chulhas** - 247 clean cookstoves provided by OREDA in 2016-17. About 9800 clean cookstoves (Parishad Chulhas) in schools for Mid-Day Meals by OREDA

Target 100% clean fuel coverage

**Restrict use of coal in hotels and restaurants,**  
link this with licensing policy



# Generator sets

## ❖ *Short-term priority action*

- **Ensure that only those DG sets that meet the standards** in terms of emission or design of chimneys/ exhaust and acoustic enclosures, also verify and check whether design specifications are followed or not thereafter the genset to be allowed to operate.
- Use of DG sets should be regulated according to GRAP
- Curtail use of DG sets in social events by providing temporary electric connections

## ❖ *Medium- to long-term action*

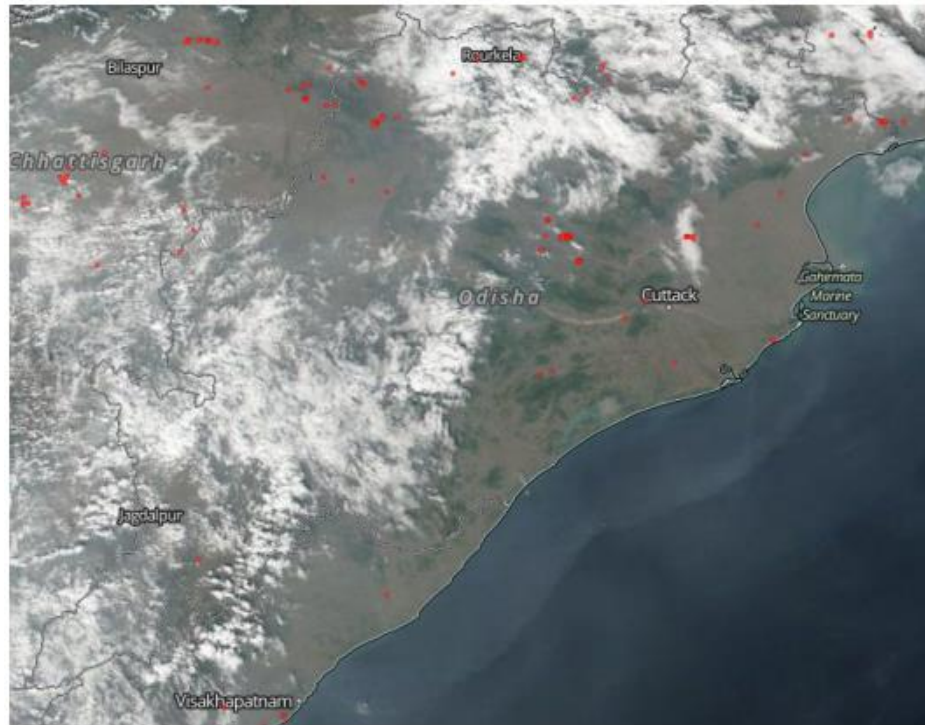
- **Alternate power systems should be promoted in cell towers**, and use of DG sets discouraged
- **Leverage roof top solar programme to reduce** dependence on DG sets
- **Ensure access to quality electricity supply**

**“Odisha Solar Policy- 2013” of Science and Technology Department:** Solar roof top power. 1 GW capacity to come from large-scale solar parks and 1GW from rooftop (both on/off grid) projects in the commercial and domestic segment; by 2017-18, target of 125MW from rooftops.

**Need reliable access to electricity**



# Open fires and Crop Fires



Satellite Image—11 December 2018

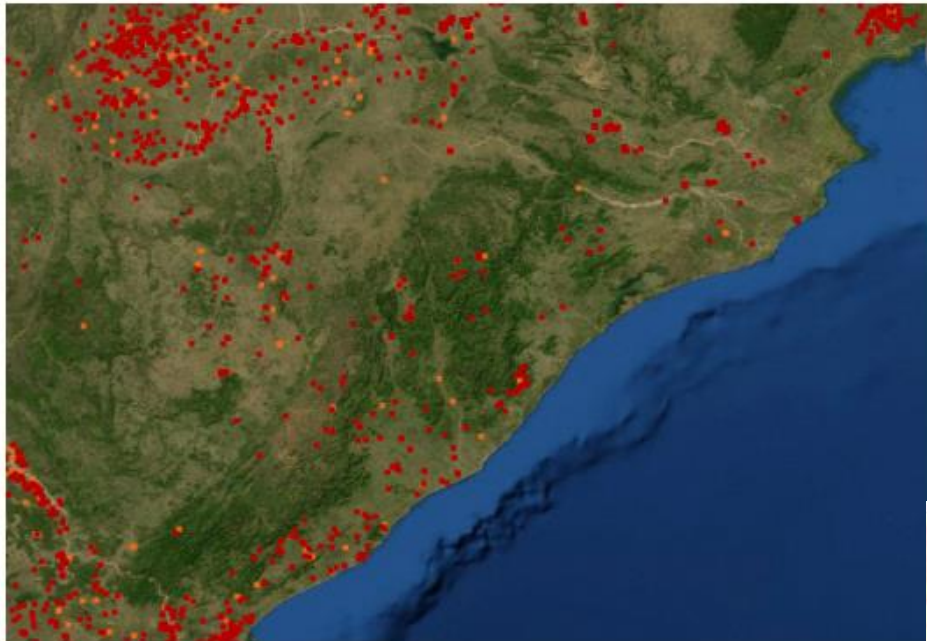


Satellite image—20 March 2018





# Open fires



Cumulative fires mapped—12  
November–12 December 2018



Cumulative fires mapped—  
or the entire month of March  
2018 (peak fires)

*Source: NASA MODIS and VIIRS data, as accessed on 12 December*



# Crop burning: A Roadmap



Provide farmers with alternatives and educate them on stubble burning

## **In field solution**

Mulch and mix with soil; Can reduce fertiliser cost for farmers

## **Ex-situ solution**

Promote biomass-based power plants

Production of biofuels and fertilizers

Biomass pellets and other uses

R&D and crop diversification

Uniform decentralized mechanism for the collection, storage and commercial sale of crop residue





# Road dust and greening



## ❖ *Short-term priority action*

- Sprinkling of recycled water (without compromising other uses); introduce water fountains at major traffic intersections, wherever feasible
- Phase-in mechanical/vacuum-based street sweeping wherever feasible; introduce wet/mechanized vacuum sweeping of roads

## ❖ *Medium- to long-term actions*

- Implement truck loading guidelines; use of appropriate enclosures for haul trucks; gravel paving for all haul routes.
- Maintain pot hole-free roads for free flow of traffic to reduce emissions and dust.
- Increase green cover in the region. Undertake greening of open areas, gardens, community places, schools and housing societies.
- Enforcement of air pollution control in concrete batching
- Adopt street design guidelines for paving of roads and footpaths (hard and soft paving) with vegetative barriers.
- Green walling approaches





## **Set up institutional process for implementation**



**Need institutional coordination**

**Harmonise action across departments; Inter-departmental task force to monitor implementation**

**Take stock periodically to further refine and upgrade the plan.**

**Framework for implementation and compliance**

**Capacity audit and improvement of implementing agencies**

**Need impact monitoring**

**Notification of Comprehensive Action Plan**



## **Fiscal strategies**



**NCAP funding for air quality monitoring and some support for studies and plans**

**Align CAP principles and guidelines with the budget of all line departments – leverage existing line funding**

**Mobilise resources based on polluter pay principles to create dedicated funds – Eg from Delhi – Environment Compensation Charge on trucks and big diesel cars and SUVs; Air Ambience cess on each litre of diesel etc. Sector specific funds**

**Bilateral and multilateral funding**

**Reform based funding**



Thank You