

National Media Briefing
Controlling Air Pollution – What Next?

State wise actions for improving air quality

Draft

20th December 2019

New Delhi

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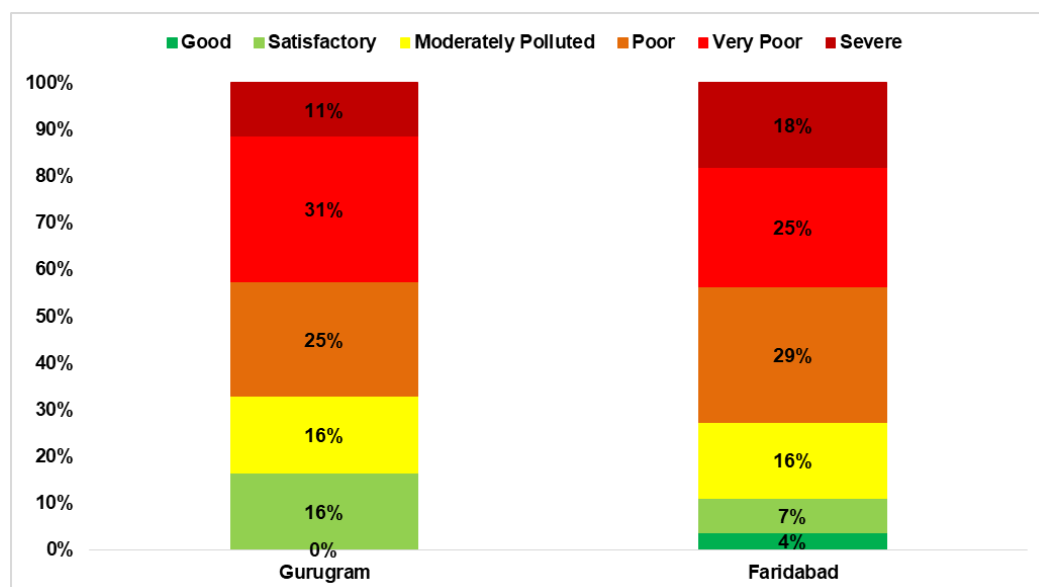
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Haryana

Tracking Particulate Pollution and action in cities of Haryana

Haryana does not have any non-attainment city, however, Gurugram being a part of National Capital Region (NCR) has had to prepare a clean air action plan as part of NCR which got notified last year in June 2018. The current state was tracked through the government websites and various media reportage on the issue of air pollution. The latest developments which include air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated from source, available in the public domain. Some of the actions such as implementation of the sale of BS VI vehicles from April 2020 is mandatory for pan India. Also BS VI fuel is already available in most of the NCR cities.

Graph: Categorisation of PM2.5 based on AQI categories from October- November 2019



Source: CSE's analysis based on the air quality data available on CPCB website for real-time monitoring stations

It must be noted that with the onset of winter, the number of days in very poor and severe categories increases. Status of actions has been listed below.

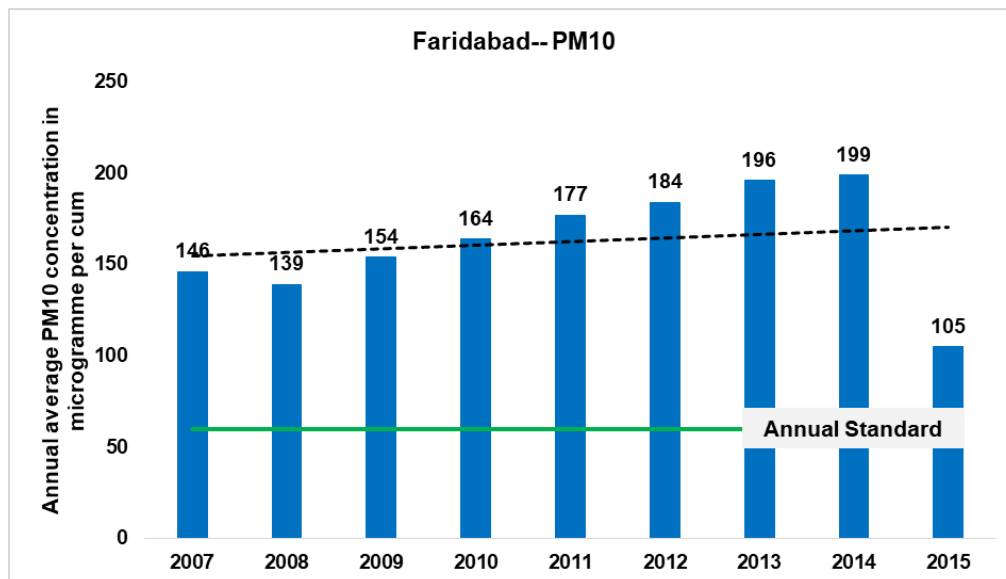
Gurugram

Sector-wise measures implemented	Initiatives undertaken
Air Quality Monitoring	Gurugram has only one monitoring station – at Vikas Sadan. A bigger database is required and new monitoring stations are expected to enable corrective action. ⁱ
Construction & Demolition waste	Construction ban was put in place in November, 2019. ⁱⁱ
Air Pollution	The Graded Response Action Plan has been implemented by Municipal Corporation of Gurugram.
Vehicular Emissions and Traffic management	The odd-even plan for vehicles was enforced in Gurugram. NGT bans more than 10 years old diesel and 15 years old petrol cars from plying in Delhi-NCR ⁱⁱⁱ (2015)

Sector-wise measures implemented	Initiatives undertaken
	Supreme Court reiterates 2015 NGT order for NCR, junking a plea to counter NGT order ^{iv} (2018)
Waste Management	The National Green Tribunal has directed the Gurugram Municipal Corporation to clear 25 lakh tonnes of legacy waste at Bandhwari landfill within six months. ^v
Public transport	<p>Integrated Mobility Plan for Gurugram Manesar Urban Complex introduced^{vi}</p> <p>Qutub Minar- Gurugram metro corridor begins operations^{vii} (2010)</p> <p>Rapid Metro Gurugram starts operation^{viii} (2013)</p> <p>The Gurugram Metropolitan City Bus Limited set up^{ix} (2017)</p> <p>Dedicated mobility division set up under GMDA ^x</p> <p>First city bus service flagged off in September 2018^{xi}</p> <p>Guru Gaman - smart travel card introduced^{xii}(2018)</p> <p>GMDA floats draft mobility plan for comments in September, 2019^{xiii}</p> <p>20,000 diesel autos to be banned wef 1.1.2020^{xiv}</p> <p>DMRC takes over Rapid Metro operations^{xv} (2019)</p>
Electric Vehicle Policy	DMRC in partnership with Treasure Vase Ventures launched 500 electric rickshaws at Huda City Centre metro station in Gurugram on September, 4, 2017 ^{xvi} (2017)
Parking	GMDA initiates process to develop parking policy for Gurugram ^{xvii} (2019)

Faridabad

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

- Increasing PM10 trend
- Annual average data is not available after 2015
- Based on the data available, the reduction target for the city is (base year as 2013-15) is 64 per cent

Actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Air Quality Monitoring	Faridabad only has one air quality monitoring station, which is situated at Sector16A, Faridabad. ^{xviii}
Industry	The Environment Pollution (Prevention and Control) Authority had announced the ban on coal-based industries in view of the extreme pollution levels that triggered a public health emergency. The task force directed the industries to take adequate pollution control measures and comply with the prescribed environmental norms. ^{xix}
Construction and Demolition Waste	The Supreme Court had on November 4 banned construction and demolition activities in the NCR including Faridabad till further orders.
Graded Response Action Plan	Directions were issued to officials to immediately stop construction activity, launch mechanised cleaning of roads, identify high dust stretches, curb coal and firewood use in eateries and hotels and ban garbage burning in the open.

Sector-wise measures implemented	Initiatives undertaken
	Civic officials were told to start sprinkling water on spots of heavy traffic immediately and procure mist cannons and water tankers for water sprinkling. The MC issued directions to ban burning of leaves, plastic waste, rubber, self-moulding compounds and other such material and warned of strict action. ^{xx}

Hissar

Sector-wise measures implemented	Initiatives undertaken
Air Pollution monitoring	The HSPCB has taken the step of opening its regional office in Hissar. ^{xxi}
Waste Burning	Deputy commissioners and concerned officials have been instructed to act strictly and promptly on complaints of stubble burning ^{xxii}

Yamuna Nagar

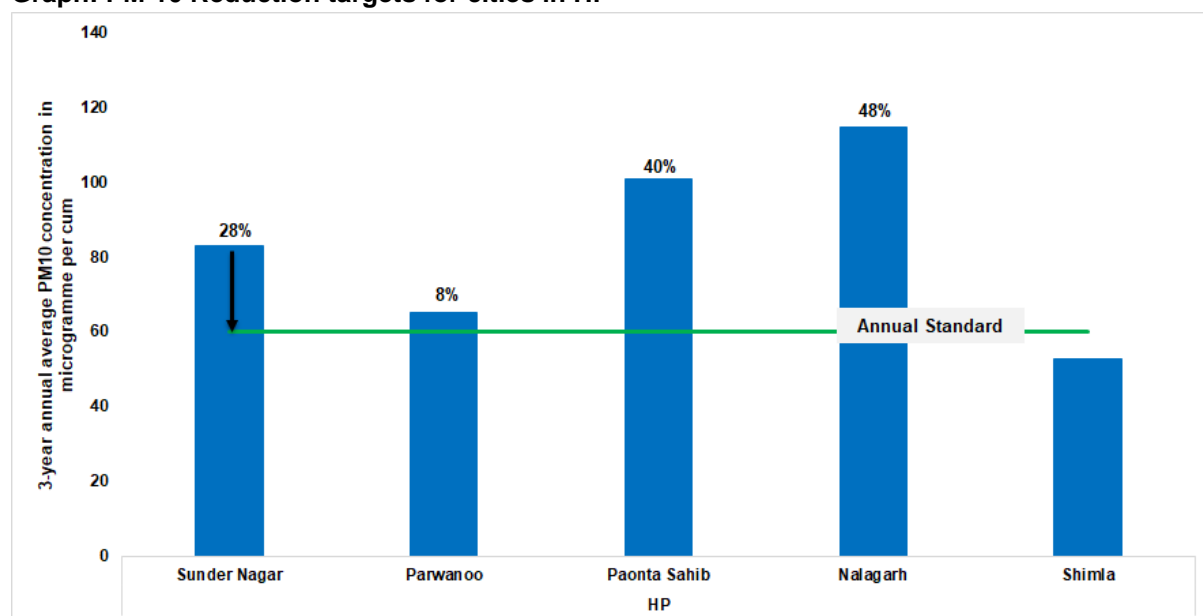
Sector-wise measures implemented	Initiatives undertaken
Air Pollution	The district has a large number of factories and jaggery units which violate pollution norms. The district administration has used fire tenders to spray water in the air and on trees in the areas under the Yamunanagar-Jagadhiri municipal corporation to improve air quality. ^{xxiii}
Waste Burning	Deputy commissioners and concerned officials have been instructed to act strictly and promptly on complaints of stubble burning. ^{xxiv}

Himachal Pradesh

Tracking particulate pollution and action in cities of Himachal Pradesh

The current state of air pollution in Himachal Pradesh was tracked from the clean air action plans, government websites, reports and recent media reports. Latest developments include strengthening of air pollution monitoring, abatement strategies, policy updates and proposed technological advancements. Interventions across all sectors, that are in the public domain have been collated for the preparation of this brief. Himachal Pradesh has seven non-attainment cities, based on the respective PM10 concentration in those cities. This brief discusses Shimla, Sunder Nagar, Parwanoo, Paonta Sahib, and Nalagarh. Some of the actions mentioned, such as such as implementation of the sale of BS VI vehicles from April 2020 is mandatory for pan India. BS VI fuel will be available country-wide from April 2020. All Pollution control Checking Centres are expected to be linked with VAHAN 4.0 1 software of the Transport department, including development of the software and linking it to all PUC centres of VAHAN 4.0.2

Graph: PM 10 Reduction targets for cities in HP



Source: CSE's analysis based on CPCB Envis Centre, Air Quality Database

Status of actions in various cities of Himachal Pradesh

Shimla

Sector wise measures	Initiatives Undertaken
Industry	Restriction on using unauthorized fuels in boilers. ^{xxv}
	Disposal of boiler ash and other non-hazardous waste into the designated dumping sites. ^{xxvi xxvii}
Vehicular Emissions ^{xxviii}	Restriction on plying and phasing out of 10 years old diesel driver vehicles. ^{xxix}
	Regular checking of Vehicular emissions and issue of Pollution Under Control (PUC) certificate. ^{xxx xxxi}
	Extensive drive against polluting vehicles for ensuring strict compliance. ^{xxxii}

Sector wise measures	Initiatives Undertaken
Household fuel	<p>91,071 LPG domestic LPG connections were issued till the end of December 2018, under the PMUY. Out these, 86% of beneficiaries came back for refills^{xxxiii}, signaling a paradigm shift in choice of cooking fuel and consequent decrease in indoor air pollution.</p> <p>As per the 4th round of National Family Health Survey (2015-16), 36.70% of consumers were using clean cooking fuel^{xxxiv}.</p> <p>Development of green belt area in open areas, garden, parks/community places, school & housing societies. ^{xxxv}</p>
Waste Burning	<p>Action plan to minimize forest fires. ^{xxxvi}</p> <p>Restriction and regular checking on open burning of municipal solid waste, biomass, plastic, agriculture, horticulture, etc. ^{xxxvii}</p> <p>Transportation and proper disposal of municipal solid wastes, construction wastes, debris in a covered system. ^{xxxviii}</p>
Monitoring and Graded response action plan	<p>Ambient air quality monitoring of Municipal dumping sites and parks.</p> <p>Upgradation of existing NAMP stations for monitoring of 12 parameters from MoEF/CPCB financial assistance. Currently the city has two manual monitoring stations under NAMP, at Tekka Bench Ridge and Bus Stand, Winterfield</p>
Public transport	<p>Comprehensive Mobility Plan introduced ^{xxxix} (2012)</p> <p>800 buses inducted at state level (2013)</p> <p>510 new buses inducted (state level) (2014)</p> <p>HRTC initiated the process for implementation of Intelligent Road Transport System (IRTS) (2014)</p> <p>Restriction on vehicles visiting Rohtang pass (upto a 1000 a day), cannot be older than 15 years^{xli} (2015)</p> <p>25 fully electric buses (zero emission) inducted (State level) ^{xlii} (2015)</p> <p>Introduction of Bharat stage IV norm vehicles ^{xlii} (2015)</p> <p>Fleet strength of 3,012 buses on 2,530 routes as on 31.12.2016. 300 new buses inducted (2016)</p> <p>No registration of more than 10-year-old diesel commercial vehicles of other states ^{xliv} (2017)</p> <p>Bharat Stage IV norms made mandatory^{xlv} (2017)</p> <p>Fleet strength of 3,078 buses, 25 Electric Buses, 21 Taxies & 50 Electric Taxies and plying bus services on 2,869 routes (2018)</p> <p>Ropeway and Rapid Transport Corporation instituted Mass Rapid Transit System (M.R.T.S) to decongest Shimla (2018)</p> <p>50 electric buses were sanctioned under FAME (2018)</p> <p>HRTC has introduced 132 new routes (2018)</p> <p>11 tempo traveller under wet- leasing scheme to major Tourist localities (2018)</p>

Sector wise measures	Initiatives Undertaken
	Ban on plying of school vehicles older than 15 years and fixed the age of drivers to 60 to ensure the safety of students (2018)
Electric Vehicles	NGT directs Himachal Pradesh (HP) government to plan a transition to CNG and electric vehicles. ^{xi} (2014)
	25 fully electric buses (zero emission) inducted (State level) ^{xiii} (2015)
	50 e-taxis inducted to cater to Shimla (2018)
Vehicles, Traffic management and emissions	Green tax imposed on all vehicles entering Himachal Pradesh (Shimla), if registered outside. All vehicles, registered outside Himachal Pradesh (re-notified in subsequent years) ^{xi} (2012)
	NGT directs Himachal Pradesh (HP) government to plan a transition to CNG and electric vehicles. ^{xi} (2014)
	Introduction of Bharat stage IV norm vehicles ^{xiii} Restriction on vehicles visiting Rohtang pass (upto a 1000 a day), cannot be older than 15 years ^{xiii} (2015)
	NGT order to start operations in CNG Bus Stations and land to be handed over to the GGL for construction and establishment of the mother Booster Station at Tahlival and Daughter Booster Station at Manali within three weeks (2016)
	14 tevera vehicles inducted in Shimla for public on sealed roads. (2016)
	Creation of transport nagar for maintenance of vehicles to reduce congestion on roads (2016)
	No registration of more than 10-year-old diesel commercial vehicles of other states ^{xiv} Bharat Stage IV norms made mandatory ^{xv} (2017)
Freight Transport	State level Installation of Weigh-in motion bridge at the entry points (2011)
Parking	10 crore budget for parking ear marked (2016)
	Multi-storey parking for 850 vehicles inaugurated in Shimla ^{xvi} (2018), Draft parking policy for Shimla introduced ^{xvii} (2019)
	Draft parking policy for Shimla introduced ^{xviii} (2019)

Paonta Sahib^{xlix}

Sector wise measures	Initiatives Undertaken
Vehicular Emissions	<ol style="list-style-type: none"> 1. Restriction on plying and phasing out of 15 year old commercial diesel driven vehicles. 2. Regular checking of vehicular emission and issue of Pollution Under Control (PUC). 3. Control of air pollution due to vehicles in the area.
Industry	<ol style="list-style-type: none"> 1. Ensuring emissions standards in industries. 2. Restriction on using un-authorized fuel in boilers. 3. Action against non-complying industrial units.
Household fuel use	91,071 LPG domestic LPG connections were issued till the end of December 2018, under the PMUY. Out these, 86%

Sector wise measures	Initiatives Undertaken
	<p>of beneficiaries came back for refillsⁱ, signaling a paradigm shift in choice of cooking fuel and consequent decrease in indoor air pollution.</p> <p>As per the 4th round of National Family Health Survey (2015-16), 36.70% of consumers were using clean cooking fuelⁱⁱ.</p>
<p>Construction and Demolition waste and Road Dust</p>	<ol style="list-style-type: none"> 1. Construction of pucca pavement along the road. 2. Providing air pollution control measures during demolition of old building and new constructions.
<p>Waste Burning</p>	<ol style="list-style-type: none"> 1. Restriction on open burning of municipal solid waste, biomass, plastic, agricultural/horticultural waste 2. Immediate lifting of solid waste generated and cleaning of municipal drains for its disposal. 3. Action plan to minimize forest fires.
<p>Monitoring and Graded response action plan</p>	<ol style="list-style-type: none"> 1. Existing AAQMS to be strengthened to monitor AAQ as per new notification by CPCB and HPPCB. 2. Providing online continuous emission monitoring system by all the Red-Large category industries of this cluster is being made mandatory 3. Up-gradation of existing NAMP Stations for monitoring of 12 parameters from the MoEF/CPCB financial Assistance. Currently the city has two manual monitoring stations under NAMP at Paonta Sahib and Gondhpur Industrial Area
<p>Public transport</p>	<p>800 buses inducted at state level (2013)</p> <p>HRTC launched Golden Temple Express luxury bus service on the Dehradun-Poanta Sahib-Amritsar route. ^{lii} (2013)</p> <p>510 new buses inducted (state level) (2014)</p> <p>HRTC initiated the process for implementation of Intelligent Road Transport System (IRTS) (2014)</p> <p>25 fully electric zero emission buses inducted at state level ^{xlii} (2015)</p>
<p>Vehicles, Traffic management and emissions</p>	<p>NGT directs Himachal Pradesh (HP) government to plan a transition to CNG and electric vehicles.^{xli} (2014)</p> <p>Introduction of Bharat stage IV norm vehicles ^{xlii} (2015)</p> <p>NGT order to start operations in CNG Bus Stations and land to be handed over to the GGL for construction and establishment of the mother Booster Station at Tahliwal and Daughter Booster Station at Manali within three weeks (2016)</p> <p>No registration of more than 10-year-old diesel commercial vehicles of other states ^{xliv}</p> <p>Bharat Stage IV norms made mandatory^{xliv} (2017)</p>

Parwanoo

Sector wise measures	Initiatives Undertaken
Vehicular Emissions	<ol style="list-style-type: none"> 1. Regular checking of vehicular emission and issue of PUCs. 2. Control of air pollution due to vehicles in the area. 3. Restriction on plying and phasing out of 15 year old commercial diesel vehicles.
Construction and Demolition waste and Road Dust	<ol style="list-style-type: none"> 1. Providing air pollution control measures during demolition of old building and new constructions. 2. Regular cleaning of road dust, water spraying on new/kacha roads through tankers.
Waste Burning	<ol style="list-style-type: none"> 1. Restriction on open burning of municipal solid waste, biomass, plastic, agricultural/horticultural waste and display of hoardings for awareness. 2. Immediate lifting of solid waste generated and cleaning of municipal drains for its disposal. 3. Action plan to minimize forest fires.
Monitoring and Graded response action plan	<ol style="list-style-type: none"> 1. Existing AAQMS to be strengthened to monitor AAQ as per new notification by CPCB and HPPCB. 2. Providing online continuous emission monitoring system by all the Red-Large category industries of this cluster is being made mandatory 3. Up-gradation of existing NAMP Stations for monitoring of 12 parameters from the MoEF/CPCB financial Assistance. Currently the city has two manual monitoring stations (at Asst. Commissioner Building Sector I and Regional Office, Sector- 4)
Public transport	Bus modern terminus to be constructed ^{liiii} (2011)
	800 buses inducted at state level (2013) 510 new buses inducted (state level) (2013) HRTC initiated the process for implementation of Intelligent Road Transport System (IRTS) (2013)
	11 tempo traveller under wet- leasing scheme to major tourist localities
	Ban on plying of school vehicles older than 15 years and fixed the age of drivers to 60 to ensure the safety of students (2018)
Vehicles, Traffic management and emissions	NGT directs Himachal Pradesh (HP) government to plan a transition to CNG and electric vehicles. ^{xii} (2014)
	Introduction of Bharat stage IV norm vehicles ^{xiii} (2015)
	NGT order to start operations in CNG Bus Stations and land to be handed over to the GGL for construction and establishment of the mother Booster Station at Tahliwal and Daughter Booster Station at Manali within three weeks (2016)
	No registration of more than 10-year-old diesel commercial vehicles of other states ^{xiv} . Bharat Stage IV norms made mandatory ^{xlv} (2017)
Freight Transport	State level Installation of Weigh-in motion bridge at the entry points (2011)

Sector wise measures	Initiatives Undertaken
Vehicular Emissions	<ol style="list-style-type: none"> 1. Restriction on plying and phasing out of 15 year old commercial diesel driven vehicles. 2. Regular checking of vehicular emission and issue of Pollution Under Control (PUC).
Industry	<ol style="list-style-type: none"> 1. Ensuring installation and operation of air pollution control devices in industries. 2. Ensuring emissions standards in industries. 3. Action against non-complying industrial units.
Household fuel use	<p>91,071 LPG domestic LPG connections were issued till the end of December 2018, under the PMUY. Out these, 86% of beneficiaries came back for refills^{lv}, signaling a paradigm shift in choice of cooking fuel and consequent decrease in indoor air pollution.</p> <p>As per the 4th round of National Family Health Survey (2015-16), 36.70% of consumers were using clean cooking fuel^{lvi}.</p>
Construction and Demolition waste and Road Dust	<ol style="list-style-type: none"> 1. Construction of pucca pavement along the road. 2. Providing air pollution control measures during demolition of old building and new constructions.
Waste Burning	<ol style="list-style-type: none"> 1. Restriction on open burning of municipal solid waste, biomass, plastic, agricultural/horticultural waste and display of hoardings for awareness. 2. Immediate lifting of solid waste generated and cleaning of municipal drains for its disposal. 3. Action plan to minimize forest fires.
Monitoring and Graded response action plan	<ol style="list-style-type: none"> 1. Existing AAQMS to be strengthened to monitor AAQ as per new notification by CPCB and HPPCB. 2. Providing online continuous emission monitoring system by all the Red-Large category industries of this cluster is being made mandatory 3. Up-gradation of existing NAMP Stations for monitoring of 12 parameters from the MoEF/CPCB financial Assistance. At present, the city has only one manual monitoring station at Municipal Council under the NAMP.
Public transport	800 buses inducted at state level (2013)
	510 new buses inducted (state level) (2014)
	HRTC initiated the process for implementation of Intelligent Road Transport System (IRTS) (2014)
	25 fully electric buses (zero emission) inducted (State level) ^{xliii} (2015)
Vehicles, Traffic management and emissions	NGT directs Himachal Pradesh (HP) government to plan a transition to CNG and electric vehicles. ^{xlii} (2014)
	Introduction of Bharat stage IV norm vehicles ^{xliii} (2015)
	NGT order to start operations in CNG Bus Stations and land to be handed over to the GGL for construction and establishment of the

Sector wise measures	Initiatives Undertaken
	mother Booster Station at Tahliwal and Daughter Booster Station at Manali within three weeks (2016)
	No registration of more than 10-year-old diesel commercial vehicles of other states ^{xiv} Bharat Stage IV norms made mandatory ^{xiv} (2017)
Freight Transport	State level Installation of Weigh-in motion bridge at the entry points (2011)

Sunder Nagar^{lvii}

Sector wise measures	Initiative Undertaken
Vehicular Emissions	<ol style="list-style-type: none"> 1. Restriction on plying and phasing out of 15 year old commercial diesel driven vehicles. 2. Regular checking of vehicular emission and issue of Pollution Under Control (PUC).
Household fuel use	<p>91,071 LPG domestic LPG connections were issued till the end of December 2018, under the PMUY. Out these, 86% of beneficiaries came back for refills^{lviii}, signaling a paradigm shift in choice of cooking fuel and consequent decrease in indoor air pollution.</p> <p>As per the 4th round of National Family Health Survey (2015-16), 36.70% of consumers were using clean cooking fuel^{lix}.</p>
Industry	<ol style="list-style-type: none"> 1. Ensuring installation and operation of air pollution control devices in industries. 2. Ensuring emissions standards in industries. 3. Action against non-complying industrial units.
Construction and Demolition waste and Road Dust	<ol style="list-style-type: none"> 1. Construction of pucca pavement along the road. 2. Providing air pollution control measures during demolition of old building and new constructions.
Waste Burning	<ol style="list-style-type: none"> 1. Restriction on open burning of municipal solid waste, biomass, plastic, agricultural/horticultural waste and display of hoardings for awareness. 2. Immediate lifting of solid waste generated and cleaning of municipal drains for its disposal. 3. Action plan to minimize forest fires.
Monitoring and Graded response action plan	<ol style="list-style-type: none"> 1. Existing AAQMS to be strengthened to monitor AAQ as per new notification by CPCB and HPPCB. 2. Providing online continuous emission monitoring system by all the Red-Large category industries of this cluster is being made mandatory 3. Up-gradation of existing NAMP Stations for monitoring of 12 parameters from the MoEF/CPCB financial Assistance. At present, the city has two manual monitoring stations under NAMP, at HPSPCB, BBMB Colony, Mandi and Municipal Council, NH-21, Mandi
	800 buses inducted at state level (2013)

Sector wise measures	Initiative Undertaken
Public transport	510 new buses inducted (at state level) (2014)
	HRTC initiated the process for implementation of Intelligent Road Transport System (IRTS) (2014)
	11 tempo traveller under wet- leasing scheme to major Tourist localities
	Ban on plying of school vehicles older than 15 years and fixed the age of drivers to 60 to ensure the safety of students (2018)
Vehicles, Traffic management and emissions	NGT directs Himachal Pradesh (HP) government to plan a transition to CNG and electric vehicles. ^{xii} (2014)
	Introduction of Bharat stage IV norm vehicles ^{xiii} (2015)
	NGT order to start operations in CNG Bus Stations and land to be handed over to the GGL for construction and establishment of the mother Booster Station at Tahliwal and Daughter Booster Station at Manali within three weeks (2016)
	No registration of more than 10-year-old diesel commercial vehicles of other states ^{xiv} (2017)
	Bharat Stage IV norms made mandatory ^{xiv} (2017)
Freight Transport	State level Installation of Weigh-in motion bridge at the entry points (2011)

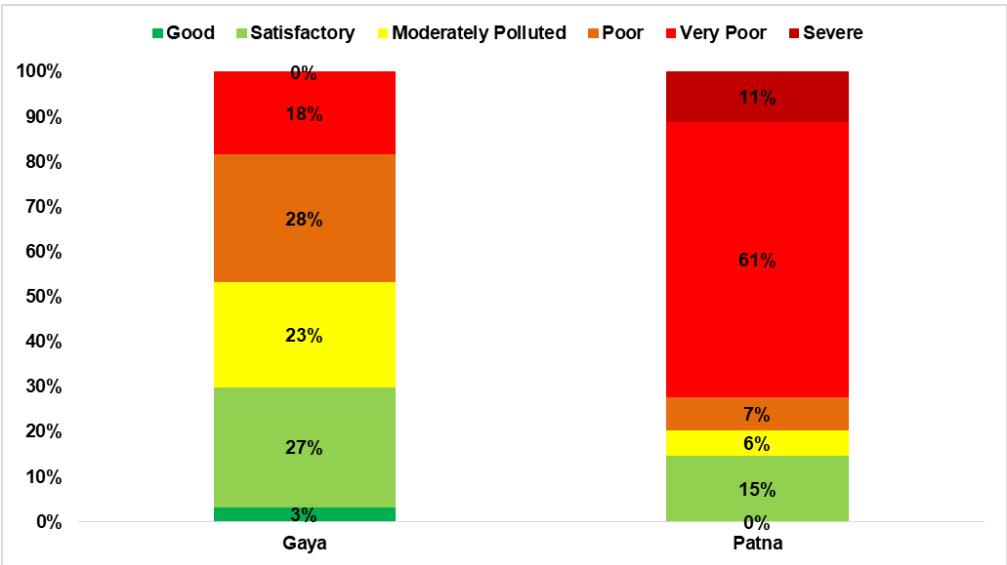
Bihar

Tracking Particulate Pollution and action in cities of Bihar

There are three cities in Bihar which have been identified as the non-attainment by CPCB - Gaya, Patna and Muzaffarpur. The current state of air pollution in Bihar was tracked from the clean air action plans submitted by the state government to CPCB and the government websites and also through some media coverage. The latest developments which include air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated from information available in public domain. Some of the actions such as implementation of the sale of BS VI new vehicles from April 2020 is mandatory across pan India. Also BS VI fuel will be available country-wide from April 2020.

As per the 4th round of National Family Health Survey (2015-16), 17.80% of consumers were using clean cooking fuel in the state. According to PMUY, 81 % of beneficiaries who had got a connection came back for a refill.

Graph: Categorisation of PM2.5 based on AQI categories for the period October- November 2019



Source: CSE's analysis based on the air quality data available on CPCB website for real-time monitoring stations

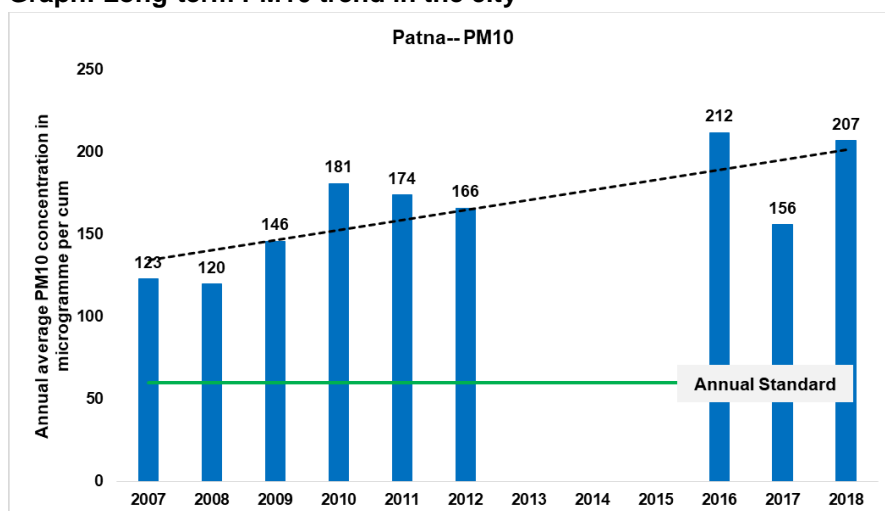
- During this period, Patna has violated the standard on 85 per cent of the days in Patna

Air quality profile and action status in selected cities of Bihar

Patna

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

Sector Wise measures implemented	Initiatives Undertaken
Air Pollution monitoring^{ix}	<p>Installation of Pollution Monitoring Stations:</p> <ul style="list-style-type: none"> - One (1) continuous monitoring station reporting data for all the criteria pollutants - Five (5) manual stations reporting data on PM10, SO2, and NO2.
Vehicular pollution control^{xi} and traffic management	<p>Ban on Diesel Auto-rickshaws:</p> <p>Thousands of auto-rickshaws running on diesel will go off the roads of Patna from the midnight of January 31, 2021, the Bihar government announced on November 6, 2019.</p> <p>The owners of the auto-rickshaws will be encouraged to switch over to CNG or battery-operated systems.</p> <p>It has been decided to ban shall be implemented in a phased manner to improve air quality and keep pollution levels under control.</p> <p>State Level Policy Intervention:</p> <ul style="list-style-type: none"> - Implemented Green Tax on vehicles older than 12 years ^{lxii} in 2010. - PUC Certificate made mandatory from 2011. - Installation of Integrated check-points constructed to keep a check on illegal vehicles^{lxiii} (2013) - In 2018, State impose Additional cess on all vehicles ^{lxiv}

Sector Wise measures implemented	Initiatives Undertaken
	<ul style="list-style-type: none"> - From 2019 onwards, all State-owned government vehicles older than 15 years^{lxv} is banned from plying in the city. - Form the same year (2019) State also banned all commercial vehicles older than 15 years in Patna ^{lxv} - CNG conversion trials initiated in 2019 and 2 refilling stations has been set-up.
<p style="text-align: center;">Industry^{lxvi}</p>	<p>Closer of Brick Kilns: Bihar State Pollution Control Board (BSPCB) has ordered closure of 10 brick kilns in Patna district for emitting harmful gases. Almost 80% brick kilns have initiated green technology with much lower emission levels. There are strict vehicle pollution checks being implemented through some testing centres at petrol pumps.^{lxvii}</p>
<p style="text-align: center;">Public transport</p>	<p>State Level Initiatives:</p> <ul style="list-style-type: none"> - Bilateral transport agreements with Jharkhand and Chhattisgarh to facilitate public transport ^{lxii} (2010) - City Bus Services initiated in 2011 with 280 buses. - State Govt. signed a bilateral transport agreement with Uttar Pradesh Error! Bookmark not defined. to increase the connectivity (2012) - Increase the fleet strength to 594^{lxviii} (2013) - initiated work to provide modern facilities in the 39 major bus stands in the state. ^{lxix} (2016) - State urban development and housing department (UDHD) signed a memorandum of understanding (MOU) with the Institute of Urban Transport (IUT) for the preparation of comprehensive mobility plan for Patna ^{lxx} (2016) and overall improvement of public transport. - BRTC, the city transport agency has augmented more fleet to the services and the total fleet size rose to 410 buses^{lxxi} (2018) - 65% reservation of seats for women and women only buses introduced ^{lxxi} in 2018 to increase the safety of services. - Buses are being provided to cater special demand, like 120 free bus services to the 2.32 lakh devotees on the celebration of 350th Birth Anniversary of Sri Guru Govind Singh Ji Maharaj ^{lxxi} (2018) - Introduced new inter-state buses with West Bengal and Uttar Pradesh ^{lxxi} (2018)
<p style="text-align: center;">Parking</p>	<p>City level Initiatives:</p> <ul style="list-style-type: none"> - Multi-level parking lot has been inaugurated at Patna Junction^{lxxii} (2016) - The city adopted odd-even parking policy for cars parked on Nala road^{lxxiii} in 2016
<p style="text-align: center;">Electric Vehicle Policy</p>	<p>State Level Initiatives:</p> <ul style="list-style-type: none"> - The State has announced to provide 50 percent concession on cost of purchase for e-rickshaws^{lxxiv} in 2017. - Registration fees for e-rickshaws subsidized by 50 % ^{lxxv} from 2018 - The State has initiated to prepare a parking policy^{lxxvi} in 2019

Sector Wise measures implemented	Initiatives Undertaken
	- State has procured 6 electric vehicles ^{lxxvii} in 2019.
	Patna Smart City Ltd procures 500 e-rickshaws ^{lxxviii} in 2019

Muzzafarpur

Status of action taken till date

Sector Wise measures implemented	Initiatives Undertaken
Air quality monitoring	Installation of Pollution Monitoring Stations: Bihar State Pollution Control is regularly monitoring the ambient air quality at Muzaffarpur through Continuous Ambient Air Quality Monitoring Station (CAAQMS) installed at Collectorate Campus, Muzaffarpur. ^{lxxix}
Industry	Shifting of Polluted Industries out-side of the city limit: BSPCB has issued an order for closure of 22 industrial units located either in the industrial areas or other places of the town. ^{lxxx}
Waste Management^{lxxxii}	Waste to Money: The municipality is producing compost and bio-friendly products from bio-degradable wastes and is earning revenue from them.
Vehicles and Traffic management	State Level Interventions: <ul style="list-style-type: none"> - Implemented Green Tax on vehicles older than 12 years ^{lxxxii} in 2010. - PUC Certificate made mandatory from 2011. - Installation of Integrated check-points constructed to keep a check on illegal vehicles^{lxxxiii} (2013) - In 2018, State impose Additional cess on all vehicles ^{lxxxiv} - From 2019 onwards, all State-owned government vehicles older than 15 years^{lxxxv} is banned from plying in the city.
Public transport	State Level Interventions: <ul style="list-style-type: none"> - Bilateral transport agreements with Jharkhand and Chhattisgarh to facilitate public transport ^{lxii} (2010) - City Bus Services initiated in 2011 with 280 buses. - State Govt. signed a bilateral transport agreement with Uttar Pradesh^{Error! Bookmark not defined.} to increase the connectivity (2012) - Increase the fleet strength to 594^{lxxxvi} (2013) - initiated work to provide modern facilities in the 39 major bus stands in the state. ^{lxxxvii} (2016) - State urban development and housing department (UDHD) signed a memorandum of understanding (MOU) with the Institute of Urban Transport (IUT) for the preparation of comprehensive mobility plan for Muzaffarpur ^{lxxxviii} (2016) and overall improvement of public transport. - BRTC, the city transport agency has augmented more fleet to the services and the total fleet size rose to 410 buses^{lxxxix} (2018)

Sector Wise measures implemented	Initiatives Undertaken
	<ul style="list-style-type: none"> - 65% reservation of seats for women and women only buses introduced ^{lxxi} in 2018 to increase the safety of services. - Buses are being provided to cater special demand, like 120 free bus services to the 2.32 lakh devotees on the celebration of 350th Birth Anniversary of Sri Guru Govind Singh Ji Maharaj ^{lxxi} (2018) - Introduced new inter-state buses with West Bengal and Uttar Pradesh ^{lxxi} (2018)
Electric Vehicle Policy	<p>State Level Initiatives:</p> <ul style="list-style-type: none"> - The State has announced to provide 50 percent concession on cost of purchase for e-rickshaws^{xc} in 2017. - Registration fees for e-rickshaws subsidized by 50 % ^{xcj} from 2018 - The State has initiated to prepare a parking policy^{xcii} in 2019 - State has procured 6 electric vehicles^{xciii} in 2019.

Gaya

Status of action taken till date

Sector Wise measures implemented	Initiatives Undertaken
Waste Management^{xciv}	<p>Creating Awareness:</p> <p>Awareness teams have been sent to all the wards of the towns for waste management awareness.</p>
Air Pollution^{xcv}	<p>Nine-point Charter:</p> <p>The Central Bihar Chamber of Commerce has presented a nine-point charter of demands to control air pollution. State pollution control board is taking action to identify causes for high ranking of Gaya, in polluted cities of the world list, brought out by WHO.^{xcvi}</p>
Industry^{xcvii}	<p>Shifting to Greener Technology:</p> <p>Adapting new technologies for brick kilns Shifting of polluting industries like stone crushers away from city area Ban on polluting industries</p>
Biomass and garbage burning	<p>Check on stubble burning:</p> <p>Identify garbage burning locations and strict enforcement of NGT (2016) rules regarding prohibition of garbage burning Promoting waste composting plants at city level Recycling plants for dry waste Ensuring of waste segregation</p>
Air Quality Monitoring	<p>Installation of Monitoring Stations:</p> <p>Installation of four CAAQMS by June 2019^{xcviii}</p>
Vehicles and Traffic management	<p>State Level Initiatives:</p> <ul style="list-style-type: none"> - Implemented Green Tax on vehicles older than 12 years ^{xcix} in 2010. - PUC Certificate made mandatory from 2011. - Installation of Integrated check-points constructed to keep a check on illegal vehicles^c (2013) - In 2018, State impose Additional cess on all vehicles ^{ci} - From 2019 onwards, all State-owned government vehicles older than 15 years^{cii} is banned from plying in the city.
Public transport	<p>State Level Initiatives:</p> <ul style="list-style-type: none"> - Bilateral transport agreements with Jharkhand and Chhattisgarh to facilitate public transport ^{lxii} (2010) - City Bus Services initiated in 2011 with 280 buses. - State Govt. signed a bilateral transport agreement with Uttar Pradesh^{lxiii} to increase the connectivity (2012) - Increase the fleet strength to 594^{lxiii} (2013) - initiated work to provide modern facilities in the 39 major bus stands in the state. ^{civ} (2016)

Sector Wise measures implemented	Initiatives Undertaken
	<ul style="list-style-type: none"> - State urban development and housing department (UDHD) signed a memorandum of understanding (MOU) with the Institute of Urban Transport (IUT) for the preparation of comprehensive mobility plan for Gaya ^{cv} (2016) and overall improvement of public transport. - BRTC, the city transport agency has augmented more fleet to the services and the total fleet size rose to 410 buses^{cvii} (2018) - 65% reservation of seats for women and women only buses introduced ^{lxxi} in 2018 to increase the safety of services. - Buses are being provided to cater special demand, like 120 free bus services to the 2.32 lakh devotees on the celebration of 350th Birth Anniversary of Sri Guru Govind Singh Ji Maharaj ^{lxxi} (2018) - Introduced new inter-state buses with West Bengal and Uttar Pradesh ^{lxxi} (2018)
<p style="text-align: center;">Electric Vehicle Policy</p>	<p>State Level Initiatives:</p> <ul style="list-style-type: none"> - The State has announced to provide 50 percent concession on cost of purchase for e-rickshaws^{cvii} in 2017. - Registration fees for e-rickshaws subsidized by 50 % ^{cviii} from 2018 - The State has initiated to prepare a parking policy^{cix} in 2019 - State has procured 6 electric vehicles^{cx} in 2019.

Bhagalpur

Status of action taken till date

Sector Wise measures implemented	Initiatives Undertaken
Air quality monitoring	Setting up Air Quality Testing Centre: An air quality testing centre is scheduled to be setup in Bhagalpur ^{cxii}
Waste Management ^{cxii}	Ban on Plastic: Bhagalpur Municipal Corporation has initiated several measures to ensure implementation of the Plastic Ban from December 14, 2018. Councillors of all 51 wards in the town have been assigned roles to enforce plastic ban in urban areas.
Vehicles and Traffic management	State Level Initiatives: <ul style="list-style-type: none"> - Implemented Green Tax on vehicles older than 12 years ^{cxiii} in 2010. - PUC Certificate made mandatory from 2011. - Installation of Integrated check-points constructed to keep a check on illegal vehicles^{cxiv} (2013) - In 2018, State impose Additional cess on all vehicles ^{cxv} - From 2019 onwards, all State-owned government vehicles older than 15 years^{cxvi} is banned from plying in the city.
Public transport	State Level Initiatives: <ul style="list-style-type: none"> - Bilateral transport agreements with Jharkhand and Chhattisgarh to facilitate public transport ^{lxii} (2010) - City Bus Services initiated in 2011 with 280 buses. - State Govt. signed a bilateral transport agreement with Uttar Pradesh^{Error! Bookmark not defined.} to increase the connectivity (2012) - Increase the fleet strength to 594^{cxvii} (2013) - initiated work to provide modern facilities in the 39 major bus stands in the state. ^{cxviii} (2016) - State urban development and housing department (UDHD) signed a memorandum of understanding (MOU) with the Institute of Urban Transport (IUT) for the preparation of comprehensive mobility plan for Gaya ^{cxix} (2016) and overall improvement of public transport. - BRTC, the city transport agency has augmented more fleet to the services and the total fleet size rose to 410 buses^{cxx} (2018) - 65% reservation of seats for women and women only buses introduced ^{lxxi} in 2018 to increase the safety of services. - Buses are being provided to cater special demand, like 120 free bus services to the 2.32 lakh devotees on the celebration of 350th Birth Anniversary of Sri Guru Govind Singh Ji Maharaj ^{lxxi} (2018) - Introduced new inter-state buses with West Bengal and Uttar Pradesh ^{lxxi} (2018)
Electric Vehicle Policy	State Level Initiatives: <ul style="list-style-type: none"> - The State has announced to provide 50 percent concession on cost of purchase for e-rickshaws^{cxxi} in 2017. - Registration fees for e-rickshaws subsidized by 50 % ^{cxvii} from 2018 - The State has initiated to prepare a parking policy^{cxviii} in 2019 - State has procured 6 electric vehicles^{cxix} in 2019.)

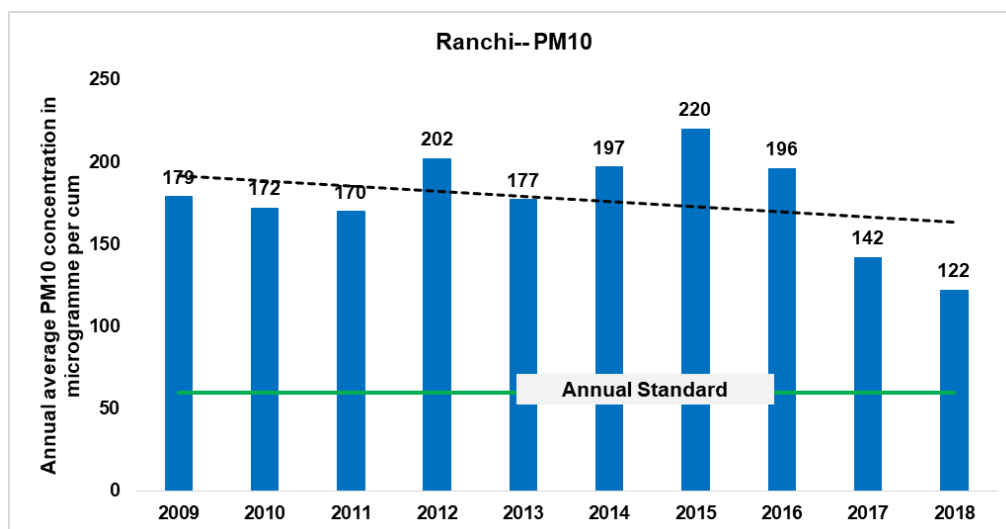
Jharkhand

In Jharkhand, most of the proposed actions are at the state level. This brief discusses air quality trends, updated policy measures and proposed technological advancements in the state’s capital; Ranchi. Pan India measures such as leapfrogging to BS VI, PUC certificates and advanced monitoring are all a part of the measures being carried out in the state. This brief collates all information from reports, policy documents and media coverage.

Air quality trends and actions in cities of Jharkhand

Ranchi

Long-term trend of PM10 concentration in Ranchi



Source: CSE’s analysis based on CPCB air quality data ENVIS centre and data submitted to Lok Sabha

- Decreasing trend in PM 10 concentration
- Reduction target- Approximately 61 per cent PM10 has to be reduced to meet the current air quality standard.

Status of actions in Ranchi city

Sector-wise measures implemented	Initiatives undertaken
Industry	Ensuring installation and operation of air pollution control devices in industries. Ensuring emission standards in industries. ^{cxxv cxxvi}
	Adoption of cleaner technology in industries. Conversion of natural draft brick kilns to induced draft ^{cxxvii} by March 2020.
	Flue gas emission control by adopting cleaner fuel or change in APCM technology. ^{cxxviii}
	Shifting or ban on Polluting industries within city limits
Power Plants	NA
	Prepare action plan to check fuel adulteration and random monitoring of fuel quality data. ^{cxxix}

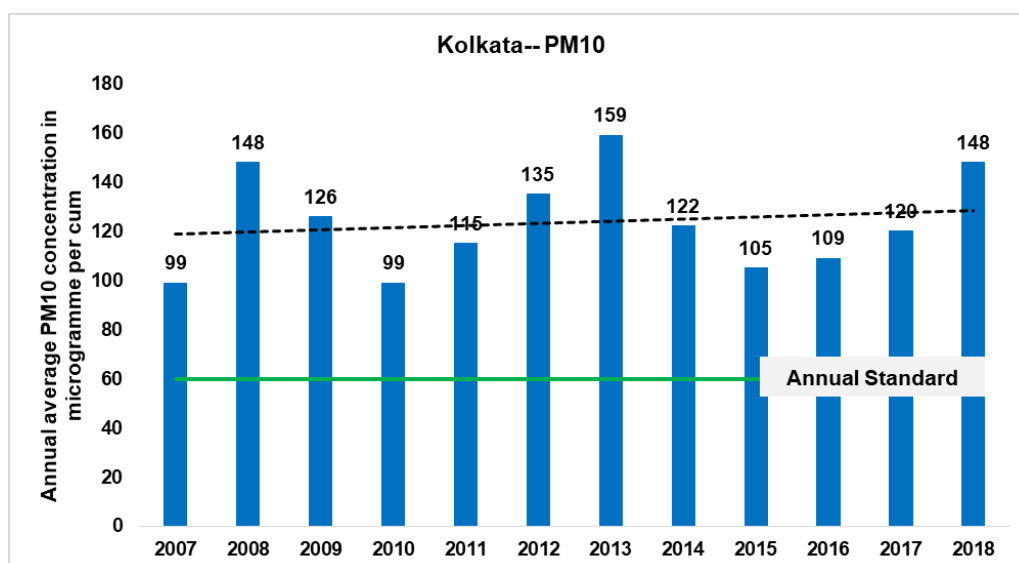
Sector-wise measures implemented	Initiatives undertaken
	Banning of 12 years old commercial vehicles. Installation of PUC centers in petrol pumps. ^{cxxx}
Vehicles and Traffic management	Ranchi Mobility Partnership Programme (2014) – partnership between ITDP, various NGOs and civic agencies ^{cxxxi} Jharkhand State Transit Oriented Development Policy ^{cxxxii} (2016) Public Bicycle Sharing system, with total 1200 bicycles – operated by Chartered Bikes ^{cxxxiii} (2018)
Public Transport	190 minibuses procured by State through JNNURM, out of which 70 for Ranchi ^{cxxxiv} (2010) 26 GPS-enabled buses added to the fleet by RMC (2017)
Electric Vehicle Policy	State adopted e-mobility programme in partnership with EESL - 50 electric vehicles to be deployed at various JBVNL offices ^{cxxxv} (2018) 12 charging stations set up at 4 offices of JBVNL, including corporate offices in Ranchi (2018)
Parking	Pilot smart parking management (a progressive on street parking management system) on chock-a-block M.G. Marg – 12 fold annual revenue increase ^{cxxxvi} (2017)
	Water Sprinkling on road through tankers. Regular cleaning of road dust. Ensure Carriage / Transportation of construction materials like sand, soil, stone, chips etc. in covered system. ^{cxxxvii} Enforcement of Construction and Demolition Waste Management Rules, 2016.
Waste Burning	Prohibition of burning of any kind of waste including agro residues. ^{cxxxviii} Regular Check and Control on open burning of municipal solid waste, Biomass, plastic, horticulture waste etc.
Monitoring and Graded response action plan	Installation of additional NAMP monitoring stations at Ranchi. Currently one exists at Albert Ekka Chowk, Main Road. ^{cxxxix} Establishment of CAAQMS, currently no real time monitoring stations exist. Source Apportionment study of Ranchi is underway.

Kolkata, West Bengal

Tracking Particulate Pollution and action in Kolkata

The present state of air pollution in Kolkata was tracked from various sources – from the Clean Air Action Plan to latest media reports. The latest developments which include air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated using information available in public domain. West Bengal now has 7 non-attainment cities under the National Clean Air Program. However, six cities viz Durgapur, Raniganj, Asansol, Howrah, Haldia and Barrackpore have been recently added, with plans being submitted recently, and hence have not been covered. Some of the actions discussed for Kolkata include sale of BS VI vehicles from April 2020 being mandatory, concomitant with introduction of BS VI fuel.

Graph: Long-term trend of PM10 in Kolkata



Source: Based on data available from CPCB Envis centre and data submitted to Lok Sabha

There is a clear increase in the PM10 trend with an enormous 50 per cent increase between 2007 and 2018, thereby setting the reduction target at 52 per cent to meet norms.

Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	Strict licensing policy: All units located within 25 kms of urban area limits of cities with population over 1 million need licensing unless belonging to categories such as electronics, printing, computer software or other non-polluting industry
	Strict Siting Policy: Special Red categories (highly polluting; as defined by CPCB) cannot be set up within Kolkata Metropolitan Area, and Orange categories (moderately polluting) cannot be set up within Kolkata or Howrah Municipal Areas; but are only permissible within designated industrial estates within those areas.

Sector-wise measures implemented	Initiatives undertaken
	<p>Green category plants may be set up in any area subject to pollution and site clearances the local bodies^{cxli}. No need for obtaining consent for White Category of industries; only an intimation to WBPCB is sufficient.</p> <p>Gradual shift in Fuel Policy: Coal Bed Methane produced in Raniganj belt and use is prevalent there^{cxli}. Shale gas sector is developing with expected investments worth 50,000 crore. New licensing regime by state government has allowed shale exploration from CBM blocks.</p> <p>SOx and NOx standards notified by MOEF&CC for 35 categories of industries is scheduled to be enforced and implemented.^{cxlii}</p> <p>Only DG sets that meet the standards are allowed to operate, and only approved fuel is to be allowed^{cxliii}</p>
Household Energy	<p>State Level: As per the 4th round of National Family Health Survey (2015-16), 27.90% of respondents were using clean cooking fuel.^{cxliv} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 68,94,558 have got an LPG connection by 31.12.2018. Out of these 75 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture.^{cxlv}</p>
Power Plants	<p>State's first solar power plant planned, development of which to begin in 2020. Expected capacity – 8,000 MW^{cxlvi}.</p>
Vehicular Emissions	<p>Though old 2008 court order was ignored regarding age of vehicles, and old vehicles could ply^{cxlvii}. In a new development all commercial vehicles more than 15 years old are to be confiscated^{cxlviii}.</p> <p>All government vehicles more than 15 years old are to be scrapped with immediate effect^{cxlix}.</p> <p>Introduction of cleaner fuels (CNG/ LPG) for vehicles and establishment of CNG/LPG stations in the city by 2020. CNG buses to be introduced on city roads by March 2020. For distribution of CNG, a new joint venture company, called Bengal Gas Company Ltd, has been floated for developing the city gas distribution in the state^{cl}.</p> <p>Currently, there are about 80 electronic busses, 70 more will be added by 2020, taking the total of electric busses to increase to 150^{cli}.</p> <p>Regular Checking of Vehicular emission and issue of PUC. There are about 59 emission monitoring stations within the city limits^{clii}.</p> <p>Auto emission testing is now almost completely automatic, which prevents vehicle owners as well as petrol pump owners tampering the data.^{cliii}</p> <p>IOC setting up BS VI fuel plant in Budge Budge and Haldia refinery to become BS VI compliant within the next two years^{cliv}.</p> <p>Periodic calibration test of vehicular emission monitoring instrument. SPCB carry out sudden inspection of the PUC centres established by the RTO.</p>

Sector-wise measures implemented	Initiatives undertaken
	<p>The Anti-Pollution Cell under Traffic Department, Kolkata has been formed. It is entrusted with the responsibility of ensuring that zero tolerances measures are maintained & enforcement is made against contravention of pollution norms in accordance with law. Modern & scientific Smoke Emission Detection Device are frequently deployed at violation prone stretches.^{clv}</p> <p>There are 103 operational AETCs in Kolkata and Howrah cities. The centres are renewed yearly after obtaining clearance from West Bengal Pollution Control Board (WBPCB). Holding of a valid Pollution under Control (PUC) Certificate is mandatory for grant of 'Certificate of Fitness'. All the RTOs/ARTOs are implementing the same. There are 11 (Eleven) Auto Emission Testing Centres of West Bengal Transport Corporation (WBTC).^{clvi}</p>
<p>Construction and Demolition waste and Road Dust</p>	<p>Regular cleaning of road dust. The WB-SPCB has initiated use of sprinklers to spray water to control road dust. The KMC has used 15 sprinkler vehicles so far and will be procuring 20 more vehicles for the initiative. At present, sprinkling vehicles are plying on Ruby Crossing, the Eastern Bypass Road, and VIP Road near the airport.^{clvii}</p> <p>Transportation of construction material like sand, soil, stone chips etc. in covered system.</p> <p>15000 new leafy saplings have been planted within Kolkata jurisdiction in last two years. KMDA has also planted saplings on the flanks of the East Metropolitan Bypass from HUDCO more of Ultadanga to Garia-dhalai Bridge.^{clviii}</p> <p>Appropriate measures are scheduled to be taken to mitigate dust pollution from construction industry like enforcement of 2009 directives by WBPCB, undertaking control measures for fugitive emissions, as well as mandatory covering of transport carrying construction materials.^{clix} There is also scheduled to be restrictions on storage of construction materials along the road.^{clx}</p> <p>Introduction of steeper penalties for non-compliance. Stricter enforcement. Provision of decentralized network of C&D waste collection sites.^{clxi}</p>
<p>Waste Burning</p>	<p>Dumping of waste at the Mollar Bheri Site (a RAMSAR site) in east Kolkata's Bidhannagar area has been stopped^{clxii}. Transportation of municipal solid waste, construction material and debris in covered system.</p> <p>Restriction on open burning of Municipal Solid Waste, Bio-mass, Plastic, horticulture waste etc.</p> <p>KMC has taken necessary steps with regard to stopping of open burning of coal and wood.^{clxiii}</p>
<p>Monitoring and Graded response action plan</p>	<p>Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – Kolkata (5) and Howrah (3) NAMP (manual stations)- 21 stations in Kolkata</p> <p>GRAP: New GRAP prepared in October 2019, with interventions and health advisories proposed for Moderate to Poor, Very Poor and Severe AQI.</p>
	<p>The Calcutta Hackney-Carriage (Amendment) Bill, 2006 called for the withdrawal of the handpulled rickshaws (2006)^{clxiv}</p> <p>8780(KMC Records) Hand pulled rickshaw gets banned on major roads (2007)^{clxv}</p> <p>CMP Kolkata was published (2008)^{clxvi}</p> <p>The Calcutta High Court order dated July 18, 2008, to ban two-stroke autos by December 2008 was based on a notification issued by the state environment department (2008)^{clxvii}</p>

Sector-wise measures implemented	Initiatives undertaken
Public Transport	Introduction of 1200 bus fleet through JNNURM in 2009 ^{clxxviii} (2009)
	In 2010, the Railway Ministry announced plans for the construction of five new metro lines and an extension of the existing North-South corridor (2010)
	First ac tram gets introduced for Heritage rides (2013)
	5 bus corporations namely CTC, CSTC, NBSTC, SBSTC, WBSTC merges to form West Bengal Transport Corporation (2015) ^{clxxix}
	Bus fleet augmentation for the newly formed WBTC was conducted(2015) ^{clxxx}
	Introduction of electric bus fleet of 40 buses through FAME(2015)
	CTC had stopped operation of 22 of 25 trams routes (2016)
	WBTC introduced Pathadisha App for convenience of Bus users (2017)
	WBTC introduced ETM based ticketing on CSTC operated buses (2017)
	WBTC -Grievance redressal system for bus users through a public WhatsApp contact which is daily (2018)
Electric vehicles	WBTC expanded the Pathadisha app for CTC buses (2019) ^{clxxxi}
	Intranet based internal Operation for both CTC and CSTC have been merged on a single platform for convenience of scheduling operation and maintenance (2019) ^{clxxii}
	Two tram coaches as refurbished AC-tram gets re-introduced on streets of Kolkata as public transport (2019) ^{clxxiii}
	NKDA plan to bring trams services between Rajarhat and new town area (2019) ^{clxxiv}
	Minimum fare in Kolkata metro gets increased from Rs 5 to Rs 10 for first 2km in 6 years. (2019) ^{clxxv}
Vehicles, Traffic management and emissions	Government of West Bengal had announced that hand-pulled rickshaws will soon be replaced with battery-operated modern vehicles as a rehabilitation plan for 6,000 rickshaw (2015)
	Existing E-rickshaws in Howrah were given registration numbers (2017) ^{clxxvi}
	EV bus shed gets build in one depots of CSTC (2018)
	Electric bus operation started in Kolkata (2019) ^{clxxvii}
	WBTC plans to add 150 more EV to existing fleet of 80 EV by 2020 (2019) ^{clxxviii}
	Selling of pre-mixed 2T oil made mandatory within the Kolkata Metropolitan Area since November 2001. Ban on supply of loose 2T oil (2001) ^{clxxix}
	Benzene content in petrol reduced to 3 per cent from 2001, subsequently to one per cent (2001)
	In 2008, order of Calcutta High Court, no commercial vehicle reaching the age of 15 years can ply within KMA Area (2008)
	Vehicles over 15 years of age gets banned from plying within KMA (2009)
	Hon'ble High Court, the State Government procured one Remote Sensing Device (RSD) in the month of November, 2009 ^{clxxx}
The city has introduced Bharat Stage-IV norms for vehicles with 50 ppm Sulphur fuels in 2010. Bharat Stage VI is due to be implemented in 2020. (2010)	

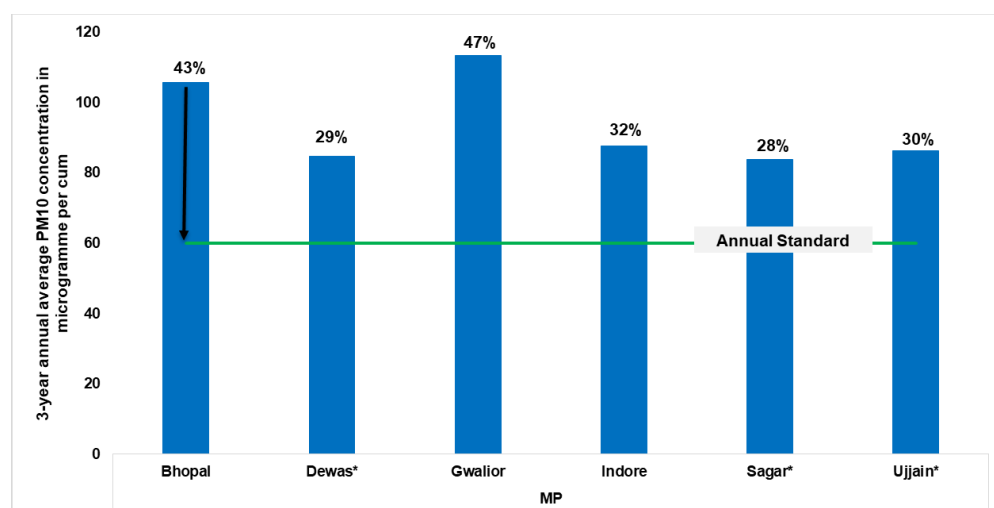
Sector-wise measures implemented	Initiatives undertaken
	<p>The remote sensing device (RSD) used to monitor pollution was stopped in 2014 ^{clxxxii}</p> <p>NGT orders to increase air pollution monitoring in twin cities of Kolkata and Howrah (2014) ^{clxxxiii}</p> <p>State government had announced that it would start confiscating 25000 diesel run commercial vehicles over 15 years old which are still plying in the city despite Calcutta high court order of 2008 (2019) ^{clxxxiii}</p>
<p>Parking</p>	<p>Parking policy draft published by KMDA for KMA Area under Vision 2025 (2008) ^{clxxxiv}</p> <p>First ever multi-level parking (Park-o-Mat) opened in Rawdon street (2004) ^{clxxxv}</p> <p>Underground MLCP (Park-o-Mat) opened at Lindsay street to decongest on-street parking in New Market area (2007) ^{clxxxvi}</p> <p>Underground MLCP (Park-o-Mat) opened in BBD Bag to accommodate institutional parking (2016) ^{clxxxvii}</p> <p>KMC took possession of (Park-o-Mat) in Rawdon street (2016) ^{clxxxviii}</p> <p>KMC published its first ever Parking policy and parking rates (2017)</p> <p>KMDA notified 6 streets as fee parking within KMA area (2019) ^{clxxxix}</p>

Madhya Pradesh

Tracking Particulate Pollution and action in cities of Madhya Pradesh

The state is home to six non-attainment cities whose action plans following the NGT order have been submitted to the CPCB and have been approved for implementation. The current state of air pollution in MP was tracked from the clean air action plans and the government websites and also through some media coverage. The latest developments which includes air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated based on the information available on public domain. Some of the actions such as implementation of the sale of new vehicles with BS VI technology from April 2020 is mandatory for pan India. Also BS VI fuel will be available country-wide from April 2020. As per the 4th round of National Family Health Survey (2015-16), 29.60% of consumers were using clean cooking fuel and according to the Pradhan Manti Ujjawala Yojana, 67 % of 52,98,247 beneficiaries came back for a refill.

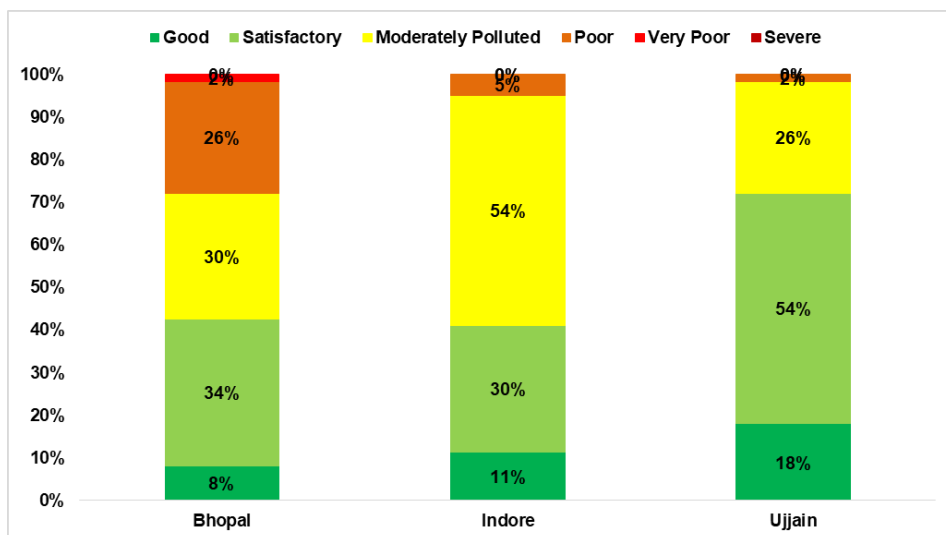
Graph: Reduction target of PM10 based on the last three year average PM10 concentration for cities in MP



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Note: *Data is taken for the years 2015-17 and for the rest the three year average is considered for the years 2016-18

Graph: Categorisation of PM2.5 based on AQI categories for the period October- November 2019



Source: CSE's analysis based on the air quality data available on CPCB website for real-time monitoring stations

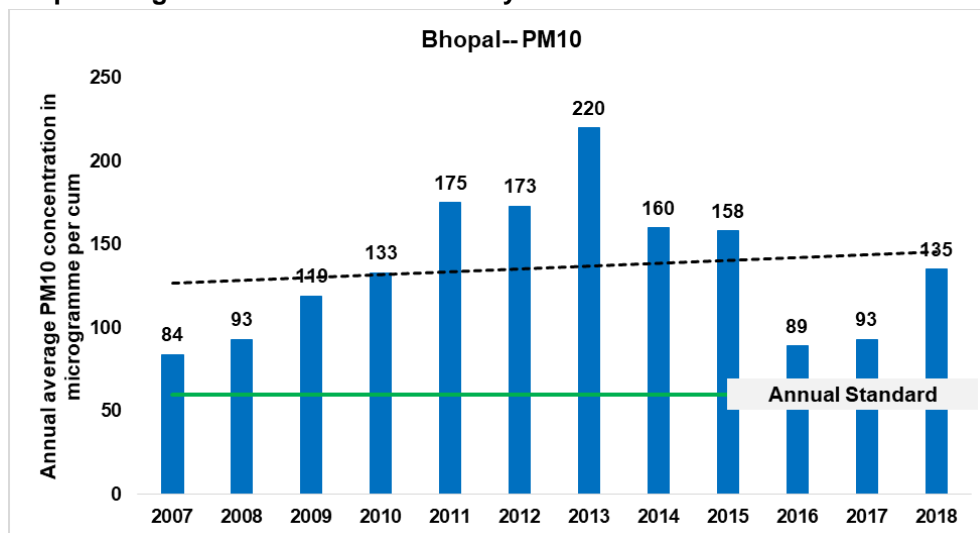
- Cities in MP experience lesser number of days in very poor and severe category.
- Even after that more than 50 per cent of the days have violated the PM2.5 standard in Bhopal and Indore.

Air quality profile and action status in selected cities of Madhya Pradesh

Bhopal^{CXC}

Long trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

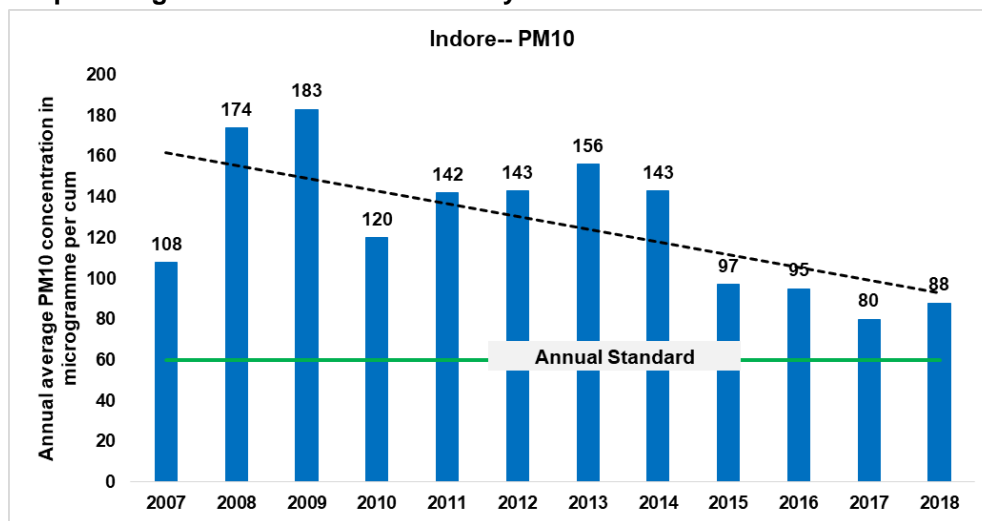
Sector-wise measures implemented	Initiatives undertaken
Industry	Installation and operation of air pollution control devices in industries. Govindpura industrial area has 27 industries that emission generating. This also includes ensuring emissions standards.
Power Plants	NA
Vehicular Emissions	Restriction on plying & phasing out of 15 years old commercial diesel driven vehicles. Under MVA, 1988 Section-59 – the Central Govt can fix the age limit of vehicles, the decision is yet to be taken.
	Regular Checking of Vehicular emission and issue of PUC. As per the information from RTO already 38 vehicle emission monitoring centres have been registered in the city for periodic check-up and certification of PUC. During the period from April 2017 to October 2018 total 2243 vehicles have been checked.

Sector-wise measures implemented	Initiatives undertaken
	<p>Periodic calibration test of vehicular emission monitoring instrument. PCB carry out sudden inspection of the PUC centres established by the RTO.</p> <p>Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.</p>
Action on Truck	NA
Construction and Demolition waste and Road Dust	<p>Regular cleaning of road dust. 2 more sweeping machines are under procurement under the smart city project. ^{cxc}</p> <p>Water spraying through water tankers.</p> <p>Tree plantation along the road, number of trees planted in 2019 – 36000. Development of green belt in open areas, gardens, park / community places, Schools & Housing societies.</p> <p>Transportation of construction material like sand, soil, stone chips etc. in covered system. Restriction on storage of construction material along the road. Provision of penalty has been laid for violation of the orders. As per the Bhopal Construction and Demolition Waste Management by-laws, 2018, Under Section 6 of the duties of the BMC - spot fine of Rs 50,000 to 1 lakh if any littering or deposition of construction and demolition waste obstructs the traffic or the public. ^{cxcii}</p>
Waste Burning	<p>Immediate lifting of solid waste generated from de-silting and cleaning of municipal drains for its disposal. Transportation of municipal solid waste, construction material and debris in covered system.</p> <p>Restriction on open burning of Municipal Solid Waste, Bio-mass, Plastic, horticulture waste etc. Waste to Energy Plant (23 MW) using MSW is under installation at Adampur Chchawani Bhopal by the BMC.</p>
Monitoring and Graded response action plan	<p>Strengthening of AAQ Monitoring. Presently Ambient Air Quality is being monitored at 06 locations in the city limit through air samplers. 2 CAAQMS station under CSR funds of CPSU through CPCB. 2 CAAQM stations under State Govt. financial assistance. Source apportionment studies, proposal for study under process.</p>
Non-motorized transport initiatives	Public Bicycle Sharing initiative launched ^{cxciii} (2017)
Vehicles and Traffic management	<p>State Level Policy: Ban on commercial vehicles older than 15 years^{cxciv}(2015) Tax on all vehicles hiked ^{cxcv}(2019) 6% extra VAT on diesel, petrol ^{cxcvi}(2019)</p>
	<p>Bhopal Bus service launched^{cxcvii} (2010) Kushabhau Thakre Inter-state bus terminus inaugurated (2010) Bus service under BRTS commenced ^{cxcviii} (2013) Comprehensive Mobility Plan introduced (2014)</p>

Sector-wise measures implemented	Initiatives undertaken
Public transport	MoU signed between Centre and State Government for Bhopal metro ^{ccxi} (2018)
	BRTS can be used by intercity operators according to <u>Bhopal City Link Limited (BCLL)</u> ^{cxciix} (2019)
Electric Vehicle Policy	<p>State Level Policy: Draft EV policy introduced (2019)Error! Bookmark not defined. No registration fees and parking fees under EV policy (2019) Plan to deploy 2200 e-buses by 2024 (2019)</p> <p>City: NTPC Vidyut Vyapar Nigam Ltd. Invites bid for 100 electric buses run in Bhopal ^{ccxiv} (2019)</p>
Road	Construction of 6 lane smart road announced at Bharat Mata square ^{cc} (2016)
Parking	Multi-level parking facility inaugurated in New Market Area, two more in pipeline ^{cci} (2018)

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	Installation and operation of air pollution control devices in industries. Work Completed. Remaining rolling mills (18 Nos.) are required to install bag filters in place of water scrubbers as up-gradation in technology of pollution control. Out of the 34, 16 are done installing bag filters. All the lead recycling units (20 Nos.) are required to installed bag filters with scrubber.
	Shifting or banning of polluting industries. Currently no such industries. Ensuring emissions standards. Already completed as all the industries of the area are complying notified standards. However, all the Air polluting industries mentioned in point no. 1 have been directed to follow more stringent norms of PM-50 mg/Nm3.
Power Plants	NA
	Introduction of cleaner fuels (CNG/ LPG) for Vehicles. Work Completed.
	Regular Checking of Vehicular emission and issue of PUC. As per the information from RTO already 61 out of 200 proposed vehicle emission monitoring centres have been registered in the city for periodic check-up and certification of PUC.
	Retrofitting of particulate filters in diesel driven vehicles. BS VI filters to be retrofitted by 2020.

Sector-wise measures implemented	Initiatives undertaken
Vehicular Emissions and Traffic Management	Periodic calibration test of vehicular emission monitoring instrument. PCB carry out sudden inspection of the PUC centres established by the RTO.
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	State Level Policy: Ban on commercial vehicles older than 15 years ^{cciii} (2015)
	State: Tax on all vehicles hiked ^{cciv} (2019) 6% extra VAT on diesel, petrol ^{ccv} (2019) City: Trial of Intelligent traffic system commenced in 3 areas by Indore Smart City Development Ltd wherein traffic signals will adapt as per vehicular density. ^{ccvi} (2019)
Action on Truck	NA
Construction and Demolition waste and Road Dust	Regular cleaning of road dust. Road cleaning is being done by mechanized sweeping machines (14 Nos.) by using water spraying system.
	Water spraying through water tankers. Work Completed.
	Development of green belt in open areas, gardens, park / community places, Schools & Housing societies. About 1 Lacks plantation done during 2017-2018.
	Construction of pucca pavement along the roads. Work Completed.
	Transportation of construction material like sand, soil, stone chips etc. in covered system. Work Completed. Restriction on storage of construction material along the road. Provision of penalty has been laid for violation of the orders. Work Completed.
Waste Burning	Immediate lifting of solid waste generated from de-silting and cleaning of municipal drains for its disposal. Transportation of municipal solid waste, construction material and debris in covered system.
	Restriction on open burning of Municipal Solid Waste, Bio-mass, Plastic, horticulture waste etc.
Monitoring and Graded response action plan	Strengthening of AAQ Monitoring. Installation of four CAAQMS 2 CAAQMS station under CSR funds of CPSU through CPCB. 2 CAAQM stations under State Govt. financial assistance.
	Source apportionment studies, proposal for study under process – expectation for completion of the study is 2 years. The Air Quality Index of Indore city is observed in “Satisfactory Category”
Public transport	City: Indore City Transport Services Ltd. (ICTSL) was incorporated on December 01, 2005 ^{ccvii} (2005)
	City: City bus service was launched ^{ccvii} (2006)
	City: Comprehensive Mobility Plan introduced ^{ccviii} (2012)
	City:

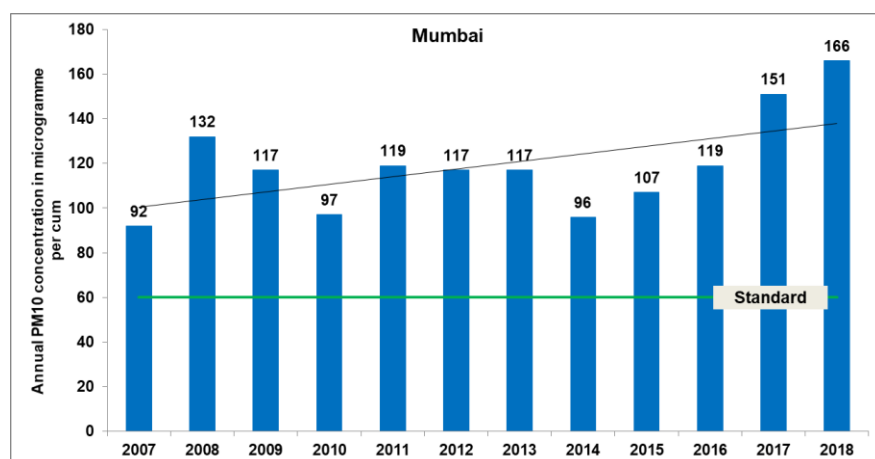
Sector-wise measures implemented	Initiatives undertaken
	<p>Trial run of buses on BRT, called i-bus ^{ccix} (2013)</p> <p>City: Mobile App introduced to track city buses^{ccx} (2017)</p> <p>State Level Policy: MoU signed between Centre and State Government for Indore metro^{ccxi} (2018) City: Atal Indore City Transport Services added 12 buses and 5 routes. AICTSL runs a fleet of around 288 buses including 74 midi buses and 63 buses on intra-city routes and 42 ibuses. ^{ccxii}(2018)</p>
Electric Vehicle Policy	<p>City: Atal Indore City Transport Services Ltd (AICTSL) finalized 5 Routes for electric buses (2018)</p> <p>State Level Policy: Draft EV policy introduced ^{ccxiii}(2019) No registration fees and parking fees under EV policy (2019) Plan to deploy 2200 e-buses by 2024 (2019)</p> <p>City: NTPC Vidyut Vyapar Nigam Ltd. Invites bid for 100 electric buses run in Indore^{ccxiv} (2019) Indore Municipal Corporation (IMC) submitted report to avail incentives for electric chargers under FAME II ^{ccxv} (2019)</p>
Parking	<p>Indore Municipal Corporation to make 3 multi-level parking facilities operational^{ccxvi} (2017)</p>

Mumbai, Maharashtra

Tracking Particulate Pollution and action in Mumbai

The current state of air pollution in Mumbai was tracked from the recently released clean air action plan, government websites, CSE’s own research in the city and through media reports. Some of latest developments include robust ai pollution monitoring, abatement strategies, policy updates and proposed technological advancements. Information that is available in the public domain have all been collated along with data from CSE’s own primary data. Apart from Mumbai, Maharashtra has 17 non-attainment cities, action plans for which have recently been released. This brief focuses on Mumbai city. Some of the interventions discussed include the implementation of the sale of BS VI vehicles from April 2020 as BS VI fuel will be available country-wide from April 2020. A note-worthy improvement in Maharashtra is the digitisation of the PUC systems.

Graph: Annual PM 10 trends in Mumbai



Source: CSE’s analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

There is a clear increase in the PM10 trend with an enormous 80% increase between 2007 and 2018, thereby setting the reduction target at 59% to meet norms.

Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	Major red category industries like Tata Power, Rastriya Chemical Fertilizers, refineries of BPCL and HPCL are all well outside city limits.
	Flue Gas Desulfurization (FGD) system provided to TATA Power Company Ltd. TATA Power Company Ltd. It has also installed and operated a state of art technology for coal handling. ^{CCXVII} TATA Power Company installs and operates a state of the art coal handling technology

Sector-wise measures implemented	Initiatives undertaken
	<p>MPCB has issued a gazette notification regarding guidelines for RMC (Ready-mix concrete) industries. RMC industries have been directed to get fugitive emissions under control.^{CCXVIII}</p> <p>Most of the Hotel industry has changed its fuel pattern from High speed diesel (HSD) to Natural Gas^{CCXIX}</p>
Household Energy	<p>As per the 4th round of National Family Health Survey (2015-16), 59.90% of consumers were using clean cooking fuel^{CCXX}. Under the Pradhan Mantri Ujwala Yojana, 34,80,922 LPG connections were issued till December 2018, out of which 79 % of beneficiaries who had got a connection came back for a refill. This shows a paradigm shift towards clean cooking fuel, thereby reducing indoor air pollution^{CCXXI}. LPG gas or electricity is the most commonly used fuel by Hotels and 'dhabas'.</p>
Power Plants	<p>Tata Trombay, the only power plant in the region is compliant with PM, SO₂ and NO_x emission norms. All ESPs meet prescribed emission norms of 50 mg/Nm³</p>
Vehicular Emissions	<p>Regular Checking of Vehicular emission and issue of PUC. There are about 263 PUC testing stations within the city limits^{CCXXII}. While e-PUC testing is now mandatory in Mumbai, following an HC directive, the number of vans are not enough to cater to the vast number of vehicles^{CCXXIII}. The Transport Department carries out periodic calibration tests of vehicular emission monitoring stations. The central and state PCBs carry out periodic audits, thus enabling the local RTO to cancel the registration of the center.</p> <p>RTOs in the state have begun digitizing the PUC data for all vehicles since September 2019. The new computerized certificate will also have a photo of the vehicle at the testing site along with other documents, thereby ensuring greater compliance^{CCXXIV}.</p> <p>Status of CNG program: 95% of auto rickshaws have been phased out to CNG, more CNG busses to be introduced on city roads by March 2020. For distribution of CNG, there are centres run by Mahanagar Gas Limited (MGL), GAIL and Indian Oil. Apart from the major centres, mobile distribution hubs are located all over the city.</p> <p>Auto companies have asked for BS VI fuel to be made available 30-45 days in advance, ahead of the April 2020 deadline so that the transition to BS VI is a seamless experience for consumers^{CCXXV}.</p> <p>Several auto companies have embarked upon new product portfolios in light of upcoming BS VI norms. From April 2020, Maruti Suzuki India will include CNG models in their fleet along with Brezza and S-Cross models that are tailor made for BS VI^{CCXXVI}. Tata motors is shedding several models from its existing portfolio and is upgrading its fleet of commercial and freight vehicles, mostly run on diesel to meet the new BS VI norms^{CCXXVII}.</p> <p>To promote green transportation, construction of 36 k.m. of cycle tracks have been initiated in 3 phases. Work of the pilot phase for 2 Kms has been completed in Mulund & from NITIE gate to Vijay Nagar Bridge in Marol.^{CCXXVIII}</p>

Sector-wise measures implemented	Initiatives undertaken
Construction and Demolition waste and Road Dust	Transportation of construction material like sand, soil, stone chips etc. in covered system. Some of the C and D waste is used to cover landfills, as part of landfill management in Deonar.
	The BMC has assigned 30 marshalls per ward to monitor illegal dumping of C&D waste, and adhere to the latest C&D disposal norms and dust control measures at construction sites ^{ccxxxix} .
	Major dumpsites in the city are located at Deonar, Mulund, Malad and Kalyan. Waste to energy plant is under construction at Deonar and expected to be operational in 2020 ^{ccxxx} .
	Municipal Corporation of Greater Mumbai is implementing C&D Rules 2016 in the city. It entails control measures at the site, before work commences. The approved Debris Management Plan also includes several control measures.
Monitoring and Graded response action plan	AAQ monitoring has been strengthened to a great extent with a steep increase in the number of monitoring stations. Currently, the city has manual monitoring, real time monitoring and SAFAR stations. CAAQMS – Mumbai City (10); Navi Mumbai (2); Kalyan (1) NAMP – Total 25 stations in the Mumbai Metropolitan Region SAFAR (Run by IITM and Ministry of Earth Sciences)- Mumbai (9) and Navi Mumbai (1)
	Last major source apportionment study carried out by NEERI in 2010, new study under preparation by NEERI, expected in 2020. The MPCB has begun using drones to monitor pollutant concentration at traffic signals. The pilot project began in November 2019 and if successful, will be replicated in Nagpur, Nashik and Pune ^{ccxxxix} .
	GRAP: At present the city does not have any Graded Response Action Plan
Vehicles and Traffic management	Mumbai Urban Transport Project (MUTP): Phase I – included projects of road and rail improvement as well as Rehabilitation and Resettlement (R&R) ^{ccxxxii} (2002-11) Phase II – included projects included projects of road and rail improvement as well as Rehabilitation and Resettlement (R&R) ^{ccxxxiii} (2010-16) Phase III – included projects of rail improvement and augmentation ^{ccxxxiv} (started in 2011)
	Comprehensive Transportation Study done by MMRDA for MMR region ^{ccxxxv} (2008)
	United Mumbai Metropolitan Transport Authority formed (Core Committee) ^{ccxxxvi} (2010)
	Mumbai Trans Harbour Link – Metro Link (from Prabhadevi to Sewri and further to mainland through Navi Mumbai) ^{ccxxxvii} (DPR prepared in 2010)
	CMP prepared for Mumbai – MCGM and Lea Associates – proposal for ban on registration of new cars and bikes albeit after a deadline, Cap on number of new registrations each year, Introduction of 'congestion tax' in certain zones ^{ccxxxviii} (2016)
	Mumbai Trans Harbour Link - improving connectivity between Island city and main land (Navi Mumbai) (2019)

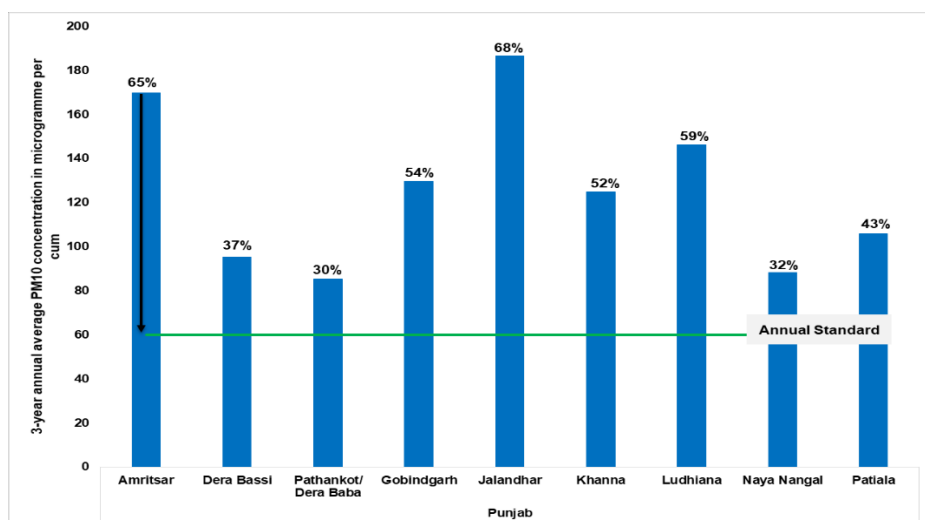
Sector-wise measures implemented	Initiatives undertaken
Public transport	<p>Tram & Bus First electric tram in the city^{ccxxxix} (1907) First double decker trams in city to ease traffic and congestion (1920) First city bus service – between Afghan Church to Crawford Market (1926) Double decker buses introduced in city^{ccxxxix} (1937) (in 1964, high operational costs and poor public support led to termination of tram services) BEST was the first transport service in India to introduce computerised billing (1974) Revised Improvement Plan for Wadala Truck Terminal Upon approval, work of planning and construction of ISBT shall be taken up^{ccxi} (2015-16) Trial of 6 e-buses of 9-meter length^{ccxli} (2017) Deployment of 40 AC and Non-AC electric buses (eBuzz K7) deployed in Mumbai by BEST (2017)</p> <p>Metro Rail Metro Rail opened for public use for Line 1 between Versova-Andheri-Ghatkopar^{ccxlii} (2014) Construction of 5 metro lines underway – for lines 2A, 2B, 4, 7 and 9 (total 12 lines to be operational controlled by both MMRDA and MMRCL) (2018)</p>
	<p>Local Train (Suburban Rail) Railway Network inaugurated; first train took off between Bori Bunder (predecessor of present-day CST) and Thane – shaped present-day Central Line^{ccxliii} (1853) A line connecting Mumbai and Vadodara in Gujarat starting Grant Road station – shaped present-day Western Line^{ccxliii} (1867) Harbour Line – Kurla to Reay Road^{ccxliii} (1910) Expanded to reach CST^{ccxliii} (1925) Further expanded to Mankhurd and Navi Mumbai^{ccxliii} (1951 and 1990s respectively) Trans-Harbour Line between Navi Mumbai and Thane – only freight trains ran on it till 2004^{ccxliii} (1993) AC and Semi-AC Local Trains proposed for certain routes^{ccxliv} (2018-19)</p>
	<p>Monorail Opened for Public Use (Line I) - Chembur and Wadala^{ccxlv} (2014) Line II between Wadala and Gadge Maharaj Chowk operational (2019)</p>
	<p>Electric Vehicle Policy State EV policy for Maharashtra prepared^{ccxlv} (2018)</p>
Parking	<p>BMC passed the policy on public parking and on-street parking; parking lots divided into three categories; prices increased by 300% for cars, 650% for 2W^{ccxlvii} (2015) CMP proposal - Making proof of parking space a requisite to obtain registration certificate (2016)</p>

Punjab

Tracking Particulate Pollution and action in cities of Punjab

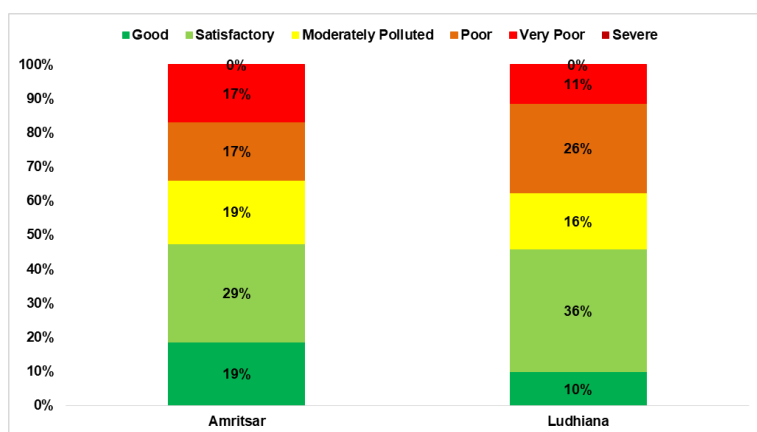
The current state of air pollution in Punjab was tracked from the clean air action plans and the government websites and also through some media coverage. The latest developments which includes air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated whatever was available on the public domain. Punjab has nine non-attainment cities based on the PM10 concentration in those cities. Some of the actions such as implementation of the sale of BS VI vehicles from April 2020 is mandatory for pan India. Also BS VI fuel will be available country-wide from April 2020. All Pollution control Checking Centres will be linked with VAHAN 4.0^{ccxlviii} software of the Transport department, including development of the software and linking it to all PUC centres of VAHAN 4.0.^{ccxlix}. They will be linked soon but the website is prepared for Punjab.

Graph: Reduction target of PM10 based on the last three year average PM10 concentration for cities in Punjab



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Graph: Categorisation of PM2.5 based on AQI categories for the period October- November 2019



Source: CSE's analysis based on the air quality data available on CPCB website for real-time monitoring stations

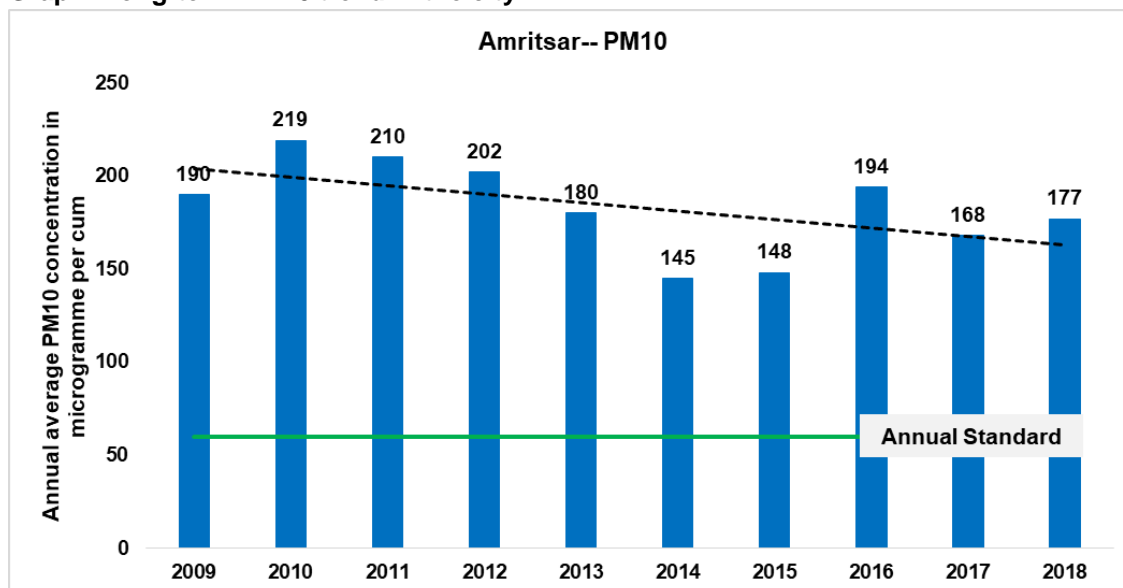
- Around more than 50 per cent of the days in Amritsar and Bhatinda were above the standard

Air quality profile and action status in selected cities of Punjab

Amritsar

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	Conversion to CNG/PNG from pet coke and coal, 95 industries in Amritsar currently using rice husk and pet coke as fuel ^{ccl} . The switch should occur two years after government provides gas pipeline (currently 61% of the implementation has been achieved from the 26km pipeline to be laid). ^{cclccli}
	Converting natural draft brick kilns to induced draft ^{ccliii} , to be followed by all 38 brick kilns within 5 km radius of Municipal Corporation limits ^{ccliv} .
Power Plants	GVK Goindwal Sahib Thermal Plant - 540 MW (2X270 MW) continues to operate after being commissioned on 1 st April 2016.
	Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 ^{cclv} software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. ^{cclvi} . They will be linked soon but the website is prepared.

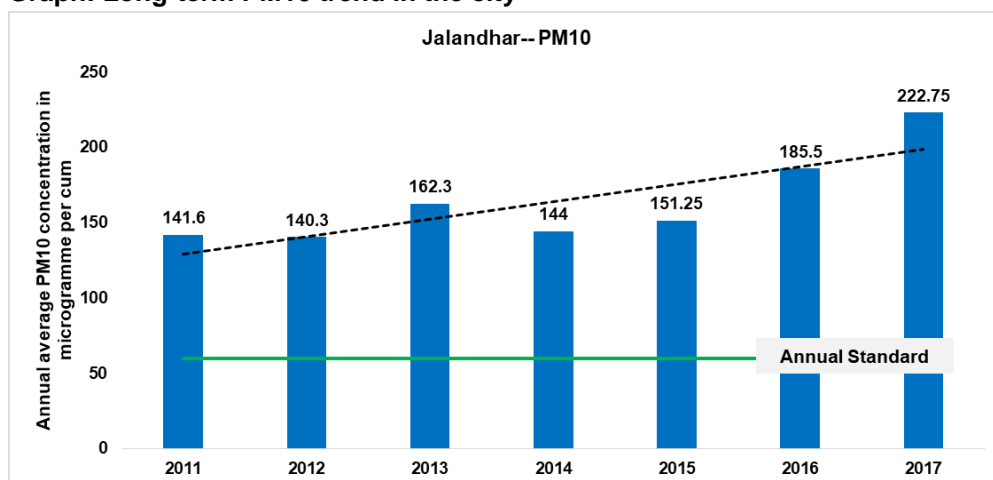
Sector-wise measures implemented	Initiatives undertaken
Vehicular Emissions and Traffic management	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel. ^{cclviicclviii}
	Extensive drive against polluters - 2218 challans ^{cclix} were issued during year 2018 to violating vehicles with regard to invalid PUC certificates / pressure horns. ^{cclx}
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year. ^{cclxicclxii}
	Anti-encroachment drive fails ^{cclxiii} (2014)
	National level policy - Bharat Stage IV norms enforced in the country ^{cclxiv} (2017) MoU with ZTEsoft Technologies to manufacture electric vehicles ^{cclxv}
	State level policy Punjab in talks with japan to partner in roll out of electric vehicles ^{cclxvi} (2019) Auto shredding plant to be set-up in Punjab ^{cclxxvii} Ban on registration of 3 wheelers run on diesel ^{cclxxviii}
Action on Truck	Adequate information not available
Public Transport	Comprehensive mobility plan for Amritsar planned, and introduced in 2013 ^{cclxxvii} (2012)
	First phase of Amritsar BRT inaugurated on 31 km long special corridor ^{cclxxviii} , Dec 2016
	City bus service launched in 2014 shut due to losses ^{cclxxix}
	Integrated traffic management and mobility plan of 130 crores proposed as part of area development program under Smart cities ^{cclxxx} (2018) Mobility corridor redevelopment along outer and inner road (Hathi Gate) ^{cclxxxix} (2018)
	Closed BRT system called Amritsar Metrobus was launched on January 28, 2019 ^{cclxxxi} (2019)
Non-motorized Transport	First cycle track of 2km length was opened in front of Trilium mall. (2016)
	E bike began operation of cycle sharing scheme in Amritsar with 460 bikes ^{cclxxxii} (2017)
	MoU was signed between Municipal corporation and Hexi which implemented Cycle sharing program in GNDU campus ^{cclxxxiii} (2018)
	Golden temple area was renovated to make it pedestrian friendly and car free. NMT and small vehicles are still allowed occasionally
Electric Vehicles	State level policy Draft EV policy released for comments on 25.11.2019 ^{cclxxxiv} No electric bus allocated under FAME II ^{cclxxxv}
	National level policy - e-rickshaws and e-carts exempted from motor vehicles tax for 2 years ^{cclxxxvi} State level policy - Partnership with World Economic Forum to come up with design for electric mobility ^{cclxxxvii}
Parking	Multilevel car parking at Kairon market tendered ^{cclxxxviii} (2019)
	14 number of roads under HRIDAY in the Walled City to be redeveloped ^{cclxxxix} (2018)

Sector-wise measures implemented	Initiatives undertaken
Roads	Tender floated for bid to develop smart road under Smart Cities Mission ^{cclxxx} (2019) Tender floated for bid for Construction of Two Foot Over Bridges under Smart City Mission ^{cclxxx}
Construction and Demolition waste and Road Dust	<p>Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste. ^{cclxxxii cclxxxiii}</p> <p>Measures for fugitive emissions to be implemented^{cclxxxiv} – construction material to remain covered and regular inspection to be made and challan to be issued to violators. ^{cclxxxv}</p> <p>Procurement of water sprinklers and use of it on roads^{cclxxxvi}, 67.5 km road identified in Amritsar. Procurement of two additional water sprinklers on the three existing with capacity of 3.0KL. ^{cclxxxvii}</p> <p>Creation of green buffers along the roads ^{cclxxxviii}– 4km road identified, 2000 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc. ^{cclxxxix}</p> <p>Kutcha/brick paved roads to be converted to pacca roads. 5.92Km road identified for this to control road dust emissions. Along with this recarpeting of roads to be done as well, 28 km roads within Municipal Corp. recognized. ^{ccxc}</p>
Waste Burning	<p>Control on open burning of bio-mass in the city. Preparation of six composting pits to ensure this plan is implemented properly. ^{ccxcic ccxcii}</p> <p>Control on burning of municipal solid waste^{ccxciii} with Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators. ^{ccxciv}</p> <p>Control on burning of waste and crop residue during wheat/rice harvesting season^{ccxcv}. 328 challan issued in which total amount of Rs 8,70,000 imposed as Environmental compensation in year 2018 by PPCB ^{ccxcvi}.</p>
Monitoring and Graded response action plan	<p>Dissemination of Air Quality Index, One Continuous Ambient Air Quality Monitoring Stations (CAAQMS) installed, three additional required. ^{ccxcvii}</p> <p>Establish an Air Quality Management Division at SPCB HQ, none exist at present. ^{ccxcviii}</p> <p>Temporary closure of all brick kilns, induction furnaces and rolling mills, stopping all construction activities, stop garbage burning in open fields and landfill areas, strict vigil and no tolerance for visible emissions from vehicles and industries, ban burning of firecrackers, water sprinkling at dust emission points and strict enforcement of PUC norms. Action plan for Clean air has mentioned about GRAP based on different AQI categories.</p>
Household air pollution	As per the 4 th round of National Family Health Survey (2015-16), 65.90% of consumers were using clean cooking fuel. According to PMUY, 83% of beneficiaries who had got a connection came back for a refill. In addition, only 2.60% of all the people who got a refill did it thrice, and 10% got 4 or more refills.

Jalandhar

Overall reduction target to meet National Ambient Air Quality Standards for PM10 in cities of Punjab

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	Conversion to side hood suction in furnace, check adequacy and need for up-gradation. ^{ccxcix}
	Conversion to CNG/PNG ^{ccc} from pet coke and coal, 5 industries in Jalandhar currently using coal in fuel in boilers. ^{cccicccii}
	Converting natural draft brick kilns to induced draft ^{ccciii} , to be followed by all 6 brick kilns within 5 km radius of Municipal Corporation limits. ^{ccciv}
Power Plants	NA
Vehicular Emissions and Traffic Management	Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 ^{cccv} software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. ^{cccvii}
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel. ^{cccvii}
	Extensive drive against polluters - 7300 no. of vehicles inspected & 1825 no. of challans issued during year 2018. ^{cccviii}
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year. ^{cccvix}
	Bharat Stage IV norms introduced ^{cclxiv} (2017) and BS VI to be implemented from April 2020

Sector-wise measures implemented	Initiatives undertaken
	Punjab in talks with japan to partner in roll out of electric vehicles ^{cclxxvi} (2019)
	<p>State level policy - Auto shredding plant to be set-up in Punjab ^{cclxxvii} (2019)</p> <p>State level policy - Ban on registration of 3 wheelers run on diesel ^{cclxxvii}</p>
Electric Vehicles	<p>State level policy - Draft EV policy released for comments on 25.11.2019 ^{cclxxiv}</p> <p>State level policy - No electric bus allocated under FAME II ^{cclxxv}</p> <p>National level policy - e-rickshaws and e-carts exempted from motor vehicles tax for 2 years ^{cccx}</p> <p>EV battery unit to be set up ^{cclxxvii}</p> <p>State level policy - Partnership with World Economic Forum to come up with design for electric mobility^{cclxxvii}</p> <p>State level policy - Punjab in talks with japan to partner in roll out of electric vehicles^{cclxxvi}</p>
Action on Truck	NA
Public Transport	Comprehensive mobility plan for Jalandhar ^{cclxxvii} (2013)
	City bus service shut due to losses ^{cclxxix} (2017)
Construction and Demolition waste and Dust	<p>Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste. ^{cccxi}</p> <p>Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators. ^{cccxi}</p> <p>Use of water sprinklers on roads. No new procurement of sprinklers required. ^{cccxi}</p> <p>Creation of green buffers along the roads– 60km road identified, 4000 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc. ^{cccxi}</p> <p>Kutcha/brick paved roads to be converted to pacca roads. 41Km road identified for this to control road dust emissions. Along with this recarpeting of roads to be done as well, 45 km roads within Municipal Corp. recognized. ^{cccxi}</p>
Waste burning^{cccxi}	Control on open burning of bio-mass in the city. Preparation of 100 composting pits to ensure this plan is implemented properly, as no composting pits exist.
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. 122 challan issued in which total amount of Rs 3,80,000/- imposed as Environmental compensation.

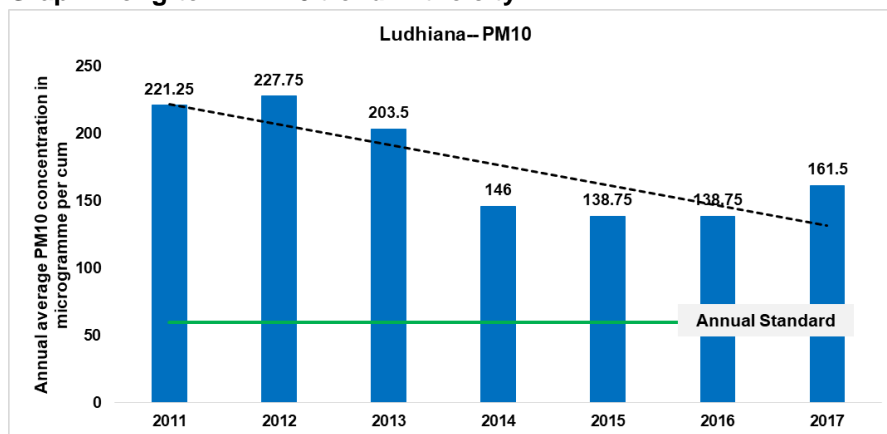
Sector-wise measures implemented	Initiatives undertaken
Monitoring and Graded response action plan <small>cccxvii</small>	Dissemination of Air Quality Index, One Continuous Ambient Air Quality Monitoring Stations (CAAQMS) installed, three additional required.
	Establish an Air Quality Management Division at SPCB HQ, none exist at present.
	Temporary closure of all brick kilns, induction furnaces and rolling mills, stopping all construction activities, stop garbage burning in open fields and landfill areas, strict vigil and no tolerance for visible emissions from vehicles and industries, ban burning of firecrackers, water sprinkling at dust emission points and strict enforcement of PUC norms.

Ludhiana

Overall reduction target to meet National Ambient Air Quality Standards for PM10 in cities of Punjab

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry ^{ccc xviii}	Conversion to side hood suction in furnace, check adequacy and need for up-gradation. 74 units to be converted.
	Conversion to CNG/PNG ^{ccc xix} from pet coke and coal, 500 industries yet to be converted. ^{ccc xx}
	Development of cleaner technologies to control fugitive emissions. Punjab State Council for Science and Technology (PSCST) to develop technologies for side hood furnace, brick kilns,
	Converting natural draft brick kilns to induced draft, one out of eight have been converted. ^{ccc xxi}
Power Plants	NA
Vehicular Emissions ^{ccc xii}	Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. The linkage is yet to be done but the website is prepared.
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	Extensive drive against polluters - 11,315 Challans were issued against polluting vehicles in 2018 and 994 challans issued upto Feb, 2019
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.

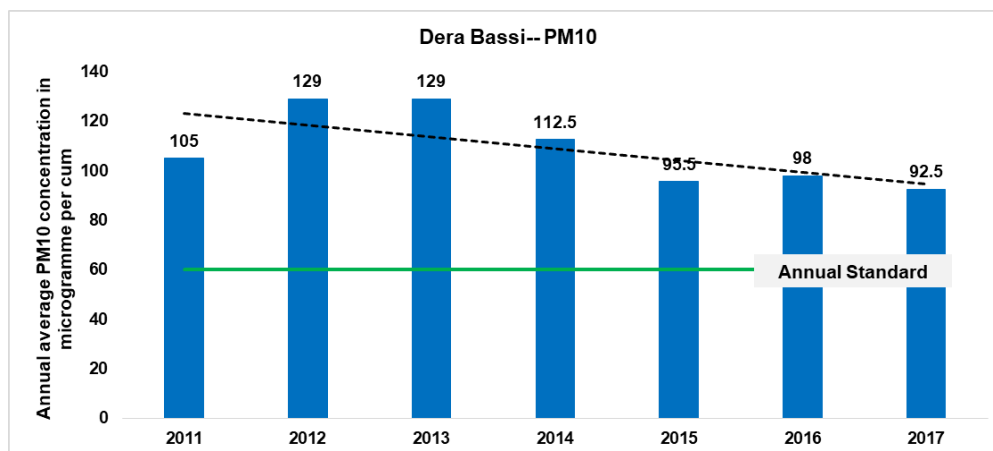
Sector-wise measures implemented	Initiatives undertaken
	<p>BS VI to be implemented for new vehicles from April 2020</p> <p>Bharat Stage IV norms introduced ^{cclxiv} (2017)</p> <p>State level policy - Auto shredding plant to be set-up in Punjab ^{cclxxvii} (2019)</p> <p>State level policy - Ban on registration of 3 wheelers run on diesel ^{cclxxvii}</p>
Action on Truck	NA
Public Transport	<p>Comprehensive mobility plan for Ludhiana ^{cclxxvii} 2013</p> <p>40 of 200 buses planned to be introduced running</p> <p>Ferozpur Road from Jagraon Bridge to Sidhwan Canal to be made into 8 lanes ^{cccxxiii}</p> <p>City bus service shut due to losses ^{cclxix} 2017</p> <p>150 buses to ply daily for Sultanpur Lodhi ^{cccxxiv} (2019)</p> <p>10 buses of Shri Bhaini Sahib exempted from MV tax ^{cccxxv}</p>
Parking	Multi-level parking at Firoze Gandhi Market under Smart City programme announced ^{cccxxvi} (2019)
Construction and Demolition waste and Dust	<p>Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste. ^{cccxxvii}</p> <p>Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators. ^{cccxxviii}</p> <p>Use of water sprinklers on roads and procurement. Two sprinklers exist and two more need to be procured. ^{cccxxix}</p> <p>Creation of green buffers along the roads– 7.8km road identified, 12000 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc. ^{cccxxx}</p> <p>Kutcha/brick paved roads to be converted to pacca roads. 10.06 Km road identified for this to control road dust emissions. Along with this recarpeting of roads to be done as well, 93.55 km roads within Municipal Corp. recognized.</p>
Waste burning^{cccxxxi}	<p>Control on open burning of bio-mass in the city. Preparation of 140 composting pits to ensure this plan is implemented properly, as no composting pits exist, 126 yet to be constructed.</p> <p>Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.</p> <p>Control on burning of waste and crop residue during wheat/rice harvesting season. 150 challan issued in which total amount of Rs 5,25,000/- imposed as Environmental compensation in 2018.</p>
Monitoring and Graded response action plan^{cccxxxii}	<p>Dissemination of Air Quality Index, One Continuous Ambient Air Quality Monitoring Stations (CAAQMS) installed, three additional required.</p> <p>Temporary closure of all brick kilns, induction furnaces and rolling mills, stopping all construction activities, stop garbage burning in open fields and landfill areas, strict vigil and no tolerance for visible emissions from vehicles</p>

Sector-wise measures implemented	Initiatives undertaken
	and industries, ban burning of firecrackers, water sprinkling at dust emission points and strict enforcement of PUC norms.

Dera Bassi

Overall reduction target to meet National Ambient Air Quality Standards for PM10 in cities of Punjab

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken till date

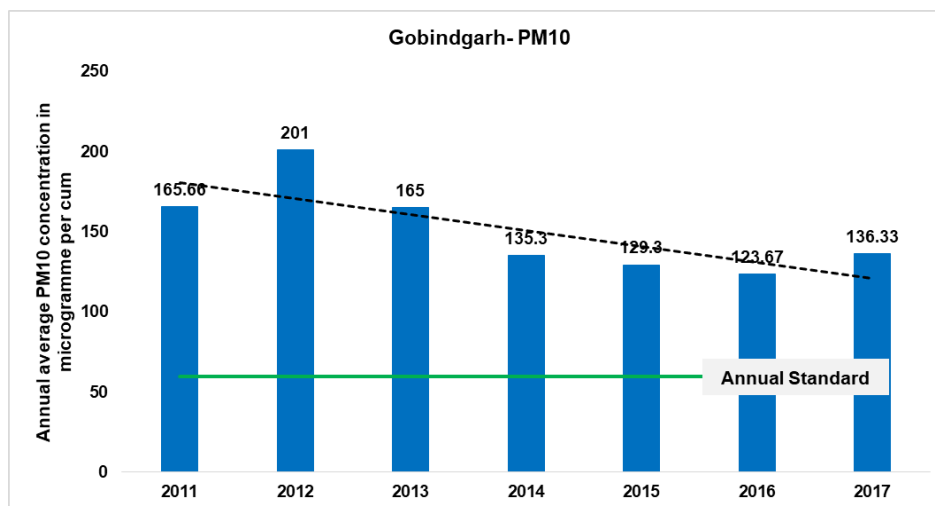
Sector-wise measures implemented	Initiatives undertaken
Industry ^{cccxxxiii}	Conversion to side hood suction in furnace, check adequacy and need for up-gradation.
	Conversion to CNG/PNG from coal.
	Conversion of natural draft brick kilns to induced draft, 8 brick kilns exists.
Power Plants	NA
Vehicular Emissions ^{cccxxxiv}	Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. The linkage is yet to be done but the website is prepared.
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	Extensive drive against polluters – 2 challans were issued with regard to valid PUC.
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.
	BS VI to be implemented from April 2020
Action on Truck	NA
Public Transport	NA

Sector-wise measures implemented	Initiatives undertaken
Construction and Demolition waste and Dust	Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste. ^{cccxxxv}
	Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators. ^{cccxxxvi}
	Use of water sprinklers on roads and procurement. Two sprinklers exist and three more need to be procured. ^{cccxxxvii}
	Creation of green buffers along the roads. ^{cccxxxviii}
	Kutch/brick paved roads to be converted to pacca roads. 4 Km road identified for this to control road dust emissions. Along with this recarpeting of roads to be done as well, 3 km roads within Municipal Corp. recognized. 2 km identified for pavement using interlocking tiles. ^{cccxxxix}
Waste burning^{cccxi}	Control on open burning of bio-mass in the city. Preparation of 14 composting pits to ensure this plan is implemented properly.
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. 40 challan issued in which total amount of Rs 1,50,000/- imposed as Environmental compensation in 2018.
Monitoring and Graded response action plan^{cccxi}	Dissemination of Air Quality Index, Two Ambient Air Quality Monitoring Stations (AAQMS) installed, and one CAAQMS required.
	Establish an Air Quality Management Division at SPCB HQ, none exist at present.
	Temporary closure of all brick kilns, induction furnaces and rolling mills, stopping all construction activities, stop garbage burning in open fields and landfill areas, strict vigil and no tolerance for visible emissions from vehicles and industries, ban burning of firecrackers, water sprinkling at dust emission points and strict enforcement of PUC norms.

Gobindgarh

Overall reduction target to meet National Ambient Air Quality Standards for PM10 in cities of Punjab

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

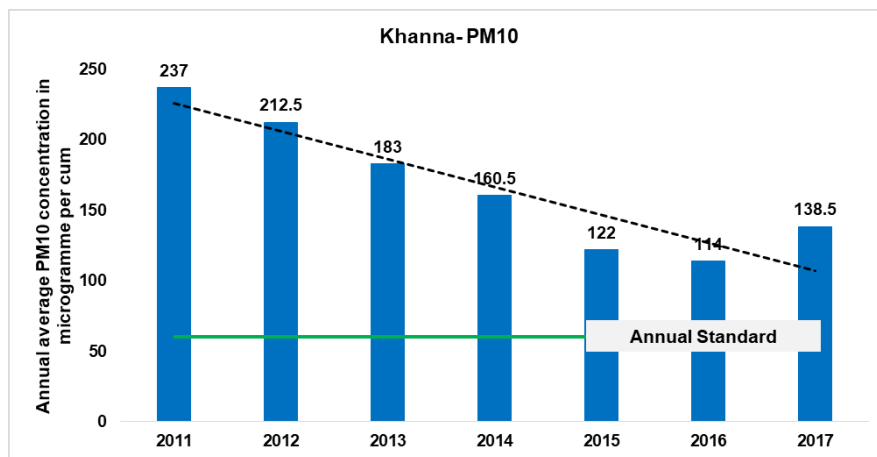
Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry ^{cccxliv}	Conversion to side hood suction in furnace, check adequacy and need for up-gradation. 69 units yet to be converted out of 88.
	Conversion to CNG/PNG from coal. 220 units will shift to cleaner fuel.
	No brick kiln
Power Plants	NA
Vehicular Emissions ^{cccxliv}	Installation of remote sensor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. The linkage is still to be done but the website is prepared.
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	Extensive drive against polluters – 450 Challans were issued against polluting vehicles in 2018 and 161 challans issued in Feb, 2019.
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.
	BS VI to be implemented for new vehicles from April 2020
Action on Truck	NA
Public Transport	NA

Sector-wise measures implemented	Initiatives undertaken
Construction and Demolition waste and Dust	Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste. ^{cccxliv}
	Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators. ^{cccxliv}
	Use of water sprinklers on roads and procurement. One sprinkler exists and two more need to be procured of 5.0KL capacity. ^{cccxlvi}
	Creation of green buffers along the roads– 12km road identified, 3000 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc. ^{cccxlvii}
	Kutch/brick paved roads to be converted to pacca roads. 25 Km road identified for this to control road dust emissions. Along with this recarpeting of roads to be done as well, 9 km roads within Municipal Corp. recognized. 10 km identified for pavement using interlocking tiles. ^{cccxlviii}
Waste burning ^{cccxlx}	Control on open burning of bio-mass in the city. Preparation of 48 composting pits to ensure this plan is implemented properly.
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. 182 challan issued in which total amount of Rs 5,87,500/- imposed as Environmental compensation in 2018.
Monitoring and Graded response action plan ^{ccccl}	Dissemination of Air Quality Index, One Continous Ambient Air Quality Monitoring Stations (CAAQMS) installed.
	Establish an Air Quality Management Division at SPCB HQ, none exist at present.
	Temporary closure of all brick kilns, induction furnaces and rolling mills, stopping all construction activities, stop garbage burning in open fields and landfill areas, strict vigil and no tolerance for visible emissions from vehicles and industries, ban burning of firecrackers, water sprinkling at dust emission points and strict enforcement of PUC norms.

Khanna

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

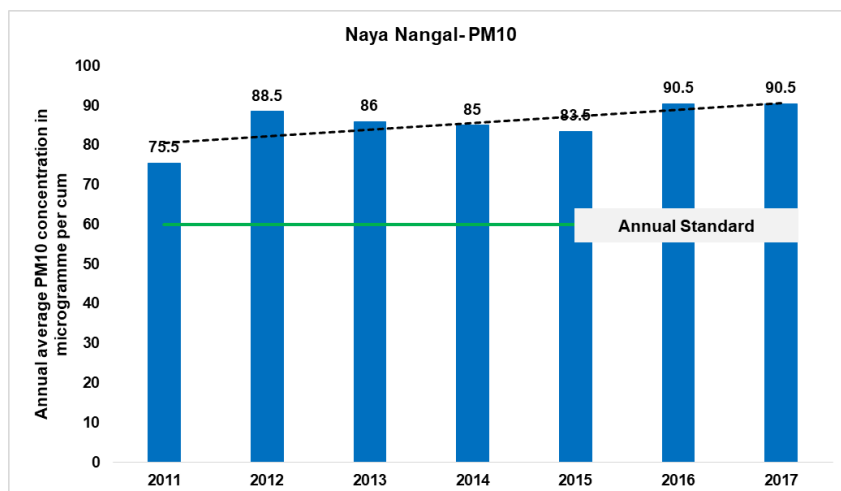
Status of action taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry ^{cccli}	Conversion to side hood suction in furnace, check adequacy and need for up-gradation. Total 16 furnaces, 8 still in need for upgrade.
	Conversion to CNG/PNG from coal. 93 units will shift to cleaner fuel.
	Conversion of natural draft brick kilns to induced draft, 5 brick kilns need to be changed which are within 5km radius of MC.
Power Plants	NA
Vehicular Emissions ^{ccclii}	Installation of remote sensor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0.
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	Extensive drive against polluters – 159 challans were issued in Jan & Feb, 2019.
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.
	Retrofitting of Particulate filters in diesel vehicles for Bharat Stage (BS) V fuels (India to move to BS VI by 2020)
Action on Truck	NA
Public Transport	NA
Construction and Demolition	Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste. ^{cccliii}

Sector-wise measures implemented	Initiatives undertaken
waste and Dust	Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators. ^{cccliv}
	Use of water sprinklers on roads and procurement. One sprinkler exists and two more need to be procured. ^{ccclv}
	Creation of green buffers along the roads– 6km road identified, 9500 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc. ^{ccclvi}
	Kutcha/brick paved roads to be converted to pacca roads. Along with this recarpeting of roads to be done as well, 4.5 km roads within Municipal Corp. recognized. 8.33 km identified for pavement using interlocking tiles. ^{ccclvii}
Waste burning^{ccclviii}	Control on open burning of bio-mass in the city. Preparation of 100 composting pits to ensure this plan is implemented properly.
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. 104 challan issued in which total amount of Rs 2,92,500/- imposed as Environmental compensation in 2018.

Naya Nangal

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

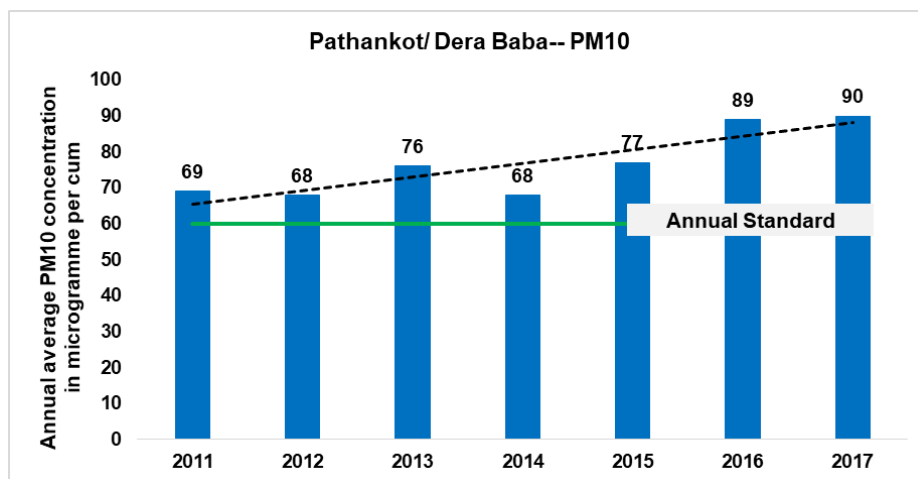
Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry^{ccclix}	Action against non-complying industrial units. Regular inspection as per PPCB.
Power Plants	NA
Vehicular Emissions^{ccclix}	<p>Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. the linkage still has to be established but the website is prepared.</p> <p>Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.</p> <p>Extensive drive against polluters – 4 challans were issued in Feb, 2019 for invalid PUC.</p> <p>BS VI to be implemented for new vehicles from April 2020</p> <p>Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.</p>
Action on Truck	NA
Public Transport	NA
Construction and	<p>Use of water sprinklers on roads. No new sprinklers to be procured.</p> <p>Creation of green buffers along the roads– 9km road identified, 600 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc.</p>

Sector-wise measures implemented	Initiatives undertaken
Demolition waste and Dust^{ccclxi}	Kutchra/brick paved roads to be converted to pucca roads. Along with this recarpeting of roads to be done as well, 10 km roads within Municipal Corp. recognized. 16 km identified for pavement using interlocking tiles.
	Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste.
	Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators.
Waste burning^{ccclxii}	Control on open burning of bio-mass in the city. No new pits needed, 20 pits already exist under MC.
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. 4 challans issued in which total amount of Rs 10,000/- imposed as Environmental compensation in 2018.

Dera Baba/Pathankot

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

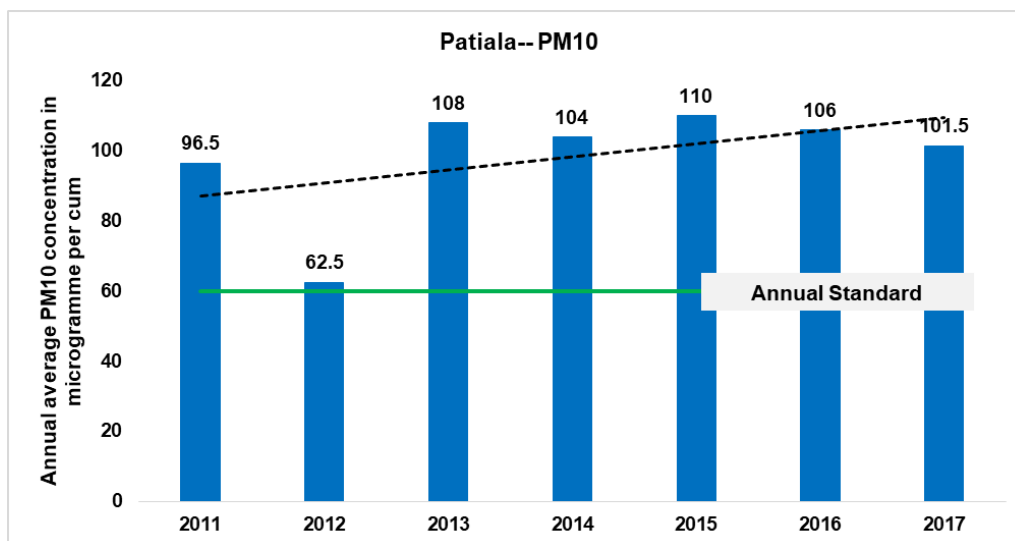
Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry ^{ccclxiii}	Conversion to side hood suction in furnace, check adequacy and need for up-gradation.
	Conversion to CNG/PNG from coal.
	Conversion of natural draft brick kilns to induced draft, one brick kiln exists within 5 km radius of MC and needs to be converted.
Power Plants	NA
Vehicular Emissions ^{ccclxiv}	Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. This is yet to be linked but then the website is available
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	Extensive drive against polluters – 450 challans were issued in 2018 for invalid PUC.
	BS VI to be implemented for new vehicles from April 2020
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.
Action on Truck	NA
Public Transport	NA
Construction and Demolition	Use of water sprinklers on roads, one exists. No need for procurement.
	Creation of green buffers along the roads– adequate green buffer at major intersections, 100 plants to be planted around industrial and residential

Sector-wise measures implemented	Initiatives undertaken
waste and Dust^{ccclxv}	areas. Along with this, greening of parks, open spaces, community places, schools, etc.
	Kutchra/brick paved roads to be converted to pucca roads. Recarpeting of roads to be done as well, 9.34 km roads within Municipal Corp. recognized. 4.60 km identified for pavement using interlocking tiles.
	Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste.
	Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators.
Waste burning^{ccclxvi}	Control on open burning of bio-mass in the city. MC has prepared 7 pits, out of which one comes under MC.
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. Zero Stubble burning in Dera Baba area. Gurdaspur - 339 challans issued in which total amount of Rs 8,48,750/- imposed as Environmental compensation in 2018.

Patiala

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

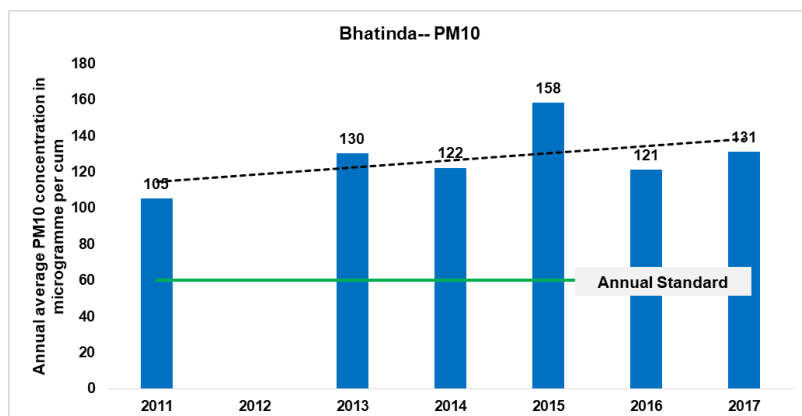
Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry ^{ccclxvii}	Conversion to side hood suction in furnace, check adequacy and need for up-gradation.
	Conversion to CNG/PNG from coal.
	Conversion of natural draft brick kilns to induced draft, one brick kiln already converted.
Power Plants	NA
Vehicular Emissions ^{ccclxviii}	Installation of remote censor Pollution Under Control (PUC) check - All Pollution Checking Centres will be linked with VAHAN 4.0 software of the Transport deptt, including development of the software and linking it to all PUC centres of VAHAN 4.0. The linkage still has to be done but the website is prepared.
	Checking Fuel Adulteration - Deptt. of Food & Civil Supplies, the Oil Companies have adopted Online Automated System for transportation & checking the density of Petrol/Diesel.
	Extensive drive against polluters – 72 challans were issued in Jan & Feb, 2019 for invalid PUC.
	BS VI to be implemented from April 2020
	Phasing out Commercial diesel vehicles more than 15 years old - New commercial diesel vehicles is registered for 2 years and thereafter, fitness certificate is being issued every year.
Action on Truck	NA
Public Transport	NA

Sector-wise measures implemented	Initiatives undertaken
Construction and Demolition waste and Dust ^{ccclix}	Use of water sprinklers on roads and procurement. One sprinkler exists and two more need to be procured.
	Creation of green buffers along the roads– 2.2km road identified, 4775 plants to be planted around industrial and residential areas. Along with this, greening of parks, open spaces, community places, schools, etc
	Kutcha/brick paved roads to be converted to pacca roads. 0.3 Km road identified for this to control road dust emissions. Along with this recarpeting of roads to be done as well, 16.17 km roads within Municipal Corp. recognized. 52.782 km identified for pavement using interlocking tiles.
	Enforcement of Construction & Demolition Rules, 2016 at both State and Central levels while also creating the infrastructure for construction and demolition waste.
	Measures for fugitive emissions to be implemented– construction material to remain covered and regular inspection to be made and challan to be issued to violators.
Waste burning ^{ccclxx}	Control on open burning of bio-mass in the city. Preparation of 200 composting pits to ensure this plan is implemented properly (141 yet to be constructed).
	Control on burning of municipal solid wastewith Regular inspections to be continued for Control on burning of municipal solid wastes and Challans to be issued to the violators.
	Control on burning of waste and crop residue during wheat/rice harvesting season. 771 challans issued in which total amount of Rs 26,32,500/- imposed as Environmental compensation in 2018.

Bhatinda

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Mobility actions

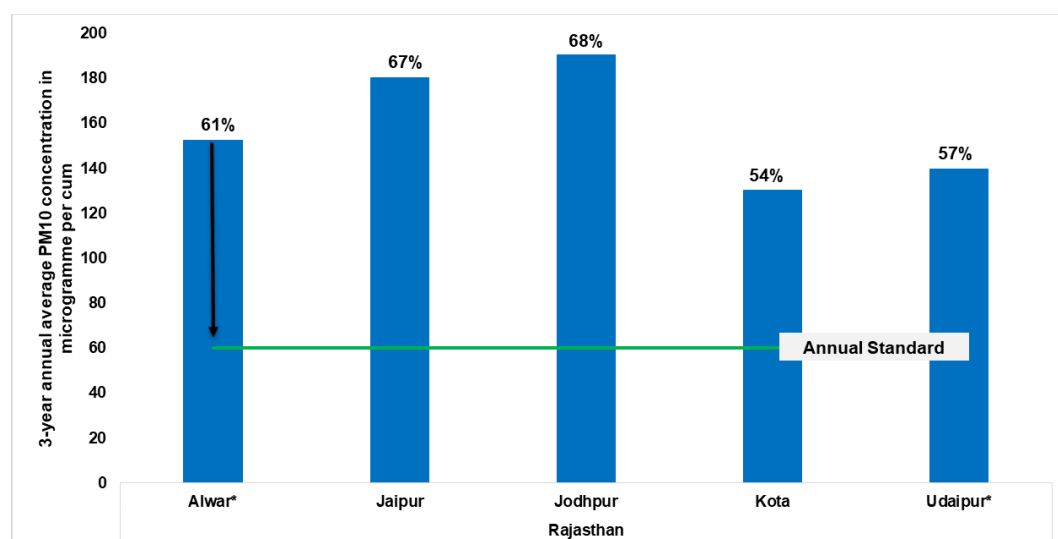
Sector-wise measures implemented	Initiatives undertaken
Public transport	Comprehensive mobility plan for Bathinda planned, and introduced in 2013 ^{cclxvii}
	Foundation stone for ISBT laid ^{ccclxxi} (2016)
	City bus service shut due to losses ^{ccclxxii} (2017)
Electric Vehicles	21 e-rickshaws flagged off ^{ccclxxiii} (2017)
	State level policy - Draft EV policy released for comments on 25.11.2019 ^{ccclxxiv}
	State level policy - No electric bus allocated under FAME II ^{ccclxxv}
	National level policy - e-rickshaws and e-carts exempted from motor vehicles tax for 2 years ^{ccclxxvi}
	Partnership with World Economic Forum to come up with design for electric mobility ^{cclxxvii} (2019)
Vehicles, Traffic management and vehicle emissions	BS VI to be implemented for new vehicles from April 2020
	State level policy - Punjab in talks with japan to partner in roll out of electric vehicles ^{cclxxvi}
	State level policy - Auto shredding plant to be set-up in Punjab ^{ccclxxvii} (2019)

Rajasthan

Tracking Particulate Pollution and action in cities of Rajasthan

The state is home to five non-attainment cities whose action plans following the NGT order have been submitted to the CPCB and have been approved for implementation. The current state of air pollution in Rajasthan was tracked from the clean air action plans and the government websites and also through some media coverage. The latest developments including air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated based on the information available on public domain. Some of the actions such as implementation of the sale of new vehicles with BS VI technology from April 2020 is mandatory for pan India. Also BS VI fuel will be available country-wide from April 2020. As per the 4th round of National Family Health Survey (2015-16), 31.80% of consumers were using clean cooking fuel and according to the Pradhan Manti Ujjawala Yojana, 82 % of 44,08,608 beneficiaries who had got a connection came back for a refill..

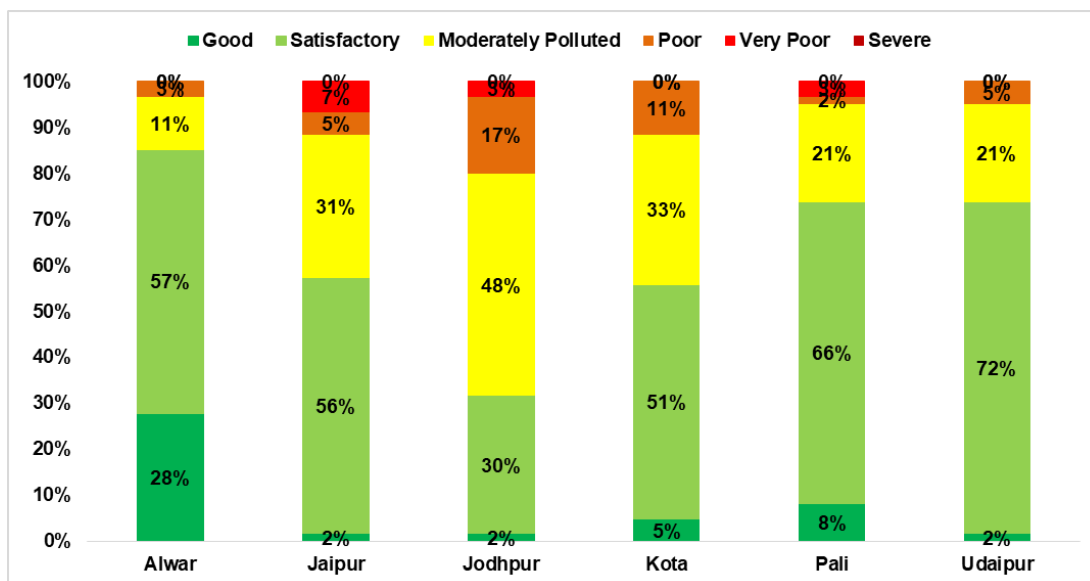
Graph: Reduction target of PM10 based on the last three year average PM10 concentration for cities in Rajasthan



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Note: *Data is taken for the years 2015-17 and for the rest the three year average is considered for the years 2016-18

Graph: Categorisation of PM2.5 based on AQI categories for the period October- November 2019



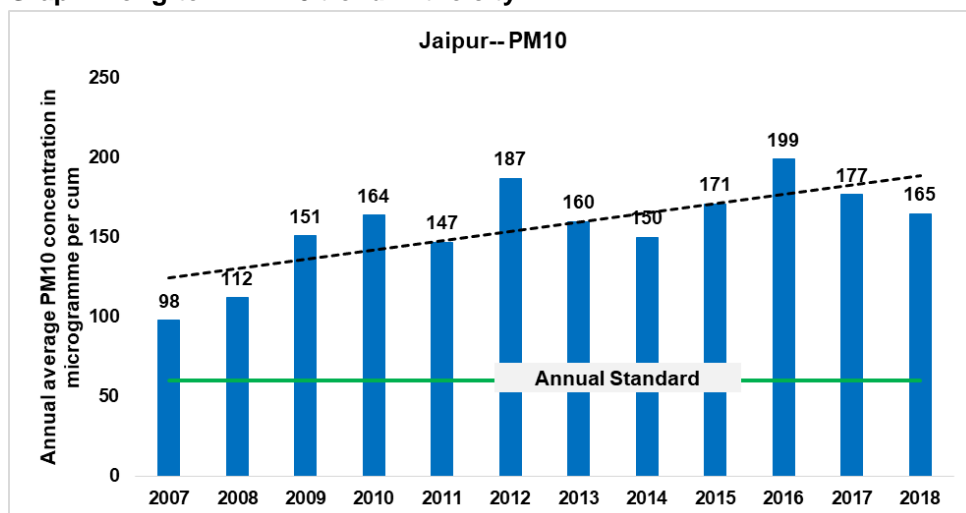
Source: CSE's analysis based on the air quality data available on CPCB website for real-time monitoring stations

Air quality profile and action status in selected cities of Madhya Pradesh

Jaipur ccclxxvii

Long trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken in Jaipur

Sector-wise measures implemented	Initiatives undertaken
Industry	<p>Noose of industrial units have been tightened (2019) ^{ccclxxviii}</p> <p>Enforcement of heavy penalty have been imposed on defaulters (2019) ^{ccclxxviii}</p> <p>The brick kilns have been banned in urban areas and those with new technology are allowed (2019) ^{ccclxxviii}</p>
Vehicular Emissions	<p>Jaipur introduced Bharat Stage III norms for vehicles and an LPG programme for autos and tempos (2010) ^{ccclxxix}</p> <p>Imposed a green tax on vehicles (2010) ^{ccclxxix}</p> <p>exempted battery-driven motor vehicles from VAT (2010) ^{ccclxxix}</p>
Construction and Demolition waste and Road Dust	<p>Road sweeping with water has been made compulsory to control dust which affects the atmosphere and visibility (2019) ^{ccclxxviii}</p>
Monitoring and Graded response action plan	<p>Rajasthan former Chief Minister Vasundhara Raje launched RajVayu, a mobile app, on the occasion of World Environment Day to provide air pollution-related details such as level of pollutants to citizens (2015) ^{ccclxxx}</p> <p>4 air quality monitoring stations were setup (2014) ^{ccclxxx}</p> <p>3 air quality monitoring stations were added (2018) ^{ccclxxx}</p>
Urban transport fund	<p>Govt. of Rajasthan vide its notification dated February 29, 2012 established "Rajasthan Transport Infrastructure Development Fund (RTIDF)" via which JCTSL operational Viability Gap is met ^{cccxcvi} (2012)</p>
Urban transport plan/ development plan/ master plan	<p>Comprehensive Mobility Plan was prepared for Jaipur City ^{ccclxxxix} (2010)</p> <p>Comprehensive Mobility Plan was prepared ^{ccclxxxii} (2018)</p>
Road infrastructure	<p>Public Bicycle Sharing System got implemented ^{ccclxxxiii} (2011)</p> <p>Jaipur Development Authority (JDA) constructed 436.88 km roads and road utilities 13.86 km drains, 12.18 km sewerage and 29.65 km electric works in the year 2018-19 and an expenditure of `1,061.91 crore has been incurred as capital expenditure ^{ccclxxxiv}</p> <p>Chandpole-Choti Chaupar smart road became operational in August, 2019 ^{ccclxxxv}</p>
Public transport	<p>Jaipur Metro Rail Corporation was incorporated ^{ccclxxxvi}</p> <p>Jaipur BRTS became operational ^{ccclxxxvii} (2010)</p> <p>Rationalized new buses and routes and put in place a BRTS on some routes ^{ccclxxxviii}</p> <p>Physical construction of Jaipur Metro Started ^{ccclxxxix}</p> <p>37 new Jaipur City Transport Service Limited (JCTSL) buses were added in Jaipur city ^{cccxc}</p> <p>13 new Rajasthan State Road Transport Corporation (RSRTC) buses added in Jaipur district ^{cccxc}</p> <p>12 new RSRTC employees deployed in Jaipur district ^{cccxc}</p> <p>3 new RSRTC routes were added in Jaipur district ^{cccxc} (2011)</p> <p>20 new JCTSL buses were added in Jaipur city ^{cccxc}</p> <p>4 new RSRTC buses added in Jaipur district ^{cccxcii}</p> <p>43 new RSRTC employees deployed in Jaipur district ^{cccxcii}</p> <p>1 new RSRTC routes was added in Jaipur district ^{cccxcii} (2012)</p>

Sector-wise measures implemented	Initiatives undertaken
	98 new JCTSL buses were added in Jaipur city ^{cccxc} (2013)
	10 new JCTSL buses were added in Jaipur city ^{cccxc}
	124 new RSRTC employees were deployed in Jaipur district ^{cccxciii}
	7 new RSRTC buses were added in Jaipur district ^{cccxciii}
	10 new RSRTC routes were added in Jaipur district ^{cccxciii} (2014)
	Phase 1A of metro was opened for public with ten trains each having 4 coaches ^{cccxciv}
	3 new RSRTC buses were added in Jaipur district ^{cccxcv} (2015)
Parking	100 new JCTSL buses were added in Jaipur city ^{cccxc}
	Todi Depot for JCSTL buses became operational ^{cccxcvi}
	Integrated Control and Command Centre got launched as part of smart city mission ^{cccxcvii} (2017)
Parking	Rajasthan High Court in 2012 had directed the RTO that registration of any vehicle should only be made when the owner files affidavit that he has parking space ^{cccxcviii} (2012)
	The construction of parking area has been completed for approx 350 four wheelers and 1600 two wheelers in Veer Hanumanji Tourist Centre, Samod (Khol), Chomu ^{cccxcix} (2015)
	Mobile app for booking parking space in Jaipur was launched ^{cd} (2019)

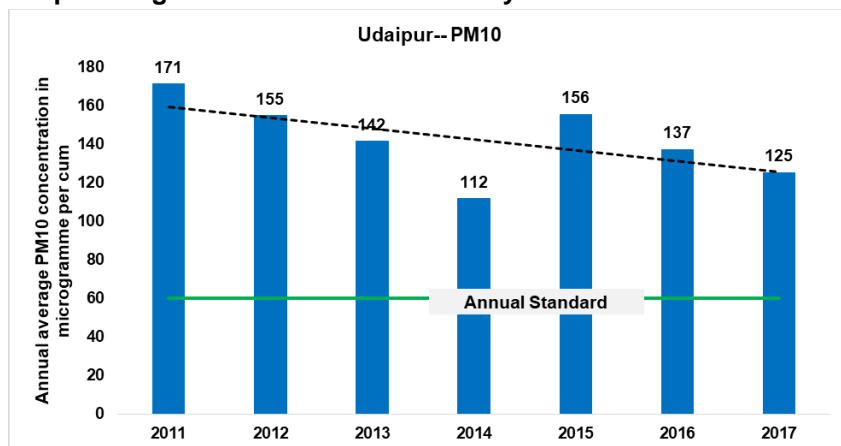
Status of action taken and proposed

Sector-wise measures implemented	Actions Taken
Industry	Identification of brick kilns and their regular monitoring including use of designated fuel and closure of unauthorized units. Conversion of natural draft brick kilns to induced draft.
	Regulation on setting up of new air polluting industries in industrial areas located in urban limits.
Vehicular Emissions	Launched extensive drive against polluting vehicles for ensuring strict compliance and regular checking of vehicular emission and issue of PUC certificate. ^{cdii} Installation of remote sensor based PUC system.
	Initiated steps for retrofitting of particulate filters in diesel vehicles, when BS-V fuels are available. BS VI to be introduced in 2020.
	Prepared action plan to check fuel adulteration and random monitoring of fuel quality data. ^{cdiii} Introduced of cleaner fuel for CNG/LPG vehicles.
	Restriction on plying & phasing out of 15 years old commercial diesel driven vehicles. ^{cdiv}
	Periodic calibration test of vehicular emission monitoring instrument.
Construction and Demolition waste and Road Dust	Prepared plan for green buffers along the traffic corridors. Greening of open areas, gardens, community places, schools and housing societies. ^{cdv}
	Introduced water fountain at major traffic intersection wherever feasible.
	Enforcement of Construction and Demolition Waste Rules 2016.
	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units.
	Covering of construction sites and Restriction on storage of construction materials along the road.
	As well as, restriction on storage of construction materials along the road.
Waste Burning	Launched extensive drive against open burning of bio-mass, garbage, leaves, etc. ^{cdvi cdvii}
	Regular check and control of burning of municipal solid waste. Ban on burning of agriculture waste and crop residues and its implementation.
	Immediate lifting of solid waste generated from desilting and cleaning of drains for its disposal.
	Transportation of this solid waste, construction material and debris in covered system.
Monitoring and Graded response action plan	Air Quality Index calculated and disseminated to the people through website and other media. Currently 6 manual stations exist and 1 CAAQMS.
	Air Quality Management Division at SPCB/PCC Head Quarters to oversee air quality management activities in the State and interact CPCB.
Road Infrastructure	Alwar was included under the Rajasthan Urban Infrastructure Development Project (RUIDP) phase II for maintenance of roads and construction of bridges ^{cdviii} (2008)
Urban transport fund	Govt. of Rajasthan vide its notification dated February 29, 2012 established "Rajasthan Transport Infrastructure Development Fund (RTIDF)" ^{cccxcvi} (2012)

	5 crores allocated for improvement of urban transport in Alwar as Atal Mission Rejuvenation and Urban Transformation (AMRUT) ^{cdxvi} (2015)
Public transport	A minibus passenger service was launched ^{cdix} 3 new RSRTC buses were added in Alwar district ^{cccxc} (2011)
	Mahila Alwar Vahini ³ was launched ^{cdix} (2012)
	65 new RSRTC employees were deployed in Alwar district ^{cccxcv} (2013)
	5 new RSRTC buses were deployed in Alwar district ^{cccxciii} 1 new RSRTC bus route was added in Alwar district ^{cccxciii} (2015)
	Rajasthan Government approved Detailed Project Report of Delhi- Alwar Regional Rapid Transport System ^{cdx} (2019)

Long trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

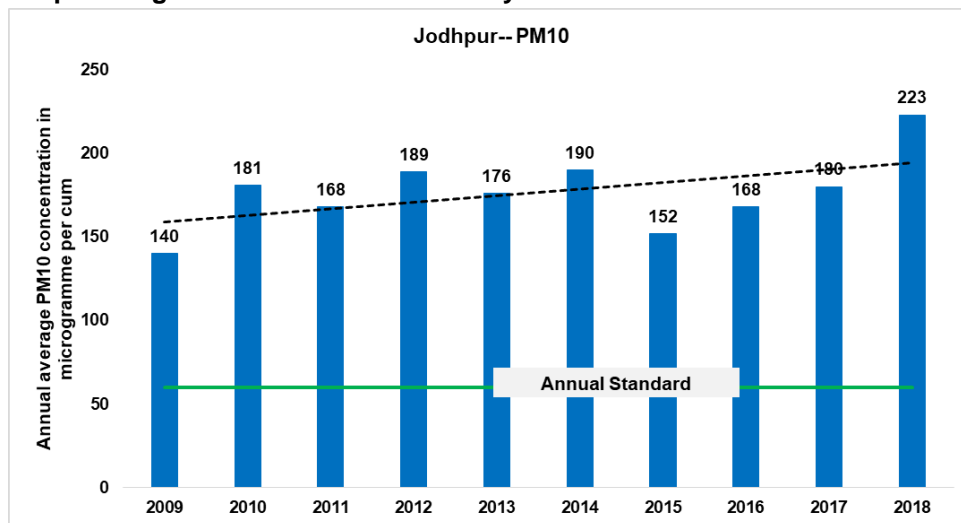
Status of action taken

Sector-wise measures implemented	Initiatives undertaken
Industry	Identification of brick kilns and their regular monitoring including use of designated fuel and closure of unauthorized units. Conversion of natural draft brick kilns to induced draft. Brick Kilns continue to operate despite SC ban on their use.
	Regulation on setting up of new air polluting industries in industrial areas located in urban limits.
Vehicular Emissions	Launched extensive drive against polluting vehicles for ensuring strict compliance and regular checking of vehicular emission and issue of PUC certificate. Installed remote sensor based PUC system.
	Initiatef steps for retrofitting of particulate filters in diesel vehicles, when BS-V fuels are available. BS VI to be introduced in 2020.
	Prepared action plan to check fuel adulteration and random monitoring of fuel quality data. Introduced of cleaner fuel for CNG/LPG vehicles.
	Restricted plying & phasing out of 15 years old commercial diesel driven vehicles.
	Periodic calibration test of vehicular emission monitoring instrument.
Construction and Demolition waste and Road	Prepared plan for green buffers along the traffic corridors. Greening of open areas, gardens, community places, schools and housing societies. cdxii
	Introduced water fountain at major traffic intersection wherever feasible.
	Enforcement of Construction and Demolition Waste Rules 2016.

Sector-wise measures implemented	Initiatives undertaken
Dust	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units. Covering of construction sites and Restriction on storage of construction materials along the road. As well as, restriction on storage of construction materials along the road.
Waste Burning	Launched extensive drive against open burning of bio-mass, garbage, leaves, etc. Regular check and control of burning of municipal solid waste. Ensured ban on burning of agriculture waste and crop residues and its implementation. Immediate lifting of solid waste generated from desilting and cleaning of drains for its disposal. Transportation of this solid waste, construction material and debris in covered system.
Monitoring and Graded response action plan	Air Quality Index calculated and disseminated to the people through website and other media. Currently 3 manual stations exist and 1 CAAQMS. Established an Air Quality Management Division at SPCB/PCC Head Quarters to oversee air quality management activities in the State and interact CPCB.
Urban transport fund	Govt. of Rajasthan vide its notification dated February 29, 2012 established "Rajasthan Transport Infrastructure Development Fund (RTIDF)" ^{cccxcvi} (2012) 25 crores fund allotted for improvement of urban transport in Udaipur as Atal Mission Rejuvenation and Urban Transformation (AMRUT) ^{cdxvi} (2015)
Urban development master plan	Master Plan of Udaipur was prepared (2013) Low Carbon Mobility Plan was prepared(2014)
Road infrastructure and Non-Motorized - Transport	The pilot implementation at Surajpole Junction was initiated on 22nd June 2016 ^{cdxiv} The pilot implementation at Delhi Gate Junction and Hathipole Junction was initiated in October 2016 ^{cdxiv} (2016) The pilot implementation of pedestrianization plan was initiated on 4th Aug 2017 from Rangniwas Chowk to Jagdish Chowk upto the City Palace Complex, after setting up necessary infrastructure in place (barricade, informatory signages etc.) ^{cdxiv} Municipal Commissioner, Udaipur Municipal Corporation in Nov 2017 asked the project team ICLEI SA to assist them in supporting the introduction of PBS system in the city (ongoing) ^{cdxiv} Hiran Magri Smart Road project started (ongoing) ^{cdxiv} (2017) The pilot implementation at Kumharo Ka Bhatta was initiated in November 2018 ^{cdxiv} The project work of Pedestrian Plan for Walled City, Udaipur completed ^{cdxiv} (2018)
	3 new RSRTC buses were added in Udaipur district ^{cccxcvii} (2011)

Sector-wise measures implemented	Initiatives undertaken
Public transport	7 new RSRTC buses were added in Udaipur district ^{cdxiii} (2013)
	10 new RSRTC buses were added in Udaipur district ^{cccxciii} (2015)
Parking	Parking Lot and Multi- Facility Hall at Aasind ki Haveli, Operationalized since 2014 ^{cdxiv} (2014)
	PWD State Garage Parking Lot; First Parking Lot to be built under Smart City Projects; Operationalized since August 2017 ^{cdxiv} U/g Parking Lot at Town Hall; Currently the only Automated Parking Lot; Operationalized since April 2017 ^{cdxiv}

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of action taken

Sector-wise measures implemented	Initiatives undertaken
Industry	Identification of brick kilns and their regular monitoring including use of designated fuel and closure of unauthorized units. Conversion of natural draft brick kilns to induced draft. Brick Kilns continue to operate despite SC ban on their use.
	Regulation on setting up of new air polluting industries in industrial areas located in urban limits.
Power Plants	NA
Vehicular Emissions	Launched extensive drive against polluting vehicles for ensuring strict compliance and regular checking of vehicular emission and issue of PUC certificate. Installation of remote sensor based PUC system.
	Initiated steps for retrofitting of particulate filters in diesel vehicles, when BS-V fuels are available. BS VI to be introduced in 2020.
	Prepared action plan to check fuel adulteration and random monitoring of fuel quality data. Introduced of cleaner fuel for CNG/LPG vehicles.
	Restriction on plying & phasing out of 15 years old commercial diesel driven vehicles.
	Periodic calibration test of vehicular emission monitoring instrument.
Action on Truck	NA

Sector-wise measures implemented	Initiatives undertaken
Construction and Demolition waste and Road Dust	Prepared plan for green buffers along the traffic corridors. Greening of open areas, gardens, community places, schools and housing societies.
	Introduce water fountain at major traffic intersection wherever feasible.
	Enforcement of Construction and Demolition Waste Rules 2016.
	Control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units.
	Covering of construction sites and Restriction on storage of construction materials along the road. As well as, restriction on storage of construction materials along the road.
Waste Burning	Launch extensive drive against open burning of bio-mass, garbage, leaves, etc.
	Regular check and control of burning of municipal solid waste. Ensure ban on burning of agriculture waste and crop residues and its implementation.
	Immediate lifting of solid waste generated from desilting and cleaning of drains for its disposal. Transportation of this solid waste, construction material and debris in covered system.
Monitoring and Graded response action plan	Air Quality Index to be calculated and disseminated to the people through website and other media. Currently 9 manual stations exist and 1 CAAQMS.
	Establish an Air Quality Management Division at SPCB/PCC Head Quarters to oversee air quality management activities in the State and interact CPCB.
Urban transport fund	Govt. of Rajasthan vide its notification dated February 29, 2012 established "Rajasthan Transport Infrastructure Development Fund (RTIDF)" ^{cccxcvi} (2012)
	25 crores allocated for improvement of urban transport in Jodhpur as Atal Mission Rejuvenation and Urban Transformation (AMRUT) ^{cdxvi} (2015)
Mobility Plan	Comprehensive mobility plan was prepared (2010)
Traffic enforcement	Wearing helmet during driving two-wheeler was made compulsory for the driver as well as additional person sitting behind the driver ^{cdxvii} (2015)
Public transport	4 new RSRTC buses were deployed in Jodhpur district ^{cccxciii} (2014)
	4 new RSRTC bus routes were added in Jodhpur district ^{cccxciii} (2015)
	Jodhpur Bus Service Limited started operation and maintenance of buses on 6 routes ^{cdxviii} (2016)

Pali

Actions taken in mobility sector

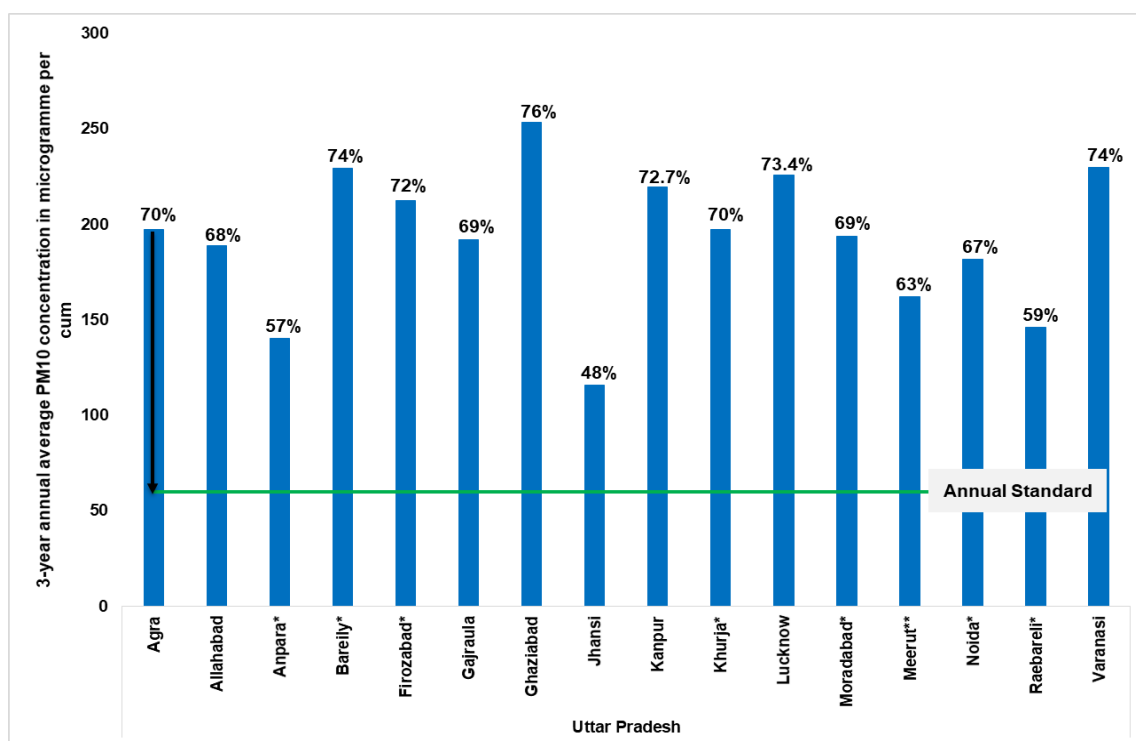
Sector-wise measures implemented	Initiatives undertaken
Urban transport fund	Govt. of Rajasthan vide its notification dated February 29, 2012 established "Rajasthan Transport Infrastructure Development Fund (RTIDF)" ^{cccxcvi} (2012)
Public transport	14 new RSRTC employees were deployed in Pali district ^{cccxcvii} (2011)
	45 new RSRTC employees were deployed in Pali district ^{cccxcviii} (2013)
	2 new RSRTC buses were deployed in Pali district ^{cccxcix}
	3 new RSRTC routes were added ^{ccccl}
	20 crores allocated for improvement of urban transport in Pali ^{cccclvi} (2015)

Uttar Pradesh

Tracking Particulate Pollution and action in cities of Uttar Pradesh

The state is home to 15 non-attainment cities whose action plans following the NGT order have been submitted to the CPCB and have been approved for implementation. The current state of air pollution in UP was tracked from the clean air action plans and the government websites and also through some media coverage. The latest developments including air pollution monitoring, abatement strategies, policy updates and proposed technological advancements across all sectors have been collated based on the information available on public domain. Some of the actions such as implementation of the sale of new vehicles with BS VI technology from April 2020 is mandatory for pan India. Also BS VI fuel will be available country-wide from April 2020. Some of the UP cities are part of NCR have already started dispensing BS VI fuel.

Graph: Reduction target of PM10 based on the last three year average PM10 concentration for cities in UP

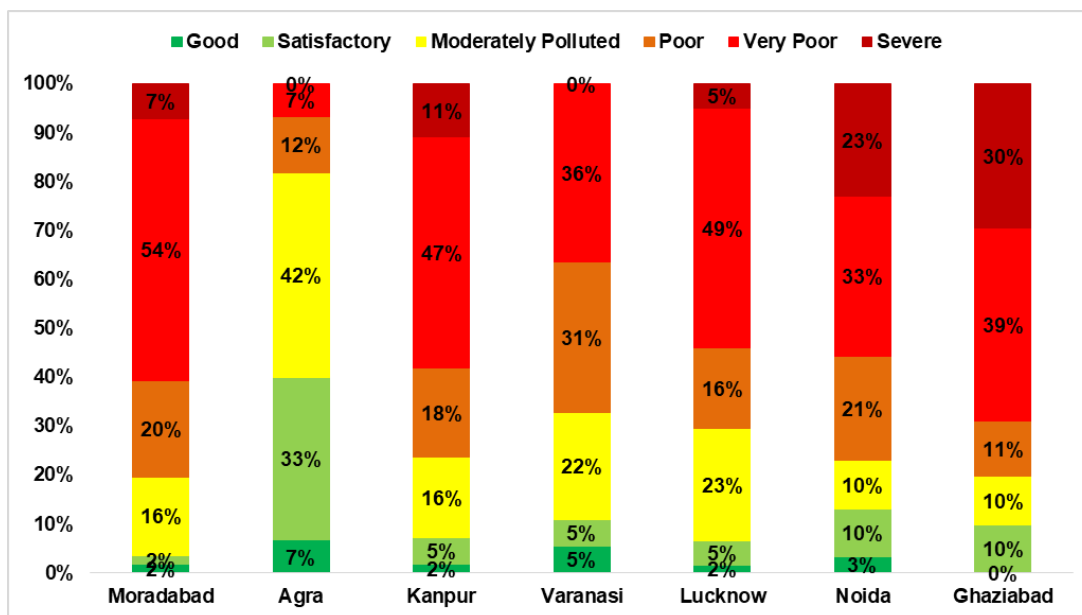


Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Note: *Data is taken for the years 2015-17 and for the rest the three year average is considered for the years 2016-18

** Meerut is not the part of the non-attainment cities in UP

Graph: Categorisation of PM2.5 based on AQI categories for the period October- November 2019



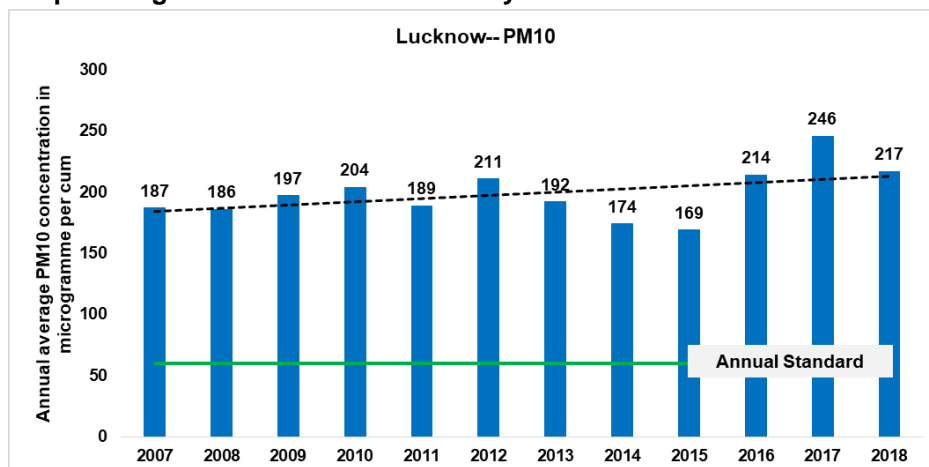
Source: CSE's analysis based on the air quality data available on CPCB website for real-time monitoring stations

- Cities in UP experiences very less number of good days with the onset of winter.
- Cities in NCR region fared the worst
- Approximately, 90 per cent of the days PM2.5 has violated the standard in these cities during the period October- November 2019.

Air quality profile and action status in selected cities of Uttar Pradesh

Lucknow

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Air Pollution	The Lucknow Trade Board (LTB) distributed masks to people in prominent areas of Lucknow after the air in the state capital continued to remain toxic in winters. The police in Lucknow, with the help of Regional Transport Office (RTO), is seizing diesel vehicles billowing out heavy smoke. ^{cdxix}
Industry	The Uttar Pradesh Pollution Control Board (UPPCB) recently issued notices to about 100 manufacturing units in Lucknow for polluting the air with dust particles and other pollutants. At the same time penalties are being imposed on repeat offenders. ^{cdxx}
Household Energy	State Level: As per the 4 th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel. ^{cdxxi} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture. ^{cdxxii}
Waste Burning	Stubble burning has been banned in the state, according to State environment minister Dara Singh Chauhan. ^{cdxxiii}
Monitoring and Graded Response action plan	Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 5 NAMP (manual stations)- 8 stations in Lucknow
Non-Motorized Transport	Cycle tracks constructed ^{cdxxiv} (2015)
	State Level Policy:

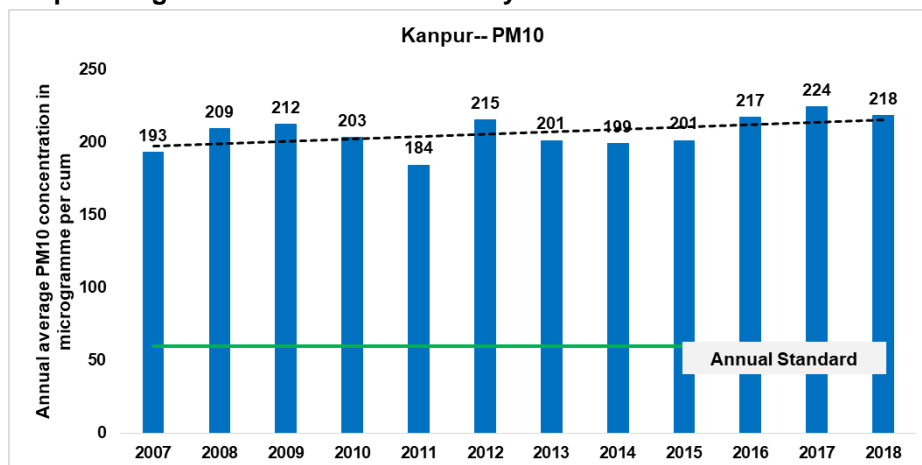
Sector-wise measures implemented	Initiatives undertaken
Vehicles and Traffic management	Green tax on all vehicles which have completed 15 years ^{cdxxv} (2015)
	City: Pelican crossing for interconnecting parks in begum hazrat area under Smart City initiative ^{cdxxvi} (2017)
	City: Integrated Traffic Management System launched ^{cdxxvii} (2019)
Public transport	City: Lucknow City Bus Services started (2005)
	City: 300 CNG buses bought ^{cdxxviii} (2010)
	City: Final Comprehensive Mobility Plan submitted ^{cdxxix} (2012)
	City: Lucknow metro Rail Corporation created (2013)
	City: Construction for metro begins ^{cdxxx} (2014)
	City: 40 buses and 11 new routes added ^{cdxxxii} (2015)
	City: Metro Phase I completed and trial run initiated ^{cdxxxiii} (2016)
	City: 16 'smart' bus shelters to be constructed under Area based development ^{cdxxxiv} (2017)
	City: RFP for 'Design, Build, Finance, Operate and Transfer (DBFOT) basis for Bus Shelters in Lucknow on PPP ^{cdxxxv}
	City: Alambagh bus terminal connected with metro inaugurated ^{cdxxxvi} (2018)
Electric Vehicle Policy	City: Bus feeder services introduced to connect outskirts to metro station ^{cdxxxvii}
	UPSRTC to deploy 200 CNG buses in Lucknow ^{cdxxxviii} (2019)
	City: Ola launches e-rickshaws ^{cdxxxix} (2016)
	City: e-rickshaws banned on 36 routes ^{cdxxxix} (2018)
	State Level Policy: Draft EV policy introduced ^{cdxl} (2019) No registration fees and road tax for One lakh consumers under EV policy ^{cdxl} Target of 2 lakh charging stations and deploying 1000 buses by 2024 ^{cdxl}

Sector-wise measures implemented	Initiatives undertaken
	<p>UPEIDA issues EoI for charging infrastructure ^{cdxli}</p> <p>City: Lucknow is a model electric mobility city under EV policy ^{cdxli} 100 buses of 700 e-buses bid for to run in Lucknow ^{cdxlii}</p>
<p>Parking</p>	<p>Request for Proposal for Selection of Developer for Installation of Smart Parking Solution with Operation & Maintenance of underground parking's at Jhandi Park, Lalbagh, Dayanidhan Park, Lalbagh and Jhandewala Park, Aminabad in Lucknow on Design, Build, Finance, Operate and Transfer (DBFOT) basis under PPP mode^{cdxliii} (2017)</p>

Kanpur

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of actions taken till date

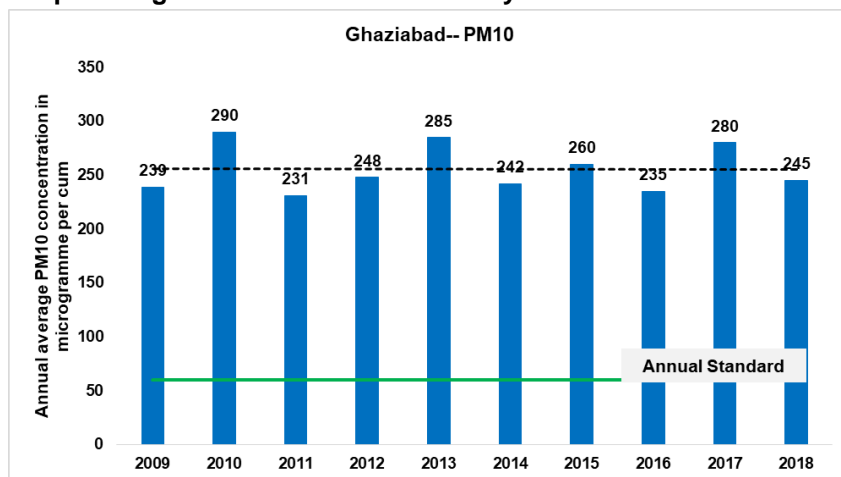
Sector-wise measures implemented	Initiatives undertaken
Air Pollution monitoring	In Kanpur, there is 1 continuous air monitoring station (CAAQMS) reporting data for all the criteria pollutants and 8 manual stations reporting data on PM10, SO2, and NO2. ^{cdxliv}
Air Pollution	<p>By 2030, the share of emissions from residential cooking and lighting is expected to decrease with a greater share of LPG, residential electrification, and increasing urbanization. However, biomass and coal burning to provide warmth in the winter will still be an issue</p> <p>By 2030, the vehicle exhaust emissions are expected to remain constant, if and only if, Bharat 6 fuel standards are introduced nationally in 2020, as recommended by the Auto Fuel Policy. ^{cdxlv}</p> <p>Under the NCAP, funds have been released for Kanpur to keep a tab on air pollution. ^{cdxlvi}</p>
Industry	Most of the small and the medium industry needs an energy efficiency management plan to address the emissions from coal, heavy fuel oil, and gas combustion or shift towards using electricity. ^{cdxlvii}
Household Energy	<p>State Level:</p> <p>As per the 4th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel. ^{cdxlviii} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture. ^{cdxlx}</p>

Sector-wise measures implemented	Initiatives undertaken
Vehicles and Traffic management	State Level Policy: Green tax on all vehicles which have completed 15 years (2015)
	City: Integrated Traffic Management System inaugurated ^{cdl} (2018)
Public transport	City: Kanpur City Transport Service Ltd. Established and introduces 270 city buses ^{cdli}
	300 CNG buses bought by UPSRTC for Kanpur ^{cdlii} (2010)
	City: UPSRTC to deploy 150 CNG buses in Kanpur ^{cdliii} Kanpur metro construction commences ^{cdliv} (2019)
Electric Vehicle Policy	State Level Policy: Draft EV policy introduced ^{cdxl} No registration fees and road tax for One lakh consumers under EV policy ^{cdxl} Target of 2 lakh charging stations and deploying 1000 buses by 2024 ^{cdxl} UPEIDA issues EoI for charging infrastructure ^{cdxli} City: Kanpur is a model electric mobility city under EV policy ^{cdxl} 100 buses of 700 e-buses bid for to run in Kanpur ^{ccxiv} (2019)
Road	Request for proposal (re-tender) smart road development work for 2.3 km Phool Bhag stretch (road improvement & maintenance, pedestrian infrastructure & street furniture, cycle track, urban node and utility conduits) at Kanpur ^{cdlv} (2019)
Parking	Multi-level parking to come up in Naveen market ^{cdlvi} (2015)

Ghaziabad

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	<p>The NGT on December 4 directed the Uttar Pradesh Pollution Control Board (UPPCB) to ensure that M/s Medicare Environmental Management Pvt Ltd at the Uttar Pradesh State Industrial Development Corporation, Masoori, Ghaziabad, comply with environmental norms.</p> <p>The order came in the wake of allegations that the facility was disposing infected bio-medical waste, discharging untreated hazardous effluents and causing air pollution.</p> <p>A joint report of the district magistrate, Ghaziabad, Central Pollution Control Board and UPPCB acknowledged the environmental violations and recommended action to be taken, which included imposition of environmental compensation of Rs 75,000 and prosecution to be initiated against the facility under the Water Act, 1974.^{cdlvii}</p>
Household Energy	<p>State Level:</p> <p>As per the 4th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel.^{cdlviii} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture.^{cdlix}</p>
Construction & Demolition Waste	<p>Construction ban on around 100 under-construction projects.^{cdlx}</p>

Graded response action plan	Basic pollution abatement measures such as road sweeping and water sprinkling to tackle dust have been done. ^{cdlxi}
Monitoring and Graded response action plan	Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 4 NAMP (manual stations)- 4
Vehicles and Traffic management	State Level Policy: Green tax on all vehicles which have completed 15 years (2015)
	City: NGT order to de-register more than 10 year old diesel vehicles and 15 year old petrol vehicles ^{cdlxii} (2017)
	State Level Policy: Government of Uttar Pradesh plans to implement Integrated Traffic Management System (ITMS) in 12 districts of Uttar Pradesh in a phased manner and for this Rs 50 crores has been provided by the state government in the budget. Ghaziabad and Noida are the selected cities from Delhi-NCR for the implementation of ITMS. City: Ghaziabad has started work of implementation of ITMS Ghaziabad Development Authority released its tender for selection for implementation agency ITMS on 8 the March 2019 and the bidding is in process. RTO deregisters 82000 vehicles in accordance with NGT order ^{cdlxiii} (2019)
Public transport	City: Vaishali metro starts operation as DMRC connects Delhi to Ghaziabad ^{cdlxiv} (2011)
	City: The Request for Proposal (RFP) for the selection of operator/s for procurement, operation, and management of AC Midi Electric Buses on Gross Cost Contract was released in September 2018 with an estimated cost of the project in between 80-90 Rs crore. UPSRTC to allot 100 CNG buses to Ghaziabad ^{cdlxv} (2018)
	City: The Ghaziabad Development Authority provided parking space for buses at Old Bus Stand, New Bus stand and Anand Vihar. The current bus fleet in Ghaziabad is 160 buses running on 16 routes. A court case is pending in Uttar Pradesh High Court regarding the questioning of the city bus service scheme in Ghaziabad. If bus permit gets canceled, then there would not be any city bus service in Ghaziabad. UPSRTC to introduce 200 buses in Ghaziabad ^{cdlxvi}

	(2019) DMRC extends red line to Ghaziabad ISBT (Shaheed Sthal) ^{cdlxvii}
Electric Vehicle Policy	City: Registration of e-rickshaws begins ^{cdlxviii} (2015)
	City: DMRC launches e-rickshaw service for last-mile connectivity ^{cdlxix} (2017)
	State Level Policy: Draft EV policy introduced ^{cdxl}
	No registration fees and road tax for One lakh consumers under EV policy ^{cdxl}
	Target of 2 lakh charging stations and deploying 1000 buses by 2024 ^{cdxli} UPEIDA issues EoI for charging infrastructure ^{cdxli} City: Ghaziabad is a model electric mobility city under EV policy ^{cdxli} 100 buses of 700 e-buses bid for to run in Ghaziabad to be run on 12 routes ^{ccxiv} 6 routes finalized for 50 buses ^{cdlxx} GMC has earmarked a 20,000 sqm land in Hindon Vihar to build charging depot ^{cdlxx} Ghaziabad to get electric autos ^{cdlxxi} (2019)
Roads	Ghaziabad Development Authority constructed footpath on Rajnagar main road and Ambedkar road
	Ghaziabad Development authority had asked Central Road Research Institute (CRRI) to prepare a traffic management plan for Ghaziabad city (hasn't been submitted) (2018)
Parking	Ghaziabad Development Authority to develop multi-level parking in Indirapuram ^{cdlxxii} (2019)

Noida

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
<p>Air Pollution^{cdlxxiii}</p>	<p>The pollution control board and Uttar Pradesh government has issued guidelines for reducing air pollution in the region.</p> <ul style="list-style-type: none"> • People are urged to adopt clean technology in the manufacture of biogas, energy, compost, electricity, building materials (bricks, cement, tiles, plasterboards, etc.) and other products by recycling waste and fly ash generated from industries and other sources. • Transport drivers have been directed to properly maintain their vehicles and keep checking the carburetor and emissions from time to time. • In place of chemical fertilizers, suggestions have been made to adopt organic fertilizers, etc.
<p>Household Energy</p>	<p>State Level: As per the 4th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel.^{cdlxxiv} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling potential for positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture.^{cdlxxv}</p>
<p>Construction & Demolition waste and road dust^{cdlxxvi}</p>	<p>In a statement, the Noida Authority said penalties amounting to Rs 5.05 lakh were imposed on those found keeping construction material uncovered, in violation of the law. The district administration and the local authorities carried out water sprinkling on the roads to check dust, as the region grappled with a "public health emergency".</p> <p>It had also banned construction activities and bursting of firecrackers, and ordered shutting down of the dirty fuel-based industries, among others, till November 5, 2019. On November 4 night, the EPCA extended the ban till November 8, 2019.</p>
<p>Monitoring and Graded Response action plan</p>	<p>Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 4 in Noida and 2 in Greater Noida NAMP (manual stations)- 4 in Noida and 2 in Greater Noida</p>
<p>Vehicles and Traffic Management</p>	<p>State Level Policy: Green tax on all vehicles which have completed 15 years (2015)</p> <p>City: NGT order to de-register more than 10 year old diesel vehicles and 15 year old petrol vehicles^{cdlxxvii} (2017)</p> <p>City: Government of Uttar Pradesh plans to implement Integrated Traffic Management System (ITMS) in 12 districts of Uttar Pradesh in a phased manner and for this Rs 50 crores has been provided by the state</p>

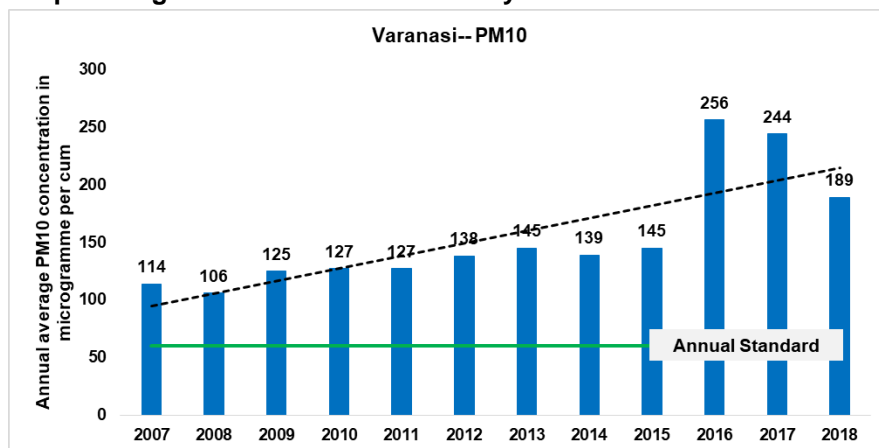
Sector-wise measures implemented	Initiatives undertaken
	<p>government in the budget. Ghaziabad and Noida are the selected cities from Delhi-NCR for the implementation of ITMS.</p> <p>Plan to introduce Adaptive Traffic Control System (ATCS) ^{cdlxxviii} (2019)</p>
Public transport	Noida sector-15 connected to Delhi by DMRC (2009)
	Noida Metro Corporation begins work on Aqua line connecting Noida and Greater Noida
	Work on Noida Sector-82 bus terminus begins (2015)
	<p>City: Noida Metro Rail Corporation (NMRC) has started the operations of city buses at Noida and Greater Noida from 14 December, 2016 ^{cdlxxix} (2016)</p>
	<p>City: Noida to get 150 roadway CNG buses from UPSRTC^{cdlxxx} (2018)</p>
	<p>City: A Gross Cost Contract was signed with M/S Empire Transport Services Limited for procurement of 100 AC low floor CNG buses. In the first phase, 50 ACCNGs on 11 routes Low floor buses are being operated.</p> <p>Aqua Line of Noida metro inaugurated in January^{cdlxxxi}</p> <p>Extension approved in December</p> <p>Noida Metro Rail Corporation has introduced 16 new routes for its feeder bus service to cater to all the operational metro stations on the Aqua Line in Noida and Greater Noida. 50 feeder buses will be plying on these new routes that will replace 13 old operational routes.^{cdlxxxii}</p> <p>Sector-82 bus terminus almost completed^{cdlxxxiii} (2019)</p>
Electric Vehicle Policy	<p>City: Registration of e-rickshaws begins^{cdlxxxiv} (2015)</p>
	<p>City: DMRC launches e-rickshaw service for last-mile connectivity^{cdlxxxv} (2017)</p>
	<p>State Level Policy: Draft EV policy introduced ^{cdxl}</p>
	<p>No registration fees and road tax for One lakh consumers under EV policy ^{cdxl}</p>
	<p>Target of 2 lakh charging stations and deploying 1000 buses by 2024^{cdxl}</p> <p>UPEIDA issues EoI for charging infrastructure ^{cdxli}</p> <p>City: Noida is a model electric mobility city and pilot will be started here under EV policy ^{cdxl} (2019)</p>

Sector-wise measures implemented	Initiatives undertaken
Roads	Noida Development Authority had issued construction of Sector 52/71 underpass along MP Road 3 in November 2018. A developer for carrying out the project work was also hired but due to the model code of conduct, work on the project was put on hold. (2018)

Varanasi

Long term trend in particulate pollution

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Waste Management	Varanasi generates 650 metric tonnes of solid waste per day – most of which is dumped in landfills. The government has recently announced that waste will be processed in a treatment plant at Karsara. The efficient operation of which still needs to be seen once it begins. The city's infrastructure is inadequate to keep up with the increase in population and visitors, especially with the solid waste management. Much of the waste is either burnt, or dumped in landfills or the river. ^{cdlxxxvi}
Household Energy	State Level: As per the 4 th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel. ^{cdlxxxvii} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling potential for positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture. ^{cdlxxxviii}
Vehicular emissions	By 2030, the vehicle exhaust emissions are expected to remain constant, if and only if, Bharat 6 fuel standards are introduced nationally in 2020, as recommended by the Auto Fuel Policy. ^{cdlxxxix}
Monitoring and Graded response action plan	Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 1 (delayed) NAMP (manual stations)- 5 stations
Electric Vehicle Policy	Varanasi is a model electric mobility city under EV policy and 50 electric buses to be introduced ^{cdl}

Jhansi

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Air pollution	Jhansi has been asked to submit their reports on the burning of crop residue—one of the biggest causes of air pollution in the country. ^{cdxc}
Vehicular emissions	The UP Government has decided to introduce battery-driven electric buses. 25 buses will be introduced in Jhansi. ^{cdxci}
Household Energy	State Level: As per the 4 th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel. ^{cdxcii} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture. ^{cdxciii}
Monitoring and Graded response action plan	Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 0 NAMP (manual stations)- 2

Khurja

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	<p>The National Green Tribunal has directed Uttar Pradesh Pollution Control Board (UPPCB) to close ceramic industries operating without approval and not adhering to mandatory pollution norms in Khurja city.</p> <p>The green panel also directed the UPPCB to prosecute ceramic industries, which have failed to comply with the Environment Protection Act, 1986 and take penal action against them.^{cdxciv}</p>
Household Energy	<p>State Level: As per the 4th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel.^{cdxcv} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture.^{cdxcvi}</p>
Vehicular emissions	<p>The 340-km stretch of Bhaupur-Khurja patch on the Eastern Dedicated Freight Corridor is climate-smart and will reduce carbon emissions and also unclog the roads. It was scheduled to be operational by December, 2018.^{cdxcvii}</p>
Monitoring and Graded response action plan	<p>Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 0 NAMP (manual stations)- 2 stations</p>

Moradabad

Status of actions taken till date

Sector-wise measures implemented	Initiatives undertaken
Industry	<p>The Uttar Pradesh Pollution Control Board (UPPCB) has put fines on the Moradabad coal factories that were operating without pollution control systems.</p> <p>The UPPCB recently conducted surveys in order to identify the factories breaking the pollution parametres. A total of 100 coal units were under the lens, out of which the pollution body shut down 80 factories earlier this week, slapping a ₹1.75 crore fine on them.^{cdxcviii}</p>
Household Energy	<p>State Level:</p> <p>As per the 4th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel.^{cdxcix} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture.^d</p>
Waste burning	<p>In an attempt to purify the air in the district, the Moradabad civic body has been ensuring no municipal waste is burned, and legal action is taken against the violators.^{di}</p>
Construction and demolition dust	<p>The district administration has also been spraying water across the city, while keeping an eye out for illegal construction activities.^{dii}</p>
Air pollution	<p>As per Order of the National Green Tribunal regarding air pollution in Muradabad City, Uttar Pradesh, 27/11/2017, State of Uttar Pradesh and Uttar Pradesh Pollution Control Board submit that they will do every possible preventive and precautionary measures to ensure that the ambient air quality in Muradabad City meets the prescribed standards or at least is not of seriously polluting or hazardous.^{diii}</p>
Monitoring and Graded response action plan	<p>Strengthening of AAQ Monitoring.</p> <p>Current number of monitoring stations: CAAQMS – 1 (inactive) NAMP (manual stations)- 2</p>

Rae Bareli

Status of actions taken till date

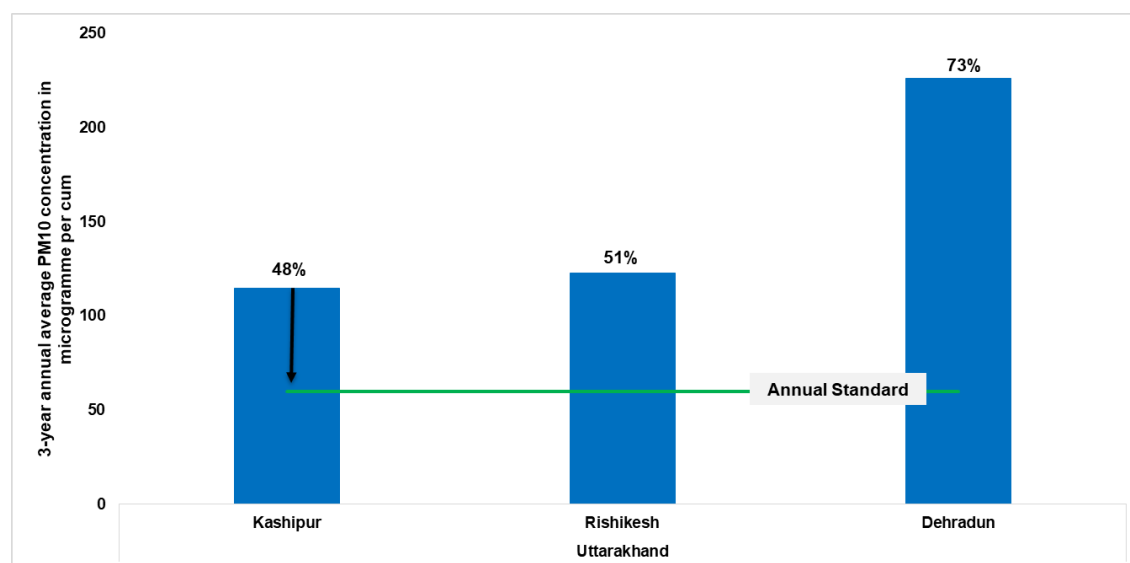
Sector-wise measures implemented	Initiatives undertaken
Air Quality Monitoring	Currently there are no Air Quality Monitoring Stations at Rae Bareli. ^{dvi}
Industry	Ambient Air is being monitored regularly by the State Board. At source emission monitoring i.e. stack monitoring of industries is also being done regularly and action is being taken accordingly on the basis of analysis report. If any industry is found violating the standards firstly show-cause notice is issued to the industry followed by closure under Air (Prevention and Control of Pollution) Act, 1981. ^{dv}
Household Energy	State Level: As per the 4 th round of National Family Health Survey (2015-16), 32.70% of respondents were using clean cooking fuel. ^{dvi} Under the Pradhan Mantri Ujjwala Yojana introduced in May 2016, 1,00,96,085 have got an LPG connection by 31.12.2018. Out of these 85 % came back for one refill, signalling a potential for a positive impact on indoor air quality. However, subsequent refill data should be tracked for a more complete picture. ^{dvii}
Monitoring and Graded response action plan	Strengthening of AAQ Monitoring. Current number of monitoring stations: CAAQMS – 2 NAMP (manual stations)- 3 stations

Uttarakhand

Tracking particulate pollution and action in cities of Uttarakhand

The current state of air pollution in Uttarakhand was tracked from the clean air action plans, government websites, reports and recent media reports. Latest developments include strengthening of air pollution monitoring, abatement strategies, policy updates and proposed technological advancements. Interventions across all sectors, that are in the public domain have been collated for the preparation of this brief. Uttarakhand has two non-attainment cities (Kashipur and Rishikesh) based on the respective PM10 concentration in those cities. This brief discusses Kashipur, Rishikesh and Dehradun. Some of the actions mentioned, such as such as implementation of the sale of BS VI vehicles from April 2020 is mandatory for pan India. BS VI fuel will be available country-wide from April 2020.

Graph: Reduction target of PM10 based on the last three year average PM10 concentration for cities in Uttarakhand



Source: CSE's analysis based on the air quality data available on CPCB Envis centre and data submitted to Lok Sabha (base year taken as 2015-17)

Status of Actions in selected cities Uttarakhand

Dehradun^{dviii}

Sector-wise measures implemented	Initiatives undertaken
Industry	Appropriate siting of high air pollution potential activities
Household Energy	Under the PMUY, 2,74,256 domestic LPG connections were issued till the end of December 2018. Out of these, 88% came back for a refill ^{dix} . This will potentially lead to betterment in indoor air quality. As per the 4th round of National Family Health Survey (2015-16), 51% of consumers were using clean cooking fuel ^{dx} .
Vehicular Emissions	The authorities are required to check vehicular pollution in the city of buses and autos which run on diesel.

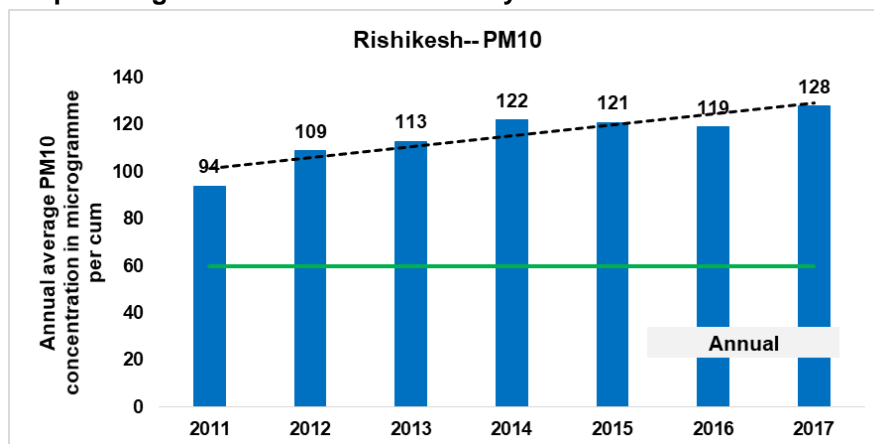
Sector-wise measures implemented	Initiatives undertaken
	<p>Monitoring of diesel-run vehicles for public transport which are used should be monitored periodically.</p> <p>Reduce total vehicular trip by promoting walking/cycling through a network of infrastructure.</p> <p>To control pollution caused by motorized vehicles plying in the state.</p>
Construction and Demolition waste and Dust	<p>Implemented night-time sweeping and use of dust abatement techniques.</p> <p>Construction sites to follow guidelines for dust management strictly.</p> <p>Water sprinkling on the roads should done to arrest the dust fly off on the major roads, like Rajpur road, Raipur road, Clock tower to FRI road and secretariat road.</p>
Waste Burning	<p>No waste burning and penalty for non-compliance should be enforced.</p> <p>Improve waste management and ensure strict enforcement of ban on municipal solid waste burning.</p>
Monitoring and Graded response action plan	<p>Proper location of CAAQMS should be selected to monitor PM10, PM2.5, SO2, NOx and Carbon Monoxide. Currently there are no CAAQMS and only three manual monitoring stations under the NAMP. These are located at Raipur Road, Near parag Diary, Clock Tower, PWD Guest House and at Himalaya Drug Co. Near ISBT</p> <p>To reduce the Suspended Particulate Matter & Emission of Vehicular Pollutant the Vehicles must be turned off while under idling condition at parking places.</p>
Public transport	<p>BS IV norms introduced, to be in force from 2017 dxxii (2015)</p> <p>Request for Proposal for Comprehensive Mobility Plan for Dehradun-Haridwar-Rishikesh region issued (2017)</p> <p>Request for Proposal for building interactive bus stop at various locations in Dehradun dxi (2017)</p> <p>Comprehensive Mobility Plan prepared, first phase from 2018 to 2022 Error! Bookmark not defined. (2018)</p> <p>Completion of Dehradun light mobility project report (metro) – fare fixation and route finalization under CMP dxii (2018)</p> <p>Plans to introduce ropeway transport under light mobility under consideration dxiii (2018)</p> <p>Rate of city buses reduced from Rs 85 per seat per month to Rs 50 per seat per month to promote public transport use dxxiv (2018)</p>
	<p>Induction of 50 electric buses and 10 CNG buses by 2020 dxiv (2019)</p> <p>Addition of 300 diesel buses to fleet, total fleet size at 1350 dxv (2019)</p> <p>Progress on metro project halted, may focus on ropeway transport only as per reports dxvi (2019)</p>
Electric Vehicle Policy	<p>Introduction of e-rickshaws dxvii (2017)</p> <p>Electric Vehicle Policy introduced dxviii (2018)</p> <p>Trial run of 30 electric buses between Dehradun and Mussoorie dxix dxx (2018)</p> <p>Ban on e-rickshaws on 8 major roads dxvii (2019)</p>
Vehicles, Traffic management	<p>Entry tax on out of state motor vehicles dxxi (2012)</p> <p>BS IV norms introduced, to be in force from 2017 dxxii (2015)</p> <p>Electric Vehicle Policy introduced dxxiii (2018)</p> <p>Motor vehicles tax rates increased dxxiv (2018)</p>

Sector-wise measures implemented	Initiatives undertaken
and emissions	Green tax on diesel vehicles more than petrol, CNG/ electric vehicles exempted ^{dxxiv} (2018) High Court order to make pavements encroachment free ^{dxxv} (2018) Ban on more than 15 year old diesel vehicles ^{dxxvi} (2019)
Roads	Construction of LED lit 'smart roads' under Smart cities mission ^{dxxvii} (2019)
Parking	Smart parking facility in Dehradun made functional ^{dxxviii} (2019) Development of parking policy announced for Mussoorie, to be constructed near JB bend and PWD guesthouse along with free e-rickshaw travel for tourists ^{dxxix} (2019)

Rishikesh

Long trend in particulate pollution

Graph: Long-term PM10 trend in the city



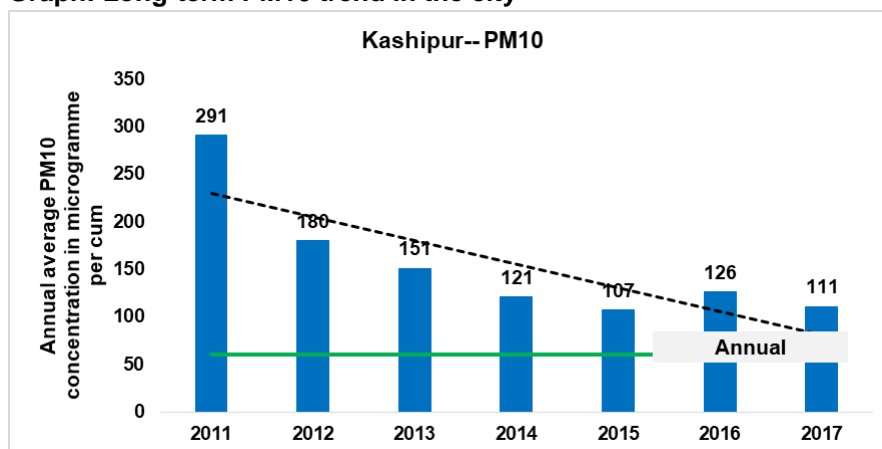
Source: CSE's analysis based on the air quality data available on CPCB Envis centre

Status of actions for clean air and other mobility initiatives^{dxxx}

Sector-wise measures implemented	Initiatives undertaken
Vehicular Emissions and Public Transport	Restriction on plying and phasing out of 15 years old commercial diesel driven vehicles. ^{dxxx} Use of cleaner fuels (CNG/LPG) for commercial vehicles. Regular checking of vehicles and Establishment of adequate number of Pollution Checking Centres to issue PUC (Pollution Under Control Certificate). ^{dxxxii} Increase in Penalty of Rs 1000 to Rs 5000 in case of violation of PUC.
Industry	Restriction of new industries which are based on Solid fuel like wood and coke.
Household Fuel	Under the PMUY, 2,74,256 domestic LPG connections were issued till the end of December 2018. Out of these, 88% came back for a refill ^{dxxxiii} . This will potentially lead to betterment in indoor air quality. As per the 4th round of National Family Health Survey (2015-16), 51% of consumers were using clean cooking fuel ^{dxxxiv} .
Construction and Demolition waste and Road Dust	Daily cleaning of road dust. Tree plantation along the roads. Development of green belt in open areas, gardens, parks/ community places, schools & housing societies.
Waste Burning	Restriction on open burning of municipal solid waste, Biomass, plastic, horticulture waste etc. Transportation of municipal solid wastes, construction materials and debris in covered system.
Monitoring and Graded response action plan	Installation of CAAQMS is in the pipeline as currently there are none. There is one manual monitoring station at Nagar Palika Parishad under the NAMP.

Sector-wise measures implemented	Initiatives undertaken
	<p>The city aims to increase the number of Manual Ambient Air Quality Station from 01 to 03.</p> <p>Carry out a proper source apportionment study.</p> <p>Compliance of guidelines on D.G. sets regarding use of retrofitted emission control system (PM captured efficiency 70%) capacity equal to or above 800 KW</p>
Public Transport	<p>Request for Proposal for Comprehensive Mobility Plan for Dehradun-Haridwar-Rishikesh region issued Error! Bookmark not defined.(2017)</p> <p>Comprehensive Mobility Plan prepared, first phase from 2018 to 2022 Error! Bookmark not defined.(2018)</p> <p>Rate of city buses reduced from Rs 85 per seat per month to Rs 50 per seat per month to promote public transport use dxxiv(2018)</p>
Electric Vehicles	<p>Electric Vehicle Policy introduced^{dxxviii}(2018)</p> <p>Induction of 50 electric buses and 10 CNG buses by 2020 ^{dxxv}(2019)</p> <p>Promotion of e-rickshaws and operationalization announced under CAAP^{dxxxvi}(2019)</p>
Vehicles, Traffic management and emissions	<p>BS IV norms introduced, to be in force from 2017 ^{dxxii}(2015)</p> <p>Motor vehicles tax rates increased ^{dxxiv}(2018)</p> <p>Green tax on diesel vehicles more than petrol, CNG/ electric vehicles exempted ^{dxxiv}(2018)</p> <p>Addition of 300 diesel buses to fleet, total fleet size at 1350 ^{dxxv}(2019)</p> <p>Inter-state Bus Terminal to be constructed at Kaleshwar near Rishikesh^{dxxxv}(2019)</p> <p>Ban on more than 15 year old diesel vehicles ^{dxxvi}(2019)</p> <p>Increase in Penalty of Rs 1000 to Rs 5000 in case of violation of Pollution Under Control Certificate (under Clean Air Action Plan)^{dxxxvi} (2019)</p>

Graph: Long-term PM10 trend in the city



Source: CSE's analysis based on the air quality data available on CPCB Envis centre

Status of actions for clean air in Kashipur and other mobility initiatives

Sector-wise measures implemented	Initiatives undertaken
Industry	<ol style="list-style-type: none"> Adoption of cleaner fuel in the industries ^{dxxxviii} Restriction of new industries which are based on Solid fuel like wood and coke Phase out of Wood and Pet coke from industries
Household Fuel	Under the PMUY, 2,74,256 domestic LPG connections were issued till the end of December 2018. Out of these, 88% came back for a refill ^{dxxxix} . This will potentially lead to betterment in indoor air quality. As per the 4th round of National Family Health Survey (2015-16), 51% of consumers were using clean cooking fuel ^{dxl} .
Vehicular Emissions and Public Transport	<ol style="list-style-type: none"> Restriction on plying and phasing out of 15 years old commercial diesel driven vehicles. Introduction of cleaner fuels (CNG/LPG) for commercial vehicles. Regular checking of vehicles and Establishment of adequate number of Pollution Checking Centres to issue PUC (Pollution Under Control Certificate).^{dxli} Increase in Penalty of Rs 1000 to Rs 5000 in case of violation of PUC.
Construction And Demolition waste and Road Dust	<ol style="list-style-type: none"> Daily cleaning of road dust. Tree plantation along the roads, development of green belt in open areas, gardens, parks/ community places, schools & housing societies.
Waste Burning	<ol style="list-style-type: none"> Restriction on open burning of municipal solid waste, Biomass, plastic, horticulture waste etc. Ensuring promotion & use of cleaner fuel for commercial purposes like local Dhaba/ eateries. Prevention of open burning of Agriculture Residue.^{dxlii}

Sector-wise measures implemented	Initiatives undertaken
Monitoring and Graded response action plan	<ol style="list-style-type: none"> 1. Installation of CAAQMS is in the pipeline as currently there are none. There is one manual monitoring station at the Government Hospital Campus. The aim is to increase the Number of Manual Ambient Air Quality Station from 01 to 03. 2. Carry out a Source apportionment study. 3. Compliance of guidelines on diesel generated sets regarding use of retrofitted emission control system (PM captured efficiency 70%) capacity equal to or above 800 KW.
Public Transport	<p>Comprehensive Mobility Plan prepared, first phase from 2018 to 2022Error! Bookmark not defined.(2018)</p> <p>Rate of city buses reduced from Rs 85 per seat per month to Rs 50 per seat per month to promote public transport use dxxiv(2018)</p> <p>Induction of 50 electric buses and 10 CNG buses by 2020 ^{dxxv}(2019)</p> <p>Addition of 300 diesel buses to fleet, total fleet size at 1350 ^{dxxv}(2019)</p>
Electric Vehicles	<p>Electric Vehicle Policy introduced^{dxxviii}(2018)</p> <p>Promotion of e-rickshaws and operationalization announced under CAAP^{dxxliii}(2019)</p>
Vehicles, Traffic management and emissions	<p>BS IV norms introduced, to be in force from 2017 dxxii</p> <p>Motor vehicles tax rates increased (2018)</p> <p>Green tax on diesel vehicles more than petrol, CNG/ electric vehicles exempted dxxiv(2018)</p> <p>Ban on more than 15 years old diesel vehicles ^{dxxvi}</p> <p>Increase in Penalty of Rs 1000 to Rs 5000 in case of violation of Pollution Under Control Certificate (under Clean Air Action Plan)^{dxxliii} (2019)</p>

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^{dxix} Jha P. (2019). Dehradun gets Uttarakhand's first smart parking facility. Accessed at <https://timesofindia.indiatimes.com/city/dehradun/city-gets-states-first-smart-parking/articleshow/67714139.cms> on 4.12.2019

^{dxxxix} Times of India (2019). Mussoorie's parking problem will soon be over: CM. Accessed at <https://timesofindia.indiatimes.com/city/dehradun/mussoories-parking-problem-will-soon-be-over-cm/articleshow/71997895.cms> on 4.12.2019

^{dxxxx} Rishikesh City Air Action Plan prepared by Uttarakhand Environment Protection And Pollution Control Board (pg.8-11) http://ueppcb.uk.gov.in/files/Rishikesh_Approved_Action_Plan.pdf

^{dxxxxi} Presently 3098 commercially driven Diesel Vehicles and this number will increase up to 3197 in next 05 year. However, Ban on diesel driven vehicles is under the preview of the Central Government.

^{dxxxxii} Present numbers of PUC checking centres are 10. These numbers of PUCs will be increased up to 20. Every year at least 10% of vehicles will be challaned. It is policy of Transport Department to allow to run PUC centres at no cost if the person willing to do it with its own resources. Transport Department will make it mandatory that the all Government Departments must have to have their vehicles checked and get PUC in time. Also, surveillance will be increase. After increase in demands, the number of PUC centres will automatically be increased. Transport Department will also do the vehicle cheeking by Mobile Laboratories. Which are to be procured.

^{dxxxxiii} Ministry of Petroleum and Natural Gas (2019). Pradhan Mantri Ujjavala Yojana website: Refill data. Accessed at <https://pmuy.gov.in/registereduser.html> on 16.12.2019

^{dxxxxiv} NITI Aayog (2018). SDG Index India, Baseline Report : 2018. Accessed at http://niti.gov.in/writereaddata/files/SDX_Index_India_21.12.2018.pdf on 16.12.2019

And International Institute for Population Sciences (IIPS) and ICF. 2017.National Family Health Survey (NFHS-4), India, 2015-16: Bihar. Mumbai: IIPS. Accessed at <http://rchiips.org/nfhs/NFHS-4Reports/India.pdf> on 16.12.2019

^{dxxxxv} Gaurav Talwar (2019). ISBT to come up at Kaleshwar. Accessed at <https://timesofindia.indiatimes.com/city/dehradun/ISBT-to-come-up-at-Kaleshwar/articleshow/53512227.cms> on 10.12.2019

^{dxxxxvi} Uttarakhand Pollution Control Board (2019). Rishikesh Clean Air Action Plan. Accessed at http://ueppcb.uk.gov.in/files/Rishikesh_Approved_Action_Plan.pdf on 10.12.2019

^{dxxxxvii} Kashipur City Air Action Plan prepared by Uttarakhand Environment Protection And Pollution Control Board (pg. 8-11) http://ueppcb.uk.gov.in/files/Kashipur_Approved_Action_Plan.pdf

^{dxxxxviii} India gets its first 2G Ethanol plant in Uttarakhand – Economic Times – 22nd April 2016 http://economictimes.indiatimes.com/articleshow/51948347.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

^{dxxxxix} Ministry of Petroleum and Natural Gas (2019). Pradhan Mantri Ujjavala Yojana website: Refill data. Accessed at <https://pmuy.gov.in/registereduser.html> on 16.12.2019

^{dxl} NITI Aayog (2018). SDG Index India, Baseline Report : 2018. Accessed at http://niti.gov.in/writereaddata/files/SDX_Index_India_21.12.2018.pdf on 16.12.2019

And International Institute for Population Sciences (IIPS) and ICF. 2017.National Family Health Survey (NFHS-4), India, 2015-16: Bihar. Mumbai: IIPS. Accessed at <http://rchiips.org/nfhs/NFHS-4Reports/India.pdf> on 16.12.2019

^{dxli} Present numbers of PUC checking centres are. These numbers of PUIC will be increased up to 06. Every year at least 10% of vehicles will be challaned. It is policy of Transport Department to allow to run PUC centres at no cost if the person willing to do it with its own resources. Transport Department will make it mandatory that the all Government Departments must have to have their vehicles checked and get PUC in time. Also, surveillance will be increase. After increase in demands, the number of PUC centres will automatically be increased. Transport Department will also do the vehicle cheeking by Mobile Laboratories. Which are to be procured.

^{dxlii} At present there is a total of 15709 Hectare land in Kashipur wherein rice crop is taken in 14000 Hectare (34584 Acre) area. From the crop annually 69168 MT of straw is produced. Out of which nearly 80% was cut down and remaining 20% i.e. 13833 MT is used to burn to clear the filed. It is to be prevented from burning. Agriculture department is proposing to give funds for setting up Straw bailing machines. In Kashipur area this will cost about Rs. 32.37 lakhs funds to be given to farmers for the same.

^{dxliiii} Uttarakhand Pollution Control Board (2019). Kashipur Clean Air Action Plan. Accessed on http://ueppcb.uk.gov.in/files/Kashipur_Approved_Action_Plan.pdf on 10.12.2019