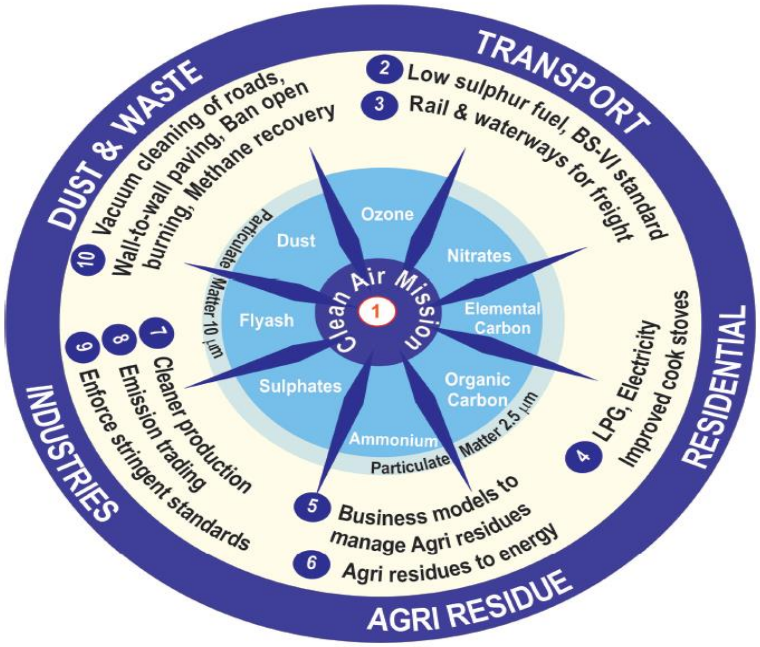
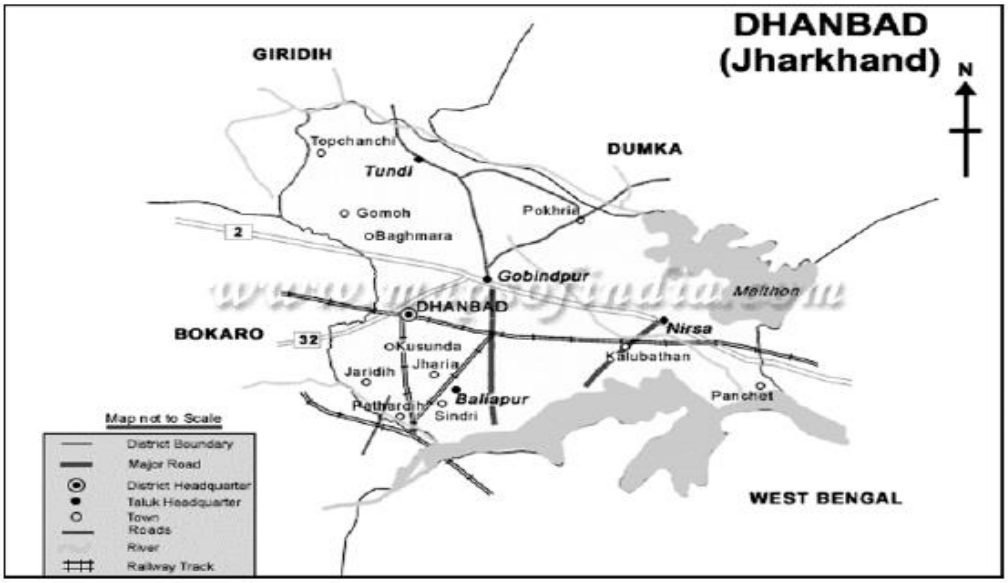
ACTION PLAN FOR
Improving Air Quality in Dhanbad





झारखण्ड सरकार

GOVERNMENT OF JHARKHAND

Introduction:

Air-borne particulate matter is an ensemble of solid particles suspended and dispersed in air. The properties of these particles vary in terms of chemical composition, morphology (size/shape) optical parameters (colour/light scattering), and electrical characteristics (charge, resistance). The particulate and gaseous wastes of various human activities e.g. burning of fossil fuels, transport, construction, mining etc. contribute various pollutants to atmosphere and when the presence of these pollutants starts affecting the human beings, plants and animals the matter becomes a cause of concern. Industrialization and urbanization have resulted in a profound deterioration of India's air quality. India's most severe environmental problem, come in several forms, including vehicular emissions and untreated industrial smoke. Apart from rapid industrialization, urbanization has resulted in the emergence of industrial centers without a corresponding growth in civic amenities and pollution control mechanisms.

Urban areas in general been experiencing a higher concentration of air pollution due to extensive vehicular movements and other activities concentrated in comparatively similar areas and the cities have been divided into four categories on the basis of exceedence factor (EF), which is the ratio of annual mean concentration of a pollutant with that of its standard.

The particulate and gaseous wastes of various human activities, e.g., burning of fossil fuels, transport, construction, mining, etc. contribute various pollutants to the atmosphere. When the presence of these pollutants starts affecting the human beings, and other biological systems the matter becomes a cause of concern. With extensive industrialization and urbanization the particulate and gaseous waste generation and their disposal in atmosphere has attracted wide attention. Urban areas have in general been experiencing a higher concentration of air pollution due to extensive vehicular movements and other activities concentrated in comparatively smaller areas and the cities have been divided into four categories on the basis of *exceedence factor (EF), which is the ratio of annual mean concentration of a pollutant with that of its limit value*. The four categories are as given below:

1. Critical pollution (C): when EF is > 1.5;
2. High pollution (H): when EF is between 1 and 1.5;
3. Moderate pollution (M): with EF is between 0.5 and 1.0; and
4. Low Pollution (L): where EF is < 0.5.

The air pollutants of immediate human concern are those which when in higher concentration affect the health and well being of the people. These are listed as below:

- Suspended Particulate Matter (SPM);
- Respirable Particulate Matter (RPM);
- Sulphur Dioxide (SO_2);
- Nitrogen Oxides (NO_x);

The Government of India on the basis of extensive studies has prescribed the *National Ambient Air Quality Standards* (NAAQS) for industrial, commercial, residential and sensitive areas (Table I).

TABLE I

National ambient air quality standards[8]

Pollutant	Time weighed average	Concentration in ambient air			
		Sensitive area	Industrial area	Residential, rural and other area	Method of measurement
(μg m^{-3})					
Sulphur dioxide	Annual[a]	15	80	60	Improved West and Gaeke method
SO_2	24 hr[b]	30	120	80	Ultraviolet fluorescence
Oxides of nitrogen	Annual[a]	15	80	60	Jacab and Hochheiser modified (Na–As method)
NO_x	24 hr[b]	30	120	80	Gas phase chemiluminescene
SPM	Annual[a]	70	360	140	High volume sampling (av. flow rate not less
	24 hr[b]	100	500	200	than 1.1 m^3 min^{-1})
RPM (size less	Annual[a]	50	120	60	Respirable
than 10 μm)	24 hr[b]	75	150	100	particulate sampler
Lead	Annual[a]	0.50	1.0	0.75	AAS method after sampling using EPM 2000 or
	24 hr[b]	0.75	1.5	1.00	equivalent filter paper

[a] Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform intervals.

[b] 24 hourly values should be met 98% of the time in a year however, 2% of the time, it may exceed but not on two consecutive days.

Air quality parameters, SPM, RPM, SO_2, and NO_X are monitored by using High Volume Samplers and Respirable Dust Samplers (Envirotech Instrument APM451) following standards procedure laid down by the Central Pollution Control Board (CPCB) in IS: 5182*(*5−7*)*.

For the study of the air pollution status along the road at the monitoring stations identified the following parameters are monitored.

The following air quality parameters were monitored:

- Suspended Particulate Matter (SPM).
- Respirable Particulate Matter (RPM).
- Sulphur Dioxide (SO_2).
- Nitrogen Oxides (NO_X).

The dust collected during monitoring of the SPM and RPM is analyzed in the laboratory using Atomic Absorption Spectrophotometer (AAS) to assess the presence and concentration of lead and other heavy metals in the dust.

Monitoring and Identification of Non-attainment Cities

According to Lancet Commission Report, the air pollution is responsible for 6.5 million (72%) of 9 million deaths per year from all type of pollutions. The Southeast Asia, which includes India, had the greatest numbers of pollution related deaths. The average life expectancy could have been 1.7 years higher, had pollution levels been less than the minimal level causing serious health loss in India.

The State Pollution Control Board is conducting the ambient air quality monitoring at identified NAMP sanctioned locations for air pollutants and is submitting the monitored data with a required frequency and interval as per CPCB monitoring guidelines i.e. 24 hourly monitoring, twice a week, having 104 monitoring in a year at each monitoring location with the monitoring interval of 8 hours for particulate matter (RSPM/PM_{10}), 24 hourly basis for micro pollutants ($PM_{2.5}$) and 4 hourly interval for gaseous pollutants (SO_2/NO_2).

On the basis of monitoring and data submission by different boards to CPCB through EDB (Environment Data Bank) under National Air Monitoring Program during the period 2011-2015, the CPCB has identified 102 cities across the country violating the standard permissible norms for RSPM (PM10) / PM2.5 during the monitoring period of entire five years and even thereafter. Among these 102 non attainment cities across the country, one (01) city of Jharkhand namely Dhanbad is having the level of air pollutants (PM10) towards higher side and has continuously violated the standard permissible limits so it is in the list of non-attainment cities. Further, the State being ecologically fragile and passing through a stage of development, the mega projects like construction of circular roads, flyovers, road widening projects, barrages, housing colonies etc. have to be taken up with precautions and stringent remedial measures to minimize air pollution during execution of such developmental projects.

Hon'ble NGT Directions:-

On the basis of news item published in the Times of India, titled as ''NCAP with multiple timelines to clean air in 102 Cities, and accordingly, the National Clean Air Program (NCAP) proposes to reduce the pollution level in 102 cities where Standards of Air Pollution are in excess in the next 10 years - 35% in the next 3 years, 50% in the next 5 years and 70-80% in the next 10 years", the Hon'ble NGT, taking cognizance of alarming situation, has issued directions dated 8/10/2018, in the matter of O.A No.681 of 2018, for preparation of appropriate Action Plan to bring the standards of air quality with in permissible norms within six months from the date of its finalization.

Non-Attainment City in Jharkhand State - Dhanbad City

Accordingly, the action plan is proposed to bring down the level of air pollutants in a required time frame in coordination with responsible implementation agencies for both the non-attainment cities identified for the State with due consideration to the Graded Response Action Plan (GRAP) points relevant to the emissions, estimated source, their level and likelihood of impact on air quality, in both the non-attainment cities. Based on present level of air pollution and trends observed in last five years, the GRAP points given below have been incorporated in the Action Plan, which include :-

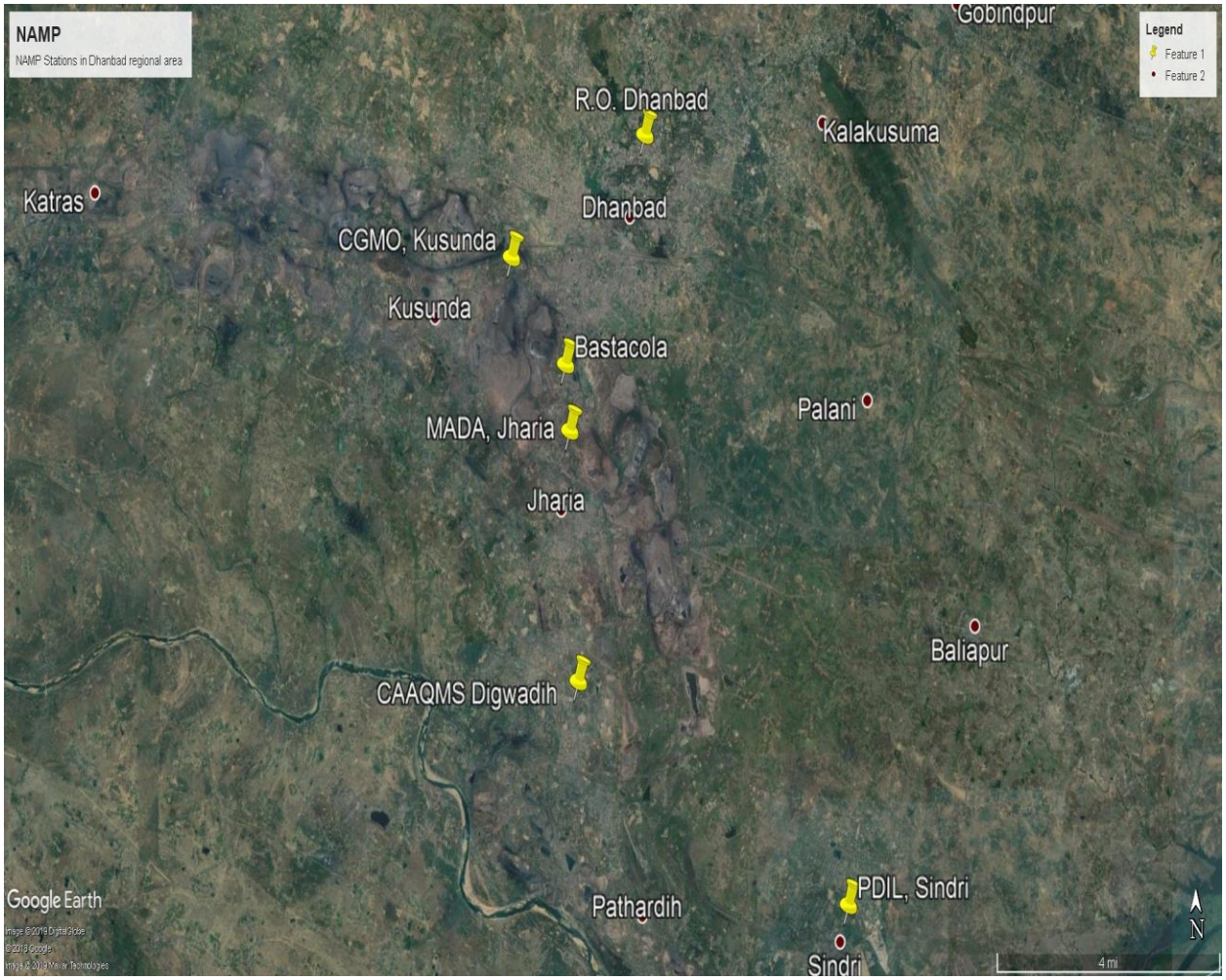
a) Periodic mechanized sweeping of roads having heavy traffic and water sprinkling on unpaved roads.
b) To stop use of diesel generator sets in case of "Emergency" status of AQI.
c) Strict vigilance and no tolerance for visible emissions, impounding or imposing heavy fine on plying of visibly polluting vehicles.
d) Strict enforcement of PUC emission norms.
e) Stringent enforcement of rules for dust control in construction activities.
f) Deployment of traffic police for smooth traffic flow at identified vulnerable traffic cross section areas.
g) Strict enforcement of Hon'ble Supreme Court directions dated 23.10.2018 on use of fire crackers.
h) Stringent enforcement of ban on open burning of garbage etc., covered movement of vehicles carrying construction material, MSW etc.

Air quality monitoring net work

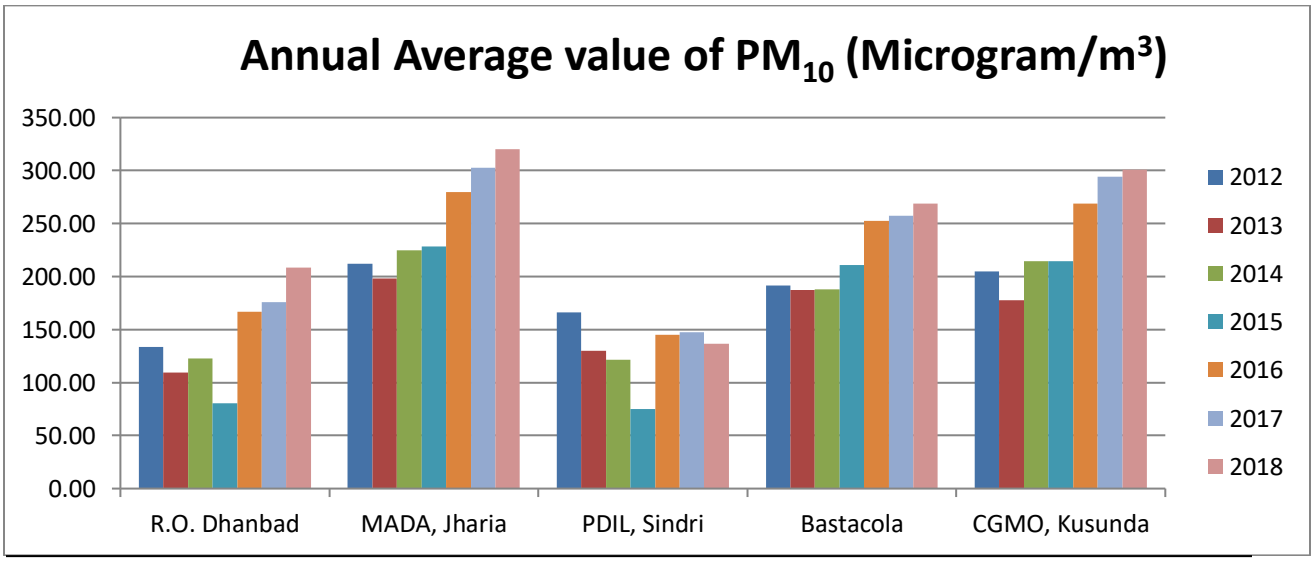
Air quality monitoring stations have been set up at five locations across the city. These stations are functional and capture data for various components. Based on the data captured by these stations action plans have been designed to reduce harmful components to auditable level and to keep air safe for communities in cities.

Annual Average value of PM_{10} (Microgram/m^3)

Stations	Latitude & Longitude	Year						
		2012	2013	2014	2015	2016	2017	2018
		PM_{10}	PM_{10}	PM_{10}	PM_{10}	PM_{10}	PM_{10}	PM_{10}
R.O. Dhanbad	23° 48'24.6"N 86°26'0.20" E	133.78	109.17	122.69	80.20	166.60	175.68	208.66
MADA, Jharia	23°45'11.9" N 86°24'44.4" E	211.92	198.18	224.55	228.46	279.63	302.68	319.89
PDIL, Sindri	23°40'02.1" N 86°29'26.4" E	166.36	129.70	121.79	74.85	144.85	147.40	136.83
Bastacola	23°45'55.2" N 86°24'40.1" E	191.55	187.29	187.88	210.94	252.41	257.34	268.60
CGMO, Kusunda	23°47'05.0" N 86°23'45.4" E	204.92	177.53	214.43	214.34	268.89	294.18	300.79



Location map of the air quality monitoring stations in Dhanbad city



Source Identification

Various pollution sources have been identified across locations in the city which includes places of heavy traffic congestion and Jam, construction and demolition activities, use of more than 15 years old commercial vehicles, open cast mining locations, brick kilns, locations of pot hole patches in the city, parking in non designed area, polluting industries, residential areas using fossil fuels for cooking and residential complexes having open spaces where no greenery are there. These sources have been identified and action plan has been based on the location specific and implementing agency specific recommendations.

S.No.	Source of Pollution	Location
1	Traffic congestion	Bank More, Station road, Steel gate, Hirapur, Saraidhela,
2	Construction and demolition activities	Saraidhela, Barwadda, Steel gate.
3	Plying of more than 15 Years old commercial vehicles	Mining areas, Public transportation, Three wheelers,
4	Open cast mining operations and transportation of coal in uncovered vehicles	Barora, Block-II, Govindpur, Katras, Sijua, Kusunda, Bastacolla, Putki Balihari, Eastern Jharia, Lodna, Western Jharia, Chanch Victoria areas of BCCL
5	Pot hole patches of roads	Kusunda, Near Hirak more,
6	Parking in non designed areas	Bank More, Hirapur, Court more, Jharia, Shramik Chowk,
7	Brick kiln	Rajganj-Tetulmari-Mahuda
8	stone crushers	Bagsuma & Rangdih (Govindpur), Moko (Baliapur)
9	Residential complexes having non green spaces	Hirapur, Jharudih, Steel Gate, Jai prakash Nagar, Bank More, Rangatand, Dhowatand,
10	Polluting industries	Coal Mines, Hard Coke (Govindpur), Soft Coke (Govindpur)
11	Locations burning fossil fuel as source for cooking	Telipara, Damodarpur, Jharia

Source apportionment and emission inventory

For Source apportionment and emission inventory a study will be conducted in Dhanbad city for which NEERI has been appointed by M/s Bharat Coking Coal Limited (BCCL), a Coal India Subsidiary and JSPCB will be finalizing the Terms of Reference (ToR) of the study and the air quality action plan for improving air quality in the city will be improved as per the results and recommendations of the source apportionment study and suggestions based on the study will be incorporated in the future plans and long term plans.

General Observations to reduce air pollution

- For Air quality improvement from the study it is evident that the area along the road under study is significantly considered as polluted and actions should be taken to reduce the concentration of PM_{10} level. On the basis of these results and physical observations the following suggestions are being made for the purpose of improving air quality which has been incorporated in the action plan.

- The paved portion of road generally has a number of bad patches, which cause dust generation and slowing down of vehicular traffic, contributing to the air pollutants, which can be minimised by maintaining the paved road in good condition.

- Due to high traffic density on the road and the tendency of overtaking by vehicles invariably the vehicles go out to the unpaved sides of the road which cause huge amounts of dust to become air borne, which contributes to the PM_{10} concentrations in the ambient air. This can be minimised by increasing the width of the road to accommodate high traffic density, regulating the traffic and if widening is not feasible than consolidating the unpaved sides by laying bricks so that the generation of dust from this source is minimum possible.

- Use of catalytic convertor should be made compulsory to all vehicles.

- ***Launching a National Clean Air Mission for Multiscale and Cross-sectoral Coordination:*** This *Clean Air Mission* [CAM-INDIA] should have the mandate to implement government policies for air pollution mitigation across several ministries dealing with transport, power, construction, agriculture, rural development, and environment, as well as across city and state jurisdictions. The targets for the CAM-INDIA are particles referred to as $PM_{2.5}$ to PM_{10} and Ozone. The term PM (particulate matter) denotes a collection of difference species of

particles in the air, while the 2.5 or 10 refer to the radius of the particle in dimension of micrometer (millionth of a meter). The most important ones are: ammonium sulphates, ammonium nitrates, black carbon (elemental carbon), organic carbon, fly ash, and dust (mineral and road dust). To emphasize the point about cross-sectoral coordination, the ammonia in ammonium sulphate comes from agriculture while the sulphates come from sulphur dioxide (SO_2) emissions from the power and industrial sector. The per cent contribution of each of these particles to PM_{10} differs from one location to another, from month to month and at times from one village or city to the next and even, from one day to the next, implying that the science of monitoring, determination of emission inventories, and modeling is crucial to evaluate the efficacy of policies. The rest of the nine solutions deal with various sectors that contribute to pollution; the technologies required implementing the solutions. Each of these solutions requires auxiliary measures and these are described in more details in the sections that follows this summary.

- **Agriculture:** ***Develop business models for collection, transport, and storage of agriculture residues and farm manure.*** This strategy aims at reducing open burning of agricultural residue; instead, we recommend them to be used as a source of energy. Business models focusing on the economic viability of this strategy are required. However, this practice is not in general practice in the city of Dhanbad.

- **Agriculture:** ***Convert agriculture residues and farm manure to electricity for rural power and biomass pellets for women who depend on biomass stoves.*** This strategy aims at developing and customizing gasification technologies for converting agricultural waste into useful energy.

- **Power and other Industry:** ***Adopt cleaner and efficient production technologies*** **such as** supercritical technologies in power sector, vertical shaft kilns, Hoffman kilns, and tunnel kilns for brick manufacturing. For urban households, it is recommended to improve energy efficiency of room air conditioners. This solution will reduce emissions that produce sulphates, nitrates, and black carbon.

- **Power and other Industry:** ***Deploy National Emission Trading Schemes (ETS) with cap and trade for power generation and other large polluting industries.*** The government is already experimenting with ETS in three industrial clusters in Gujarat, Tamil Nadu, and Maharashtra, which needs to be scaled up.

- **Power and other Industry:** ***Implement stringent emission standards to control fine particulate (black carbon and fly ash) emissions from both power plants and big industries.*** This will reduce PM_{10} levels due to reductions in sulphates, nitrates, fly ash, and black carbon and will also mitigate ozone formation through reduction of NOx.

- **Dust and Waste:** ***Implement wall-to-wall paving of streets and vacuum cleaning of roads; enforce ban on open burning of solid waste; manage waste and recovery of methane from landfills.*** Dust and waste burning are major sources of PM in cities and Solution 10 will drastically cut their contributions to city PM levels.

Other than these ten solutions, India's efforts to meet its Paris INDCs (Intended Nationally Determined Contributions) will significantly reduce air pollution due to the nexus between air pollution mitigation and climate mitigation. For example, India's ambitious target of 100GW power generation from solar energy by 2022 can help reduce the power sector's overall emissions of PM_{10} as compared to its current coal-based power generation. Similarly, improving the energy efficiency of room air conditioning units can sufficiently reduce energy demand to avoid the need for 60–140 medium-sized peak power plants in India by 2030 (Shah et al., 2015a). This would mitigate climate change by preventing nearly 100 Gt CO_2 by 2050 globally. Similarly, reducing fugitive methane emissions from landfills, manure, and gas pipes is important as methane is 25 times more potent greenhouse gas than CO_2; this will also lead to a significant reduction in ozone concentrations, as methane is an ozone precursor.

These aforesaid solutions also require a combination of new policies off-the-shelf available existing technologies, new technologies (Table 1), behavioral changes, most of all cooperation among a myriad of agencies and ministries. It is a very complex problem but there are many successful living laboratories in the world which gives us confidence that the solutions listed in this report will have a major impact on reducing the toxins that enter the lungs of the men, women, and children of India.

General Observation to Reduce Air Pollution:

Sector	Sub-sector	Technology
Transport	Vehicles	Diesel particulate filters; selective catalytic reduction; exhaust gas recirculation; on-board diagnostics for inspection and maintenance; high energy density batteries and technologies for electric vehicles
	Fuel	Hydro-desulfurization at refineries
Industries and power plants	Tail-pipe control	Electrostatic precipitators; bag filters, cyclones; flue gas desulphurization; wet scrubbers; selective catalytic reduction
	Process improvement	Low NO_x burners; efficient super critical combustion technologies; advanced brick manufacturing technology (vertical shaft kilns, hoffman kilns, tunnel kilns)
Residential	Stove	Tier-4 cook stoves with higher thermal efficiencies (50% or more) and emissions conforming to WHO guidelines
	Fuels Lighting	Processed biomass for high efficiency combustion; replace kerosene with LEDs powered by solar
Open burning of agricultural residues	Agri. residues	Biomass gasifiers
Waste management	Waste	Methane recovery at landfills and sewage treatment plants;
	Live stocks	Anaerobic digesters and methane recovery in livestock farms

Action Points for Dhanbad:

The following are the department wise action points for Dhanbad. Notably Dhanbad has been placed in the 102 critically polluted cities w.r.t. PM_{10} only. The action plan has been derived accordingly.

Action points for reducing Air Pollution (PM_{10}) in Dhanbad

Source group	Action	Implementation period (Short/ Mid/ Long term)	Time target for Implementation	a) Responsible agency(ies) b) Any other information
STEPS TO CONTROL EMISSIONS FROM VEHICULAR POLLUTION	Launch extensive drive against polluting vehicles for ensuring strict compliance.	*Mid Term*	October 2019	**a) TRANSPORT DEPARTMENT (Traffic police)** **b)** (I) All the subordinates have been directed for ensuring launch of extensive drive against polluting vehicle. (II) Regular checking drives of polluting vehicles being conducted by Traffic Police per day and every Two days in a week by DTO in every month, also Registration of vehicles, insurance, fitness, driving license and PUC certificates are mainly examined during the drive.
	Launch Public awareness campaign for air pollution control, vehicle maintenance, minimizing use of personal vehicle, lane discipline, etc.	*Mid Term*	Continuous basis	**a) TRANSPORT DEPARTMENT** **b)** (I) This will be implemented along with road safety awareness programme by different stake holders of Department of Transport. (II) Awareness programme and camps are being organized at various schools and places on one day in each week of every month by Road safety cell & Traffic police officials Dhanbad. Till now awareness programme has been organized at 65 School and places in Dhanbad. Whereas traffic rules are also being tought in various schools.

	Install weigh in motion bridges at the borders of cities/ towns and states to prevent overloading of vehicles.	*Long Term*		**a) TRANSPORT DEPARTMENT** **b)** Being the mining district, In mining areas about 5-6 days in every month regular checking drive are being conducted by DTO for overloading of vehicles and checking of weighing machines are installed or not in mining areas of BCCL, ECL, MPL, TATA etc for preventing overloading.
	Promoting battery operated vehicles.	*Long Term*	Continuous basis	**a) TRANSPORT DEPARTMENT** **b)** (I) As per new taxation act 25% of rebate in tax has been given to the battery operated vehicles for reducing pollution. (II) DTO Dhanbad has till now issued 35 trade licenses to e- rickshaws. (III) E – rickshaws trade licenses is being issued on priority basis by DTO Dhanbad.
	Inspection / maintenance of all BS II & BS III commercial vehicles.	*Short Term*	Continuous basis	**a) TRANSPORT DEPARTMENT** **b)** In every 2 or 3 days vehicle checking drive has been conducted by DTO and fine has been challaned to those which are found unfit & without PUC for all BS-II & BS-III commercial vehicles. .
	Prohibition of entry of commercial heavy vehicles in the city.	*Short Term*	December 2019	**a) TRANSPORT DEPARTMENT & DHANBAD MUNICIPAL CORPORATION** **b)** (I) DMC have created a team to identify the major entrance point towards the Dhanbad Municipal area. (II) Initially we have survey & identified 8 major

				point entrances towards the City (Heavy Vehicles & LMV). (III) Implementation of toll tax on these points is under process. (IV) 300 nos. of traffic barricades owned by the DMC for maintaining the flow of traffic. (V) Entry of heavy vehicles to ply in the city area of Dhanbad is prohibited.
	Banning of old commercial vehicles and other steps.	*Short Term*	Continuous basis	**a) TRANSPORT DEPARTMENT & STATE TRANSPORT AUTHORITY** **b)** (I) Plying of commercial inter state buses older than 12 years have been banned by the State Transport Authority of Jharkhand. (II)
	To install PUC centers in petrol pump as per the order of Hon'ble Supreme Court.	*Short Term*	December 2019	**a) TRANSPORT DEPARTMENT** **b)** (I) All the District Transport Officers have been directed to strict compliance of Hon'ble Supreme Court order to install PUC centers in petrol pump. (II) Till now 38 PUC centres (13 in Petrol Pumps + 25 other than Petrol Pumps) have been established in Dhanbad. (III) 60-70 more PUC centeres will be established by the end of december 2019.
	Good traffic management including re-direction of traffic			**a) TRANSPORT DEPARTMENT (Traffic police)** **b)** Frequent and regular Traffic congestion and jam

	movement to avoid congestion.	*Short Term*	October 2019	density are two most important reasons for air pollution load in the city. Traffic density and carrying capacity of roads are required to be looked into with optimal transport network with effective movement of traffic and minimal traffic congestion with the taming and training of commercial vehicles / matadors (Public Transportation) drivers, who have no concern for specified and designated stoppages for mini buses, and use already congested and narrow roads for stopping vehicles as and when required on "I Stop My Bus Stop" thinking, forcing traffic movement at a snail pace, road blocking, thereby, resulting emissions in large quantity. Besides this, unauthorized parking adds on to the traffic congestion which further results in deterioration of air quality in city. The traffic police to ensure good traffic management and enforcement of rules.
CONTROL OF AIR POLLUTION FROM ROAD DUST	Regular cleaning of road dust.	*Short Term*	Complied	**a) DHANBAD MUNICIPAL CORPORATION** **b)** (I) Road dust is mainly due to traffic load, worst condition of roads especially without black-topping, absence of water spraying etc. Besides this, sweeping is a major cause of increasing levels of PM10 in the area. (II) Control measures for road dust including sweeping, water spraying on roads, black topping, plantation, etc. to prevent re-suspension of dust. (III) Regular cleaning and sweeping of city roads is being done on daily basis, besides that the DMC will also be using the road sweeping vacuum cleaning machine for sweeping dust on the major trunk roads

				of the city. (As proposed in the NCAP) **<u>Action already taken</u>** 1. Recently DMC have purchased road sweeping machine. a) Truck Mounted Sweeping Machine- 03 b) Smart sweeping machine to access easily to sweeping in narrow road location- 02. 2. DMC have already practicing / implementing on these activities. **Road sweeping Area (In trail basis)** Time : 11:00 PM to 07: 00 AM 1} Housings colony 2} Memko more to Puja Talkis 3} Luby Circular Road
	Water Sprinkling on road through tankers.	*Short Term*	March 2020	**a) DHANBAD MUNICIPAL CORPORATION** **b)** (I) In the areas where there is road dust, water sprinkling is to be done regularly. This has also been proposed in NCAP. (II) DMC, BCCL, TATA, CMPDI all are dedicated to water sprinkling in roads dust area. (III) Six new mobile water sprinklers will be purchased under NCAP in the financial year 2019-20.
	Widening of road and improvement of infrastructure for decongestion of road.			**a) URBAN DEVELOPMENT AND HOUSING DEPARTMENT** **b)** Work awarded for 375.40 Crore World Bank funded

		Long Term	March 2022	Jharkhand MunicipalDevelopment Project (JMDP) for total stretch of 19.99 Km road from Kanko Chowk to Memko Goal Building Chowk in Dhanbad to improve city road infrastructure and decongestion. The road has been recently inaugurated by Hon'ble CM on 22.02.2019. The is having total 8 lane including both sides with 2 service lane and 2 cycle track and 4 carriage way.
	Construction of expressways/bypass to avoid congestion due to non- destined vehicles.	*Long Term*	March 2022	**a) URBAN DEVELOPMENT AND HOUSING DEPARTMENT** **b)** Urban Development & HousingDepartment, GoJ has already awardedcontract for construction of 8 lane Roadfrom Kanko Chowk to Memko GoalBuilding Chowk in Dhanbad. This is amoderate step towards diverting trafficand avoiding congestion due to non-destined vehicles to some extent.
	Green buffers along the traffic corridors.	*Mid Term*	March 2020	**a) URBAN DEVELOPMENT AND HOUSING DEPARTMENT** **b)** Under ATAL MISSION FOR REJUVINATION AND URBAN TRANSFORMATION (AMRUT) Five park work status:- ❖ Rs 3.36 Crore Bekarbandh Park. Inaugurated on 22.02.2019. ❖ Rs 2.76 Crore LiloriAsthan Park work in progress. ❖ Rs.1.08 Crore Manaitand Park work in progress. ❖ Rs 1.39 Crore HIG(MIG) Park Work in progress. ❖ Rs 1.41 Crore LiloriAsthan, KatrasPark ,under tendering.

				Action already taken a. Status report of Bekarbandh park - Project Completed b. Status of LiloriAsthan Park Name of implementing agency: DMC Physical progress of work: 40% c. Status of Manaitand Park Name of implementing agency: DMC Physical progress of work:85% d. Status of HIG (MIG) Park Name of implementing agency: DMC Physical progress of work: 99% e. Status of LiloriAsthan, Katras Park Park Name of implementing agency: DMC Physical progress of work: 70% **f.** DMC has sapling planted approx. 150000 (Kapoor, Neem etc.).
	Maintain potholes free roads for free floor of traffic.	*Mid Term*	June 2020	**a) DHANBAD MUNICIPAL CORPORATION& URBAN DEVELOPMENT AND HOUSING DEPARTMENT** **b)** (I) Necessary direction already given to Dhanbad Nagar Nigam by this office vide letter no. SMCG/UDHD/NGT/AIR/2019/09/69 dated 23.02.2019 by UD & HD. (II) DMC has already implementing on this through engineering cell.
	Black topping metaled			**a) DHANBAD MUNICIPAL CORPORATION &**

	road including pavement of road shoulders.	*Mid Term*	June 2020	**URBAN DEVELOPMENT AND HOUSING DEPARTMENT** **b)** (I) Necessary direction already given to Dhanbad Nagar Nigam by this office vide letter no. SMCG/UDHD/NGT/AIR/2019/09/69 dated 23.02.2019 by UD & HD. (II) DMC has already implementing on this through engineering cell.
CONTROL OF AIR POLLUTION FROM CONSTRUCTION AND DEMOLITION ACTIVITIES	Covering of construction site.	*Short Term*	Complied	**a) DHANBAD MUNICIPAL CORPORATION & URBAN DEVELOPMENT AND HOUSING DEPARTMENT** **b)** (I) DMC to issue directions to all the concerned construction agencies for covering of construction sites while granting building permissions. (II) DMC has already implementing on this through engineering cell.Directed to all construction agencies.
	Ensure Carriage / Transportation of construction materials like sand, soil, stone, chips etc. in covered system.	*Short Term*	Complied	**a) DHANBAD MUNICIPAL CORPORATION** **b)** (I) The DMC will enforce and implement the ban with the help of Traffic police. (II) DMC has already implementing on this through engineering cell.Directed to all construction agencies.
	Restriction on Storage/ dumping of construction materials along the road.	*Short Term*	Complied	**a) DHANBAD MUNICIPAL CORPORATION** **b)** (I) DMC will put in place the mechanism for preventing people from dumping of the construction material and the C&D waste on road side. The public will be informed by way of notices in the leading newspapers.

				(II) DMC has already implementing on this. Directed to all Executive Officers of concerned Circle.
	Enforcement of Construction and Demolition Waste Management Rules, 2016.	*Short Term*	Partially Complied	**a) DHANBAD MUNICIPAL CORPORATION& STATE URBAN DEVELOPMENT AUTHORITY** **b)** (I) Strict enforcement of C & D Rules, penalty to be imposed on defaulters. The draft C & D action plan is already in process of finalization. (II) After the notification of the C & D Action Plan it will be strictly implemented. (III) DMC has already implementing on this and has directed to all construction agencies enforcement of C & D Rules 2016, penalty to be imposed on defaulters. Also published in newspaper.
	Control Measures for fugitive emissions.	*Short Term*	Complied	**a) DHANBAD MUNICIPAL CORPORATION& STATE URBAN DEVELOPMENT AUTHORITY** **b)** (I) The above agencies are responsible to take control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units. (II) DMC has already implementing on this. Directed to all construction agencies enforcement of SWM Rules 2016, penalty to be imposed on defaulters. Also published in newspaper.
	Builders should leave 33% area for green belt in residential colonies to			**a) DHANBAD MUNICIPAL CORPORATION & STATE URBAN DEVELOPMENT AUTHORITY**

	be made mandatory.	*Long Term*	Continuous basis	**b)** (I) The agencies responsible must ensure that building permissions for the residential colonies are issued with Jharkhand Building Bye-Laws 2016 Notification dtd. 05.04.2016. (II) DMC have already implementing on this. Directed to all builders & public to follow the Jharkhand Building Bye-Laws 2016 Notification dtd. 05.04.2016.
CONTROL OF EMISSIONS FROM BIOMASS AND GARBAGE BURNING	Regular Check and Control on open burning of municipal solid waste, Biomass, plastic, horticulture waste etc.	*Short Term*	Continuous basis	**a) DHANBAD MUNICIPAL CORPORATION** **b)** (I) DMC is responsible agency for collection, segregation, transportation and scientific disposal of municipal solid waste as per MSW Rules, 2016. (II) Agricultural biomass burning is not taking place in and around the city. (III) DMC / SPCB will be regularly imposing the fines on persons who will be found burning the MSW, biomass, plastics, horticulture waste etc., and strict enforcement of directions issued by the Hon'ble NGT in this regard. The provision of mobile enforcement units to check this has also been made in NCAP. (IV) DMC has directed the implementing agency (DIMSW Ltd.) for collection, segregation, transportation and scientific disposal of municipal solid waste as per MSW Rules, 2016. (V) IEC activities for the local people engaged in biomass burning etc. will be done once a month on regular basis.

				(VI) Launch extensive drive against open burning of biomass and coal on random basis. (VII) Regular check and control of burning of MSW. (VIII) Proper collection of horticulture waste (Biomass) and its disposal following composting cum gardening.
CONROL OF AIR POLLUTION FROM INDUSTRIAL EMISSIONS	Ensuring installation and operation of air pollution control devices in industries.	*Mid Term*	June 2020	**a) JHARKHAND SPCB** **b)** (I) The non – complying units will be given directions for the compliance of emission standards. (II) In Dhanbad there are Industries like Coal mines, Hard coke plant, soft coke plant etc. which have been equipped with online monitoring system as per guide lines of CPCB which ensures the monitoring of real time data. Similarly, all industries causing air pollution shall be made compliant for installation of adequate PCDs as per guidelines of CPCB.
	Ensuring emission standards in industries.	*Long Term*	March 2020	**a) JHARKHAND SPCB** **b)** (I) All industries causing Air, Water and Noise pollution shall be made compliant w.r.t causing emission levels with the standard as are issued by SPCB. (II) To install Online PM_{10} Analyzers in all major air polluting industries. All the major polluting industries such as Railway sidings, Stone crushers with capacity more than 5oo TPD and Bauxite mines, iron ore

				mines and hard coke industries etc. (III) The covering of loaded transport vehicles will be compulsory. (IV) All haul roads will be made pucca, by. New haul roads will be taken in use after making it pucca, (V) All OB dumps will be enclosed by pucca boundary wall to prevent entry through them. (VI) All drillings shall be done with dust containment and suppression systems, from. The fixed type sprinklers will be installed in all dust prone areas. (VII) The prudent operational practices will be adapted to control.
	Clean technology in industries.	*Mid Term*	Continuous basis	**a) JHARKHAND SPCB** **b)** (I) Industries shall be encouraged to adopt cleaner technologies as per guidelines of CPCB. (II) Conversion of natural draft brick kilns to induced draft. The occupier of the brick kilns owners has been asked to give affidavit that they will change natural draft brick kilns to induced draft by March 2020. (III) Efforts for good mining practices. In this regard consultation with authorities of BCCL and corrective measures to be adopted by BCCL. (IV) Green Belt for activity zone and the buffer zone for each mining area. In this regard direction has been given to the authorities of BCCL for green belt

				development as per guidelines/norms. (V) Proper maintenance of induced draft system by Hard Coke industries which has been already installed. (VI) Proper maintenance/upgradation of bag filters attached with coal crushing/grinding disintegrator. (VII) Proper maintenance/upgradation of paved/black top haul road by the hard coke units. (VIII) Soft coke units to properly maintain/install/upgrade wet scrubber. (IX) Proper water sprinkling arrangement in all the hard coke/ soft coke units.
	Shifting of polluting industries.	*Mid Term*	Continuous basis	**a) JHARKHAND SPCB & INDUSTRIES DEPARTMENT** **b)** The identification of polluting industries is under process. After the identification they will be shifted with the help of industries department. Further, all the brick kilns nearby and around the city shall be converted to zig-zag technology within stipulated period of time.
	Ban on Polluting industries.	*Mid Term*	Continuous basis	**a) JHARKHAND SPCB & INDUSTRIES DEPARTMENT** **b)** Many polluting and non compliant industries have been closed down. The industries which will not be complying with the emission standards will be issued closure under the provisions of The Water

				(Prevention and Control of Pollution) Act, 1974 and The Air (Prevention and Control of Pollution) Act, 1981.
STRENGTHENING OF AAQ MONITORING	Installation of additional NAMP monitoring stations at Dhanbad	*Mid Term*	June 2020	**a) JHARKHAND SPCB** **b)** Presently, there are five (05) NAMP sanctioned stations at identified locations (I) JSPCB Regional Office, Dhanbad (II) MADA, Jharia (III) PDIL, Sindri (IV) Bastacola (V) CGMO, Kusunda operational since 2009-10.
	Establishment of CAAQMS	*Mid Term*	March 2021	**a) JHARKHAND SPCB** **b)** At present one CAAQMS is installed at Digwadih, Dhanbad. MoEF&CC has sanctioned two CAAQMS Stations for Dhanbad under the National Clean Air Programme (NCAP) in the current financial year 2019-20. One more CAAQMS is proposed under CPCB-SPCB (50-50 share basis) at Dhanbad. One more CAAQMS will be installed in next financial year (2020-21) with NCAP fund.
	Source Apportionment of Dhanbad city	*Long Term*	*December 2020*	**a) JHARKHAND SPCB** **b)** For Source apportionment and emission inventory a study will be conducted in Dhanbad city for which NEERI has been appointed by M/s Bharat Coking Coal Limited (BCCL), a Coal India Subsidiary and JSPCB will be finalizing the Terms of Reference (ToR) of the study and the air quality action plan for improving air quality in the city will be improved as per the results and recommendations of the source apportionment study and suggestions based on the study will be

				incorporated in the future plans and long term plans.
PUBLIC AWARENESS	Issue of advisory to public for prevention and control of air pollution.	*Short Term*	Continuous basis	**a) JHARKHAND SPCB** **b)** Advisories have been issued from time to time to the public for prevention and control of pollution. Same needs to be continued in future as well through mass awareness programmes using print and electronic media.
	Involvement of school and other academic institution in awareness program.	*Short Term*	Continuous basis	**a) JHARKHAND SPCB** **b)** State Pollution Control Board conducts programs like painting competitions, essay competitions, symposia etc. amongst students. The registered NGO's may be involved in this process too.
OTHER STEPS TO CONTROL AIR POLLUTION	Compliance of guidelines on :- a) D.G. sets, b) Fire crackers	*Short Term*	September 2019	**a) JHARKHAND SPCB** **b)** (I) Board conducts the monitoring/inspection of DG sets/similar installations as and when required, as a DG set with canopy (acoustic enclosure) and requisite stack height on meeting emission norms as per EP standard be allowed to function, failing which strict action including seizure and penalty be imposed. (II) Use of fire crackers as per Hon'ble Supreme Court order dated 23/10/2018 and directions there under to be strictly enforced. The enforcement will be carried out by Local administration.
	Establish a NABL Accredited Laboratory at the Regional Office Dhanbad to oversee the	*Long Term*	March 2021	**a) JHARKHAND SPCB** **b)** A NABL Accredited laboratory to be established at the Regional Office Dhanbad to oversee the air

	air quality management activities in the state and to interact with CPCB.			quality management activities in the state and to interact with CPCB which will be headed by a Scientist (Board Analyst) of SPCB on priority basis.
	Steps to Publicize helpline in city as well as in SPCB (HQ) for complaints against reported noncompliance issues related to cause of air pollution.	*Short Term*	August 2019	**a) JHARKHAND SPCB** **b)** JSPCB is having its twitter handle, email id etc. where public can lodge complain and get their grievance redressed in time. The link of twitter handle and email id is as follows:- **Twitter: -** https//twitter.com/jspcbranchi?s=09 **Email ID:** - ranchijspcb@gmail.com
	Involvement of Industrial associations, NGOs, Transport unions associations in awareness program based on ambient air quality status, present prevailing trends.	*Short Term*	Continuous process	**a) JHARKHAND SPCB** **b)** Awareness programme will be conducted on regular basis involving NGOs, transport unions, industries, industries associations and other allied agencies.

Action plan for prevention and control of air pollution for mine/collieries of BCCL which is to be followed on continuous basis.

Sl. No	Environmental Aspect	Activities	Current Practices	Future Action Plan		
				Short Term (by August 2020)	Mid Term (by August 2022)	Long Term (by August 2024)
1	Ambient Air	Covered Transportation	This is being practiced	Strict enforcement and random audits with Pollution	Mechanically covered trucks shall be deployed on availability with OEM (CIL referred	

				Control Board	for same)	
		Permanent Pucca Transportation Road	Road made up of local stones and OB/ Pucca		Will be compacted to control fugitive dust	Will be black topped in Non-Coal Bearing Area
		Sweeping of road		Manual sweeping of sides of road of Major NH through which transportation is done	Mechanical sweeping will be done	
		Drilling with Dust extractor /wet drilling	Some drills are equipped with dust extractor while some are equipped with wet drilling		All new and old drills will be fitted with wet drilling and dust extractor system	
		Sprinkling arrangements at Siding/Permanent Transportation routes/Coal Dumps	Mobile sprinkling on haul roads, Fixed sprinkling at feeder brakers and washeries	Mobile water sprinkling frequency will be increased. Road sides of major NH being used will manually broomed	Fixed Sprinkler shall be installed at Railways siding, FEEDER/Braker at dust generating sources.	Fixed Sprinklers shall be installed at Railways siding, Feeder/Braker at dust generating sources. Mist type mobile sprinklers will be used for haul roads and unloading operations.

Action plan for prevention and control of air pollution for Coal Washeries of BCCL which is to be followed on continuous basis.

S. No	Action Point	Action Plan for stakeholders	Compliance
1.	The ambient air of the premises of coal washeries remains dusty due to pliance of uncovered trucks and those too on kutcha haul roads and on reject dumps and due to uncovered processing of coal	a) The covering of loaded transport vehicles will be compulsory.	Coal transportation from out underground colliers takes place through underground belt conveyor network system directly to captive washery. Coal transportation through trucks is done only from BCCL, mines till washery and it is ensured that only optimally loaded trucks with proper tarpaulin cover are allowed into the washery premises Clean coal is dispatched via rail from the Rail-yard situated in the washery premises.
		b) All transport roads will be made pucca.	All the internal roads of the washery have been concreted while the approach roads are black-topped.
		c) Reject dumps will be enclosed by pucca boundary wall to prevent entry through them.	Rejects are already kept in stockyards enclosed by pucca boundary wall and rejects are sold off regularly to various customers.
		d) All processing (crushing screening, etc) chambers of coal will be covered.	All processing chambers are provided with enclosures. Conveyer belts in washery are covered on top and both sides. In addition, dry fog system is installed at all transfer points of CHP.
		e) Fixed type of water sprinklers will be installed in all dust prone areas.	Fixed water sprinklers are installed in internal roads of washery for dust suppression. In addition, movable water sprinklers are also being deployed on the roads for dust suppression.

Action plan for prevention and control of air pollution for Coal Mines of Tata Steel Limited, Jharia which is to be followed on continuous basis.

S. No	Action Point	Action Plan for stakeholders	Compliance by Tata Steel Limited, Jharia

	The ambient air of the collieries remains dusty due to pliance of uncovered trucks and those too on kutcha haul roads and on OB dumps and due to drilling & blasting and uncontrolled emission of their boilers.	a. The covering of loaded transport vehicles will be compulsory.	Coal transportation from our underground colliers takes place through underground belt conveyor network system directly to; our washeries only sand is transported via tarpaulin covered trucks from riverbed to sand stowing yard.
		b. Coal Transport roads and long time transport road shall be made pucca. New haul roads will be taken in use after making it pucca.	This is not applicable for underground mines. However, the approach roads of the underground collieries are already made pucca.
		c. OB dumps will be enclosed by pucca boundary wall to prevent entry through them.	Not applicable as Tata Steel is presently operating underground mines only. Earlier, we had one open cast mine viz. Kalimela OCB for which production has been ceased since Nov'14. There is retention wall of around 2200 meters that exist around the dump of OCP Kalimela.
		d. All drillings shall be done with dust containment and suppression systems. The fixed type sprinklers will be installed in all dust prone areas, including all coal stock & sidings.	Not applicable as this is for open cast mine. The Kalimela OCP is already closed and backfilling of the mine void is being done. Raw coal is directly transported from underground mines to washery via belt conveyor networks where water sprinkling arrangements are present at transfer points.
		e. The prudent operational practices will be adopted to control dust.	The best environmental practices adopted by Tata Steel Jharia Division are attached in Annexure-I.

Action plan for prevention and control of air pollution from Thermal Power Plants, Soft Coke Units and Bee Hive Coke Oven Plants (Hard coke units) which is to be followed on continuous basis.

Source group	Action	Implementation period (Short/ Mid/ Long term)	Time target for Implementation	a) Responsible agency(ies) b) Any other information
Thermal	(a) The covering of loaded			**a) Maithon Power Limited**

Power Plants	transport vehicles will be compulsory, from. (b) All haul roads will be made pucca, by. New haul roads will be taken in use after making it pucca, from. (c) All ash dumps will be enclosed by pucca boundary to prevent entry through them. (e) All processing of ash will be done in covered space. (f) The chimneys of all boilers will be equipped with ESPs with on line monitoring systems. (g) Dry ash collection system shall be installed and dry ash sale cement mills shall be resumed. (h) All ash shall be disposed of by utilization or sale and it will be continued from. (i) The plantation of saplings for creation of tree and forest cover of local species. (j) The conversion of	**Mid term**	*June 2020*	**b)** JSPCB will be giving directions in this regard to M/s Maithon Power Limited.

	abandoned / inoperative mines into water bodies.			
Soft Coke Units	(a) The covering of loaded transport vehicles will be compulsory, from. (b) All haul roads will be made pucca, by. New haul road will be taken in use after making it pucca, from. (c) The space of processing of coal or coke will be kept covered. (d) All plants will be modified to ensure emission of particulate matter to below 150 micro gm per cubic meter. (e) The plantation of saplings for creation of tree and forest cover of local species.	**Mid term**	*March2020*	**a) All the Soft Coke Units** **b)** JSPCB will be giving directions in this regard to all the soft coke units.
Bee Hive Coke Oven Plants (Hard coke units)	(a) The covering of loaded transport vehicles will be compulsory, from. All haul roads will be made pucca, by. (b) New haul road will be taken in use after making it pucca, from. (c) The space of processing of			**a) All the Bee Hive Coke Oven Plants (Hard Coke Units)** **b)** JSPCB will be giving directions in this regard to all the Bee Hive Coke Oven Plants (Hard Coke Units).

	coal or coke will be kept covered. (d) All plants will be modified to ensure emission of particulate matter to below 150 micro gm per cubic meter. (e) The plantation of saplings for creation of tree and forest cover of local species.	**Mid term**	*March 2020*	

Long term strategy

Long term strategies involve –

- Making people aware about the effects of air pollution
- Developing good practices among industries and mining
- Creating green belts around the mining areas and also around the local habitations
- Bringing behavior change communication among the people using traditional cook stoves and make them use improved cook stoves
- Replacing diesel operated three wheelers with battery operated vehicles

Time frame

Time frame for action points have been mentioned in the action plan segment.

Budgetary Provisions

As the budget for the aforementioned programme will be finalized by the concerned departments it will be conveyed to the concerned authorities and will be incorporated in the action plan.

Executing agencies

Executing agencies will involve –

- M/s BCCL
- Transport department
- Traffic police
- Industry Department
- Dhanbad Nagar Nigam
- Jharkhand state pollution control board
- Urban Development and Housing Department

Implementation will be monitored by a district level committee headed by the district collector and will also involve head of different executing departments. All these will be done under the aegis of State Pollution Control Board.

Public awareness and grievance redressal mechanism:

For making public aware about the harm full effects of the air pollution and its various segments will be explained to public. Public information disclosure boards will be installed at Petrol pumps, designed parking stations and weighbridges. Local FM stations will be tied up to announce awareness programme especially during peak traffic aware. Awareness drive will also be requested by the implementing departments. Driving schools will be also made to make aware bout the air pollution resulting from old vehicles and also due to adulteration in the fuels. Moreover, JSPCB is having its twitter handle, email id etc. where public can lodge complain and get their grievance redressed in time. The link of twitter handle and email id is as follows:-

Twitter: - https//twitter.com/jspcbranchi?s=09

Email ID: - ranchijspcb@gmail.com

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