Clean Air Action Plans for Non-Attainment Cities of Andhra Pradesh

COMPREHENSIVE ACTION PLAN FOR CLEAN AIR FOR NON-ATTAINMENT CITIES OF ANDHRA PRADESH

December 2018

Vijayawada, Visakhapatnam, Guntur, Nellore, Kurnool

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Centre for Science and Environment

Air Quality Management: Building Strategies for Clean Air,

Joint initiative of State Pollution Control Board, Government of Andhra Pradesh, and Centre for Science and Environment

Vijayawada, June 11, 2019
City-wise and cross sectoral action plan

Non-attainment cities:
-- Vijayawada
-- Visakhapatnam
-- Guntur
-- Kurnool
-- Nellore

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. **Source-wise and city-wise Comprehensive Plan to meet air pollution reduction targets**
   (National Clean Air Programme has set a generic target of 35% reduction; Need city and sector specific targets based on the current baseline)
   - **Base plan** common for all cities. **Additional special measures** for individual cities
   - **Strategies with detailed indicators** instead of listing only broad action items
   - **Integrated existing action plans, aligned ongoing measures in different sectors, and added improved measures** for a comprehensive framework. This leverages available resources and maximizes benefits
   - **Provides scope of replication and expansion of emerging good practices** like the Smart City initiatives of Bhubaneswar; industrial pollution control efforts etc
   - **Addresses issues of big and small cities differently**
   - **Timeline for action; agencies responsible**
   - **Institutional arrangement** for implementation
   - **Compliance and monitoring strategies**
   - **Need robust data; Assessment of pollution sources and health risk**
   - **Need equituous, affordable, and innovative solutions**
   - **Combine local air quality control with regional air quality planning 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

-- Vijayawada = 8 manual, 1 real-time
-- Visakhapatnam = 10 manual, 2 real-time
-- Guntur = 2 manual
-- Nellore = 1 manual
-- Kurnool = 1 manual

The annual trend assessment based on data available on CPCB Envis air quality database

Manual monitoring underestimates pollution; not amenable for daily action and public information
Rising trend in annual average PM10

Source: Based on the data available on CPCB air quality database.
Stable trend in annual average PM10

Source: Based on the data available on CPCB envis air quality database
Regional Challenge

Annual PM2.5 mean

Daily PM2.5 mean

Source 2015, Norwegian Institute for Air Research, International Institute for Applied Systems Analysis, IITM

Source: Sagnik Dey 2016, Indian Institute of Technology Delhi,
Aerial raids

PROBABLE SO2 HOTSPOT? ???

Strengthening air quality monitoring and assessment strategy

• **Monitoring network design** (By population distribution and land-use (industry, residential, traffic intersections, sensitive areas etc).
• **Leapfrog to real-time monitoring**.
• **Quality control and assurance for credible data**
• **Data reporting and public information system**
• **Pollution forecasting**
• **Realtime Continuous monitoring of stack emissions**

• **Pollution source assessment strategy**
  • Emissions inventory and Source apportionment & Modeling tools

• **Exposure assessment**

• **Potential of sensor based monitoring**

• **Remote sensing monitoring**
Adopt official criteria to decide the number of Air quality monitoring stations in each city

• Proposed expansion of monitoring network

<table>
<thead>
<tr>
<th>City</th>
<th>Population*</th>
<th>Number of Monitors Required</th>
<th>Existing Number of Monitors</th>
<th>Additional number of monitors required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vijayawada</td>
<td>1,491,202</td>
<td>11</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>1,883,185</td>
<td>13</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Guntur</td>
<td>743,354</td>
<td>8</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Nellore</td>
<td>600,689</td>
<td>8</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Kurnool</td>
<td>459,463</td>
<td>8</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: This table lists the minimum number of monitoring stations required. *Existing number of monitors includes combination of manual and real time monitoring. More than 80 per cent of the stations in Andhra Pradesh are manual and do not provide daily air quality information. Replace manual monitors with automatic monitors.

Source: Project reports on solid waste management prepared by respective urban local bodie sand Guidelines for Ambient Air Quality Monitoring, CPCB, 2003.

• Need real time monitors for real time action; manual monitors underestimate problem
Set air pollution reduction targets

Based on past three years annual average baseline

<table>
<thead>
<tr>
<th>City</th>
<th>Three-year average concentration (2015–17)</th>
<th>Reduction target (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vijayawada</td>
<td>104</td>
<td>42</td>
</tr>
<tr>
<td>Guntur</td>
<td>78</td>
<td>30</td>
</tr>
<tr>
<td>Kurnool</td>
<td>71</td>
<td>23</td>
</tr>
<tr>
<td>Nellore</td>
<td>66</td>
<td>9</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>71</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: CSE analysis of data available on CPCB Envis Air quality database

- 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
Seasonal Analysis of PM10 and PM2.5 concentrations in Vijayawada and Visakhapatnam

Winter Analysis: Vijayawada

Source: CSE analysis of data provided by APPCB
Seasonal Analysis of PM10 and PM2.5 concentrations in Vijayawada and Visakhapatnam

Winter Analysis: Visakhapatnam

Source: CSE analysis of data provided by APPCB
Seasonal Analysis of PM10 and PM2.5 concentrations in Vijayawada and Visakhapatnam

Summer Analysis: Vijayawada

Source: CSE analysis of data provided by APPCB
Seasonal Analysis of PM10 and PM2.5 concentrations in Vijayawada and Visakhapatnam

Summer Analysis: Visakhapatnam

Source: CSE analysis of data provided by APPCB
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;
Emission estimates for PM10 in Andhra Pradesh

- New source inventory and apportionment studies for 5 cities
- In February 2019, the APPCB zonal laboratory got equipped with advanced instrumentation laboratory.

Source: IIASA GAINS, simulation year: 2015
Health Risk in Andhra Pradesh

- In 2017, the first ever state-level disease burden estimates released by IHME, ICMR and PHFI showed that air pollution ranked as the fourth-highest risk factor in 2016 and was responsible for premature deaths in Andhra Pradesh.

- A 2018 Lancet report estimated that in 2017, the number of deaths attributed to air pollution in Andhra Pradesh are 45,525.

- The number of deaths due to household air pollution (19,345) and number of deaths due to ambient air pollution (23,280) in Andhra Pradesh.

- In the disease profile of the state, ischemic heart disease and lower respiratory infections have been identified as the leading cause of productive life year’s
High Health Risk in Andhra Pradesh
(per 100,000 population)
What do we do?

Industries and power plants
Industries and power plants

SPREAD OF INDUSTRIES IN ANDHRA PRADESH

1. Chittoor: Food processing, Steel, Sugar & Distilleries and Bulk Drugs
2. Anantapur: Cement, Steel, Mining & Mineral based industries
4. Nellore: Steel, Thermal Power Plants, Rice Mills, Engineering
5. Kurnool: Caustic Soda, Cement, Mining, Granite polishing, Lime Kilns & Mineral based industries
6. Prakasam: Granite Mining & Granite polishing industries
7. Guntur: Cement, Spinning Mills, Lime Kilns
8. Krishna: Automobiles, Ancillary Industries & Pharma
9. West Godavari: Caustic Soda, Distilleries, Sago Mills, Rice Mills
11. Visakhapatnam: Bulk Drugs, Refinery, Steel & Thermal Power Plant
12. Vizianagaram: Pharma, Ferrous Alloys, Sponge Iron
13. Srikakulam: Cashew Nut Processing, Power Projects
### Profile of industries in different districts of Andhra Pradesh

<table>
<thead>
<tr>
<th>District</th>
<th>Industries and Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vijayawada</td>
<td>Steel, metals, petroleum, polymers, fertilizers, heavy engineering equipment, ship building</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>Processing of agricultural products, automobile body building, hardware, textile, consumer goods and small scale industries</td>
</tr>
<tr>
<td>Guntur</td>
<td>Textile and garment manufacturing, agro and food processing, cement</td>
</tr>
<tr>
<td>Nellore</td>
<td>Textile and garment manufacturing, agro and food processing, leather, IT and electronics, power generation</td>
</tr>
<tr>
<td>Kurnool</td>
<td>Agro and food processing, mineral based industries, engineering</td>
</tr>
</tbody>
</table>

Source: Andhra Pradesh state economic development board, district industrial profiles
Baseline policy action on industrial pollution control

Visakhapatnam Action Plan as part of critically polluted areas specified by CPCB:


- Comprehensive industrial siting guidelines
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: SOx and NOx standards for 34 groups of industry

Approved Fuels: Delhi Government - Notification of Approved fuels list inDelhi: 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 **SOx and NOx standards notified** by MOEF&CC on January 29, 2018 for 35 categories of industries.
- Implement **clean fuel policy**
- Ensure implementation of **CEMS** across applicable industries
- **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**, including unauthorized areas.
- Strengthen implementation of **siting policy** for industries to be notified in future
- Use CEMS data for enforcement and **legal compliance monitoring**
The state has eight thermal power plants. As of December of 2018, the total power generation capacity of Andhra Pradesh stands at 17,657 MW, of which 11,626 MW is coal based, 4,880 is gas-based and 1,150 is hydel.

As per Andhra Pradesh’s solar policy, the state targets generation of 5000 MW in next 5 years.

The state’s wind policy targets generation of 4,000 MW wind based power in next 5 years.

Leverage clean power
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: A Roadmap

- Enforce restrictions on operations of brick kilns within urban airshed zones during high pollution periods
- Implement 2017 order of CPCB on brick kilns to:
  - provide consent, failing which brick kilns to be shut;
  - Meet prescribed norm and siting guideline with immediate effect,
  - Provide status on conversion of natural draft to induced draft
  - Strictly enforce siting guidelines,
  - Ensure the area around brick kilns is paved,
  - Ensure fine dust does not accumulate around brick kilns.
  - Move from natural draft to induced draft kilns (zigzag
  - Prescribe design specifications and ensure compliance checking
- 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 vehicles
How much pollution we breathe while travelling?

Source: Based on CSE exposure monitoring and DPCC data for ambient levels
Annual registration of vehicles of Andhra Pradesh from 2001–12

- The total vehicles registered in Andhra Pradesh grew at an annual rate of approximately 19 per cent per annum between 2001 and 2012.

Trend in motorization in Vijayawada and Visakhapatnam

Source: Road Transport Yearbook, 2017
The state has witnessed almost 16 per cent of annual growth of both 2-wheeler and 4-wheeler registrations.
Fuel-wise breakup of fleet shows that in all the non-attainment cities except Visakhapatnam the number of diesel 4-wheelers is higher than petrol 4-wheelers.

Source: Based on data from Andhra Pradesh Transport Department
Reducing tailpipe emissions

Vehicle technology and fuel quality

- **Leapfrog** to clean emissions standards (BSVI)
- Introduce clean fuels (CNG)
- **Zero emissions mandate** for electric mobility
- 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
Age-wise distribution of diesel auto-rickshaws registered in the five cities

- Under BSIV, diesel auto is legally allowed to emit 1.7 times higher particulate matter, and 1.3 times higher NOx+HC than a BSIV diesel car.
- This gap will widen under BSVI regulations.
- Even after meeting BSVI standards, a diesel three-wheeler will emit close to 6 times higher particulate matter and two times more nitrogen oxide than BSVI diesel car.

Source: Based on data from Andhra Pradesh Transport Department
Bhagyanagar Gas Ltd. is responsible for provision of CNG to the urban agglomerations of Vijayawada and Kakinada.

There are 8 CNG fueling facilities around Vijayawada.

As of November, 2018, there are 11,236 CNG auto-rickshaws plying on the streets of Vijayawada and 8,200 CNG 4-wheelers in the district.

Natural gas programme can reduce emissions significantly.
Electric Mobility Policy, 2018

Complete reimbursement of road tax and registration fees, on sale of electric vehicles until 2024.

Target of 10 lakh electric vehicles on road by 2024; To stop registration of petrol and diesel vehicles by 2024 in Amravati. All government vehicles to be electric by 2024.

Aims to convert the entire fleet of Andhra Pradesh State Road Transport Corporation (APSRTC) into electric vehicles.

Deployment of 1500 e-buses in 3 cities of Andhra Pradesh; To purchase over 7,500 e-three-wheelers for garbage collection by 2019. As of 7th June, 2019, 106 electric vehicles sold – 50% are 2-wheelers.

To collaborate with Kia Motor India for ‘Partnership for Future Eco Mobility’

Multiple agreements with EESL to get more EVs deployed

New EV policy to attract investment of Rs 30000 Crore; State grant of Rs 500 Crore for EV R&D

To set up 1 lakh slow and fast EV charging stations by 2024.
Electric mobility: A Roadmap

- **Need State Level Electric Mobility Policy and Zero Emissions Mandate** to chart the roadmap for all five cities.

- **Prioritise electric mobility for public transport, para transit (autos and taxis), feeder service and delivery fleet**

- **Charging infrastructure; affordable strategies for batteries**
  - 50 charging station will be erected in the first phase among which 33 charging stations have already been built in Krishna, East Godavari and West Godavari districts.

- **Scale up and replicate initiative in other non-attainment cities**
Addressing on-road emissions
Andhra Pradesh’s ageing vehicular Fleet: 4-wheelers (diesel)

Source: Based on data from Andhra Pradesh Transport Department

- Transport department seeking Whatsapp messages visibly polluting vehicles on road
Andhra Pradesh’s ageing vehicular Fleet: 2-wheelers

Most of the 2-wheelers fleet in 5 non-attainment cities of Andhra Pradesh are more than 25 years old and specifically Guntur has the highest number of aging vehicles.

Source: Based on data from Andhra Pradesh Transport Department
PUC reforms: A Roadmap

i. National level
   - Link PUC certificates with annual vehicle insurance to ensure 100 per cent compliance. (MORTH is assessing this)

ii. State level
   - Auditing of Pollution under Control (PUC) certification centres
   - Upgradation of in-use emissions testing for diesel vehicles
   - Enforcement of law against visibly polluting vehicles
   - Implement an on-board diagnostic system fitted in new vehicles for vehicle inspection (MORTH Notification). Check MIL light and if OBD is working
   - Set up centralised testing centres for both emissions and fitness tests
   - Vujaywada can pilot remote sensing emissions monitoring of on-road vehicles
Baseline action on trucks
In Bhubaneswar the trucks are allowed to ply from 8pm to 8 am and in coal mining areas from 6pm to 6 am.

Lessons from Delhi
- Environment compensation charge on truck entry
- Created dedicated fund
- RFID system – installed at 13 locations for automatic and electronic payment and improved monitoring
- Weigh in motion bridge to check overloading
- Entry restriction on more than 10 year old trucks
- Eastern and Western Peripheral Expressways to bypass truck traffic
Reduce tailpipe emissions: A Roadmap

- **Short- to medium-term priority action**
  - Emission and fuel quality for new vehicles: Ensure on-schedule implementation of BS VI fuel and emission standards on April 1, 2020.

- **Medium-term priority action**
  - Vapour recovery at Refueling Stations

- **Alternative clean fuel policy for vehicles**

- **Short-term priority action**
  - Gaseous fuel programme: Expand CNG, LNG, LPG programme across all six cities

- **Short- to medium-term action**
  - **Electric vehicle programme**: Need zero emissions mandate for targeted vehicle segment-wise phase in of electric vehicles—two-wheelers, three-wheelers/para transit, buses and large delivery fleet.
  - **Bio fuel policy**
  - Need favorable tax measures to promote clean fuels and zero emissions vehicles
Link with mobility management

Cars occupy more road space, carry fewer people, pollute more, guzzle more fuel.

They edge out public transport users, pedestrians, bicycles, cycle rickshaws ..
Most of the non-attainment cities, the primary mode of travel is (walking and cycling. Andhra Pradesh should capitalise on this inherent advantage of higher preference for NMT.

Source: Census of India, 2011
Baseline policy action on public transport

- **City bus operation in Vijayawada and Visakhapatnam** - Among 5 non-attainment cities only these two big cities have formal bus service

- **BRT system in Vijayawada and Vishakhapatnam**

Vijayawada Bus shelter
Introduce reliable and accessible city bus system of appropriate fleet size and desirable bus type

Need GPS enabled public information system (PIS)

ETVMs for fare collection and Passenger Information Systems
Develop passenger information system

Implement electric bus programme

With multi-system plans in plans (bus, BRT, Metro) prepare for multi-modal integration – physical integration, and fare integration
Roadmap for smaller cities

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
Need accessible streets
Unsafe walking access….discourage low/zero pollution modes

Poorly designed walking infrastructure
- Discontinuous, poorly paved footpaths, and not easily accessible
- Height and width of pavements violate norms
- Poor signages, no pedestrian refuge islands -- crosswalks are ordeal
- No kerbed ramps or blended crossings to access the crosswalk facilities
- Exposure to traffic very high.

Source: CSE
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

Source: Delhi Traffic Police
Can unsafe roads promote public transport?
Footpaths in Vijayawada being encroached by shops lining the roads
Street design norms can make streets safe and accessible

- Implement street design guidelines

Connaught Place

Source: CSE
Non-motorised transport and last mile connectivity: A Roadmap

Implement zonal plan for developing NMT network

Compact city development

City Master Plan to promote compact urban form to contain urban sprawl, and reduce distances and emissions. Promote planned mixed use development
Car centric road design locks in enormous pollution

Engineering changes once made cannot be reversed easily... It permanently decides our travel choices
Is this paradigm sustainable?
Super blocks, opaque boundary walls, no street activity, limited access....
Build compact city

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

<table>
<thead>
<tr>
<th>Hierarchy of Facilities</th>
<th>Accessibility Standard from each home/ work place.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRTS Station</td>
<td>Approx. 800 m or 10 min walk</td>
</tr>
<tr>
<td>Metro feeder/ HOV feeder Stop</td>
<td>Approx. 400 m or 5 min walk</td>
</tr>
<tr>
<td>Bus Stop</td>
<td>Approx. 400 m or 5 min walk</td>
</tr>
<tr>
<td>IPT/ auto-rickshaw Stand</td>
<td>Approx. 250 m or 3 min walk</td>
</tr>
<tr>
<td>Cycle Rickshaw Stand</td>
<td>Approx. 250 m or 3 min walk</td>
</tr>
<tr>
<td>Cycle Rental Stand</td>
<td>Approx. 250 m or 3 min walk</td>
</tr>
<tr>
<td>Shared private parking garage</td>
<td>Approx. 500 m or 6 min walk</td>
</tr>
</tbody>
</table>
Is this sustainable?
Why current parking policy will lock in more air pollution?

Unlimited and free parking incites more car ownership and usage; lead to more pollution

Wasteful use: 90 to 95% of the time a car is parked and makes enormous demand on land

Inequitous use of land: A car gets more space (23-26 sqm) to park than poor households get land to make houses (18-25 sq m).

Parking takes away space from other important development, walkways from pedestrians, and green areas
Parking demand 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 focused on demand management
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 NO2 and PM10 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 NO2 emissions when determining the amount of parking to be allowed.
Global parking pricing levers

Japan
Proof of parking regulations and ban on night parking on streets: Vehicle owner procures a “garage certificate” from the Police department for vehicle registration. This is re-issued in case of change of ownership or address.

Singapore and Hong Kong have stringent approaches towards restraining car ownership and usage.

Hong Kong has been more effective in restraining car ownership – about 60 cars per 1000 people vs 110 cars per 1000 people in Singapore. Singapore has three times more private car kilometres of travel per person than Hong Kong.

This is explained by the Hong Kong’s more expensive parking.
Walking and cycling policies cannot work without Parking Policy: Lesson from Bhubaneswar
Effectively priced parking can make a difference

No meters
Grosvenor square, London

Meters

Prices quadrupled

Source: TRL in ITDP (2011): Europe's Parking U-Turn
Need parking area management plan

- **Area level plan prepared by any local body to demarcate:**
  - Legal On-street, off-street and multi-level parking facilities.
  - Vending zones; Multi-modal integration facilities,
  - Green open spaces along with the allied traffic,
  - Pedestrian / NMT circulation plans; Signage plans
  - Pricing strategy – variable parking pricing
  - No parking in green areas, near intersection, near bus stands etc
- Penalise illegal parking
- Promote shared, priced and public parking
- 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
- Green areas
Waste generation in non-attainment cities

<table>
<thead>
<tr>
<th>City</th>
<th>Projected population (Solid waste management DPRs for ULBs)</th>
<th>Per capita/day (Source: District Waste Management Detailed Project Reports)</th>
<th>Total daily waste generation (MT)</th>
<th>Existing waste management</th>
<th>Distance of dump yard from city (in km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vijayawada</td>
<td>1,491,202</td>
<td>0.45</td>
<td>671,041</td>
<td>Open dump and biomethanization</td>
<td>&lt; 10</td>
</tr>
<tr>
<td>Guntur</td>
<td>743,354</td>
<td>0.45</td>
<td>334,509</td>
<td>Open dump and biomethanization</td>
<td>17</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>1,883,185</td>
<td>0.45</td>
<td>847,433</td>
<td>Open dump, small compost plant</td>
<td>~30</td>
</tr>
<tr>
<td>Kurnool</td>
<td>4,59,463</td>
<td>0.35</td>
<td>160,812</td>
<td>Open dump</td>
<td>16</td>
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<tr>
<td>Nellore</td>
<td>600,689</td>
<td>0.42</td>
<td>252,289</td>
<td>Open dump</td>
<td></td>
</tr>
</tbody>
</table>

Source: CSE analysis
Some burning visuals from Kurnool...

Gargeyapuram landfill site
Waste Generation and Burning: A Roadmap

- Implement Solid Waste Management Rules and Regulations
- Household level segregation, decentralised recycling and reuse
- Landfill management
- Zero landfill policy
Municipal Solid Waste Management: Baseline Action

Andhra Pradesh is investing in cluster based Waste to Energy (WTE) treatment plants.

In 2019 there will be WTE plants catering to the urban agglomerations of Vijayawada, Visakhapatnam and Guntur. Another WTE plan is being proposed to scientifically manage the waste being generated in Tirupati.

Plan Waste to Energy Plants – Only if needed - This requires:
- Strict implementation of emission norms,
- State of the art technology
- Provide emission data to State Pollution Control Boards (CEMS).
- Ensure robust collection system that focuses on collection of segregated waste.
- Develop a siting policy for WTE plants.
Open burning: A Roadmap

- **Enforce complete ban on garbage burning.** Needs monitoring
- **Stringent action against open burning of biomass / leaves / tyres etc.**
- **Ensure proper collection of horticulture waste (biomass) and composting-cum-gardening approach and infrastructure**
- **Implement provisions of Solid Waste Management Rules 2016 to implement penal provisions to spot fine on waste burning.** Strictly ban open burning of hazardous industrial waste
- **Use satellite based monitoring as well as mobile spot check squads for enforcement**
- **Proper management of landfill sites** to prevent spontaneous fire
- **Adopt roadmap for zero landfill policy** to promote decentralized waste segregation, reuse and recycling
Greater Visakhapatnam Municipal Corporation (GVMC) generated close to 80 tonnes of C&D waste per day. Vijayawada and Guntur generate 110 and 80 TPD of C&D waste respectively.

State government accorded permission to Swachha Andhra Corporation to float 80 TPD capacity recycling plant near Kapuluppada. The state has also set up waste processing units at Kanaka Durga Varadhi and Eluru canal near Sitaramaraju Bridge.

--- 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.
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. Needs enforcement.
  - Enforce restrictions on construction activities within urban airshed zones during high pollution period.

- **Medium- to long-term action**
  - Provide 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.
Cooking fuels and open eateries: A Roadmap

• A targeted programme to be implemented for 100% coverage of households by distribution of LPG/PNG

• Promote and give access to LPG and electricity in low-income neighbourhoods, as well as roadside eateries/dhabas/ restaurants etc.

• Mandate and link commercial license to clean fuels.

• Restrict use of coal in hotels and restaurants, link with licensing policy;

• Incentivize move to LPG, piped natural gas for residential and commercial use

• 2011 census: Usage of firewood in districts of Nellore and Kurnool was very high back in 2011.
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

Need reliable access to electricity
Open fires and Crop Fires

Satellite Image—1st April to 31st April, 2018

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

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

Cumulative fires mapped—1 November–31 November 2018

Cumulative fires mapped—1st -20th December

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

- **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.
Set up institutional process for clean air action

Need institutional coordination between departments for cross-sector action – vehicles and transport; industry and power plants; waste management; construction; domestic sources etc

List action with time line and attribute it to the ministry/department responsible for implementation

Harmonise action across departments; Set up inter-departmental task force to monitor implementation

Take stock periodically to further refine and upgrade the plan.

Adopt strong legal framework for implementation and compliance

Capacity audit and improvement of implementing agencies

Need impact monitoring

Notify Graded Response Action Plan and Comprehensive Action Plan under Environment Protection Act
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