



CLEAN AIR ACTION PLAN

DURGAPUR



Environment Department
Government of West Bengal

2020



CLEAN AIR ACTION PLAN

DURGAPUR

Environment Department
Government of West Bengal
2020

Contents

Objective	5
Part I: Overview	7
1. Air quality concern and public health imperative	9
1.1. Air quality monitoring	9
1.2. Status of air quality	9
1.3. Public health evidence	15
2. Pollution source profile and baseline policy action	16
2.1. Industry and power plants	17
2.2. Vehicles and mobility	32
2.3. Strategies to reduce tailpipe emissions	35
2.4. Solid waste management	37
2.5. Construction and demolition waste	37
2.6. Suspended road dust	38
2.7. Crop fires	38
PART II: Comprehensive Clean Air Action Plan (CAP) and Graded Response Action Plan	41
Comprehensive Clean Air Action Plan (CAP)	43
Graded Response Action Plan (GRAP)	44
Annexure 1	66
Annexure 2	71
Bibliography	72

Objective

This is the initiative of the Government of West Bengal to prepare and implement comprehensive clean air action plan to reduce particulate air pollution in non-attainment cities of West Bengal. The Hon'ble National Green Tribunal's (NGT) order dated 6 August 2019 has added six new non-attainment cities (NACs) in West Bengal namely Howrah, Barrackpore, Haldia, Asansol, Raniganj and Durgapur to the list of the non-attainment cities. The order has directed, Action Plans need to be prepared by States for the additional 20 non attainment cities (NACs) on the pattern of 102 NACs within three months and after its approval by CPCB within two months, States must initiate time bound action on remediation within next three months. These cities require to submit the clean air action plans to the Air Quality Monitoring (AQM) committee within three months of the order. The action plans will be reviewed and examined by a three-member committee to implement the plan. These action plans are being prepared within the broader framework of the National Clean Air Programme (NCAP) that has set a generic target of 20–30 per cent reduction in particulate pollution by 2024.

The Government of West Bengal has set up a three-tier committee to facilitate framing and implementation of the clean air plans:

- Steering Committee for implementation of Committee, WB–led by Chief Secretary
- Monitoring Committee for implementation of Committee, WB–led by Principal Secretary, Environment
- Implementation Committee for NCAP in Kolkata–led by Commissioner, KMC

Multi-sector and integrated clean air action plans have been developed for each of the six non-attainment cities of West Bengal. For best results the plans have considered a larger region around the city to take into account the trans-boundary effect of pollution. This report is on Durgapur, one of the most industrialized towns in eastern India that represents special pollution challenges.

This report is divided into two parts.

Part 1 presents the overview of air quality trends, public health evidence, and challenges in each sector that need addressing through the action planning process in the city. This multi-sector plan includes review of current challenges and baseline policy action in the concerned sectors of pollution control including industry, power plant, vehicles and mobility, construction activities, waste burning, road dust, solid fuels in domestic cooking and roadside eateries among others. This has reviewed the available information from existing studies and reports, official databases, field assessment, and information available from the implementing agencies.

Part 2 lays out the proposed Clean Air Action Plan (CAP) for each city in tabular form that identifies specific measures in each sector, lists agencies responsible for implementation of measures and the timeline for action. While substantial part of the proposed measures are common and uniform for all the six cities, further customization has been done depending on the nature of the local issues and problems. The framing of the action plans has taken into account several ongoing initiatives of the State Government of West Bengal to implement strategies in each sector that have a bearing on the air quality. This has also drawn upon the existing plans as well as the baseline policy measures to have integrated plan for the city.

Durgapur, third most populated city of West Bengal, is located in the Paschim Badhaman district. Industrial emissions, road dust, vehicular emissions, emissions from construction sector and trans-boundary pollution continue to foul the city air. The situation aggravates in winter months when typical weather conditions like temperature inversions entrap pollutants in lower levels of atmosphere.

PART I

OVERVIEW

1. Air quality concern and public health imperative

1.1. Air quality monitoring

Currently, there are four manual air quality monitoring stations and one real-time station in Durgapur (see *Table 1: Durgapur—locations of the ambient air quality monitoring stations and the parameters monitored*). The real-time monitors measure all key pollutants including particulate matter less than 10 micron size (PM10), particulate matter less than 2.5 micron size (PM2.5), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO) and ozone (O₃). However, real-time monitoring of the more harmful particulate matter, less than 2.5 micron size (PM2.5), is limited.

Table 1: Durgapur—locations of the ambient air quality monitoring stations and the parameters monitored

Station name and location	Parameters monitored
Automatic monitoring stations	
Sidhu Kanhu Indoor Stadium, Durgapur	PM10, PM2.5, SO ₂ , NO ₂ , ozone, ammonia, CO, lead, nickel, arsenic, benzene, BaP
Manual monitoring stations	
DMC Water Works, Angadpur	PM10, SO ₂ , NO ₂
Kwality Hotel, Bhiringi More, Benachiti	PM10, SO ₂ , NO ₂
Bidhannagar, PCBL Club, Muchipara	PM10, PM2.5, SO ₂ , NO ₂ , ozone, ammonia, CO, lead, nickel, arsenic, benzene, BaP
Dew India Limited, PCBL More, Durgapur	PM10, SO ₂ , NO ₂

Source: As provided by the West Bengal Pollution Control Board and CPCB website for automatic monitoring station

Further strengthening of the air quality monitoring grid, especially based on real-time monitoring will provide more robust data and enable assessment of local area trends as well. Real-time monitoring and on-line reporting of data is critical for implementation of short-term graded response action plan measures to enable decision-making on high pollution days and on a day-to-day basis. As per the air quality index whichever pollutant is shown to be leading will determine the nature of interventions that will be predefined in the short-term action plan. Thus, a short-term or graded response action plan needs to be supported by real-time and on-line air quality monitoring and continuous reporting of daily air quality data to assess the rolling daily average to enable decision-making. Manual monitors generally report data twice a week. The resulting time lag is not suitable for implementation of short term graded response action plan. Two more CAAQM stations are scheduled for implementation in Durgapur.

1.2 Status of air quality

Long-term trend in annual average PM10 levels

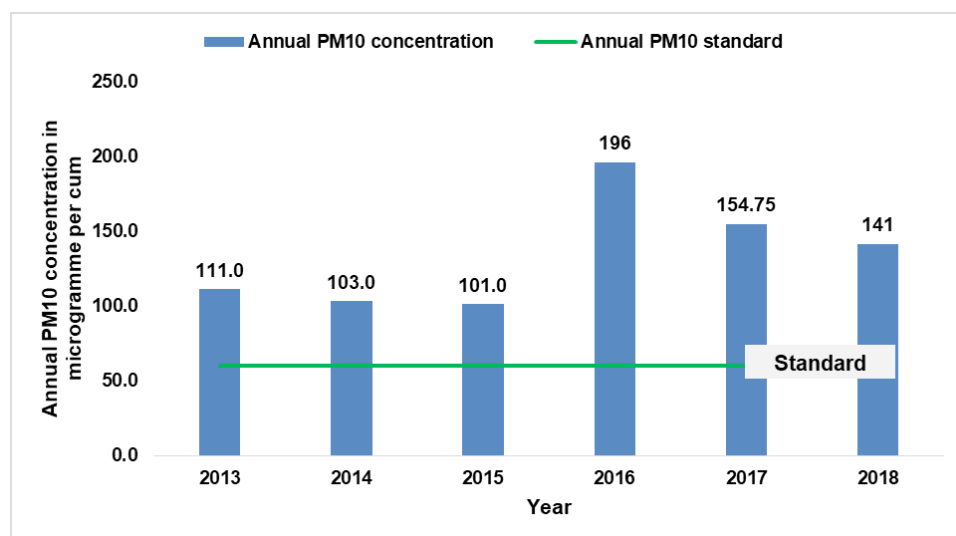
To understand the longer-term trends in annual average levels, available PM10 data has been analyzed. As mentioned earlier, long-term annual average PM2.5 data is not available. The PM2.5 data is available from Bidhannagar monitoring station. The data analyzed was provided

by WBPCB. Annual average PM₁₀ levels have remained elevated, substantially higher than the National Ambient Air Quality Standards, but show a stable trend.

Based on the WBPCB data, the city needs to reduce PM₁₀ levels by approximately 63.5 per cent to meet the annual standard. This was calculated using the average PM₁₀ concentration for three consecutive years which is 2016–18 (see *Graph 1: Durgapur—long-term trend in annual average level of PM₁₀ concentration*). As per the methods used by the US Environmental Protection Agency (USEPA), an annual average of immediate past three years is taken to define the base pollution level and, accordingly, the target reduction is set. This helps to assess the level of reduction that is needed to meet the clean air standards.

Graph 1: Durgapur—long-term trend in annual average level of PM₁₀ concentration

Data from West Bengal Pollution Control Board (2013–18)

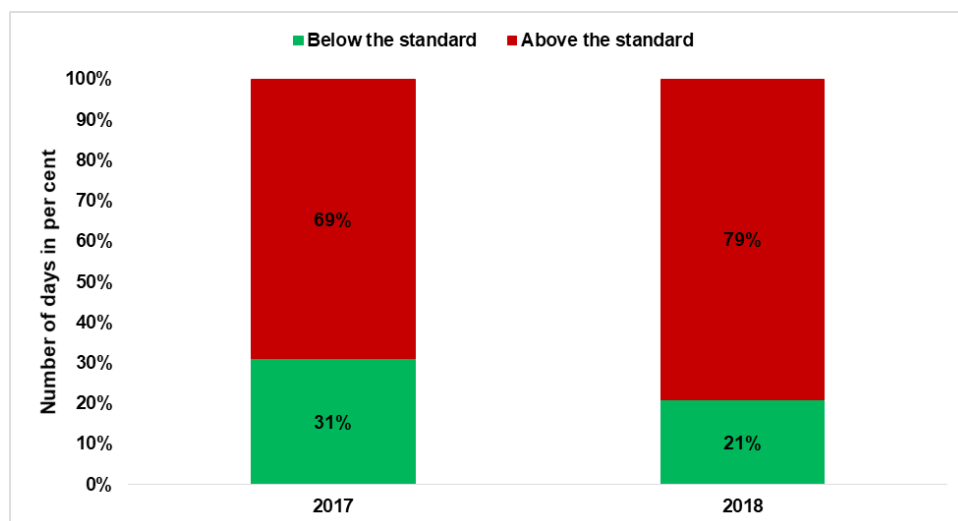


Source: Based on the data provided by WBPCB—For 2013–15 the data was taken for Bidhannagar and from 2016–18 the data was taken for four monitoring stations- Bidhannagar, Benachiti, PCBL More, Angadpur

Analysis of daily or 24-hour average of PM₁₀ levels show that close to 80 per cent of the days in a year exceed the National Ambient Air Quality Standards. The number of days violating the PM₁₀ standard has increased from 69 per cent in 2017 to 79 per cent in 2018 (see *Graph 2: Increase in number of days exceeding PM₁₀ standard in Durgapur–2017 and 2018*).

It has not been possible to carry a long-term analysis of smaller particles of 2.5 micron size (PM_{2.5}) as its monitoring is more recent and only limited data is available. However, from a health standpoint, this pollutant is more harmful. Pollution profile of the days is expected to change substantially if PM_{2.5} levels are taken into consideration.

Graph 2: Increase in number of days exceeding PM10 standard in Durgapur–2017 and 2018



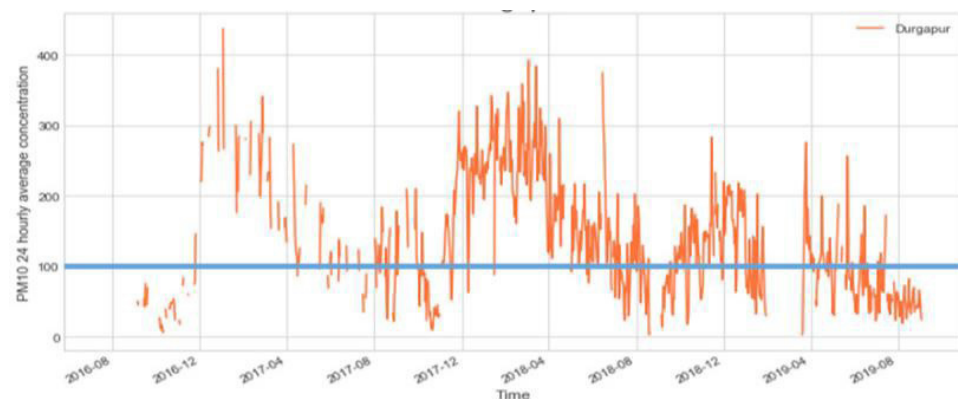
Source: Based on CPCB air quality data of the station at Sidhu Kanhu Indoor stadium, accessed at <https://app.cpcbcr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data>

Seasonal variation in air quality

There is a seasonal trend as well. Pollution level increases during winter due to colder temperature, inversion and lowering of mixing height and slower winds. This traps pollution and inhibits quicker dispersion. This is evident in the daily trends in PM_{2.5} levels during 2016–18 (see *Graph 3: Daily PM_{2.5} trend in Durgapur* and *Graph 4: Mapping of seasonal pollution in Durgapur*). Once the short-term graded response action plan for daily emergency measures comes into force, it will become obligatory to carry out daily analysis of 24-hourly average concentration of air pollutants to classify days based on the NAQI and implement measures according to the severity of pollution.

It may therefore be helpful to analyze past trends to assess how days so far have been distributed across different NAQI categories of good, satisfactory, moderate, poor, very poor, and severe (see *Box 1: National Air Quality Index and daily emergency response*).

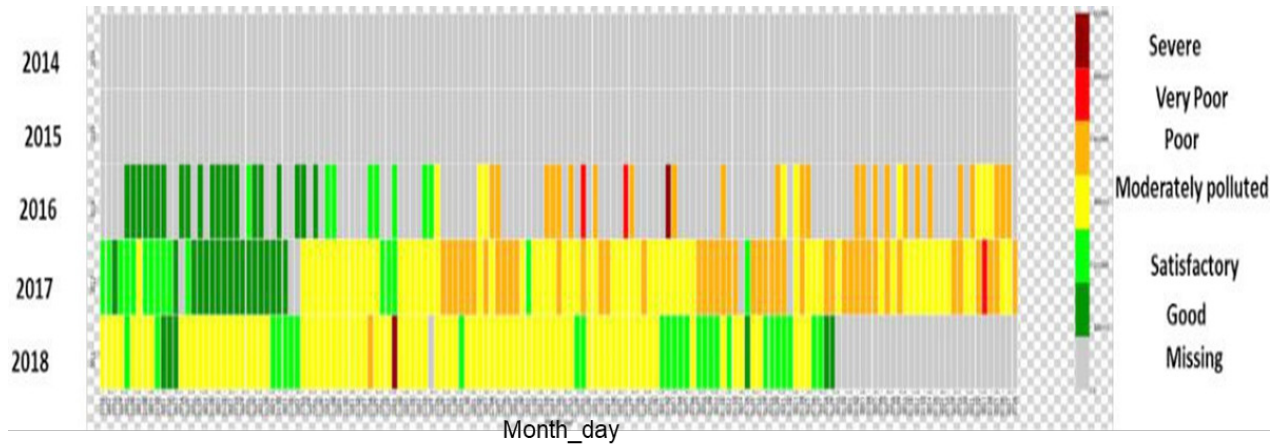
Graph 3: Daily PM_{2.5} trend in Durgapur (August 2016 to 2019, 03 September)



Source: Based on CPCB air quality data of the stations at Sidhu Kanhu Indoor stadium, accessed at <https://app.cpcbcr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data>

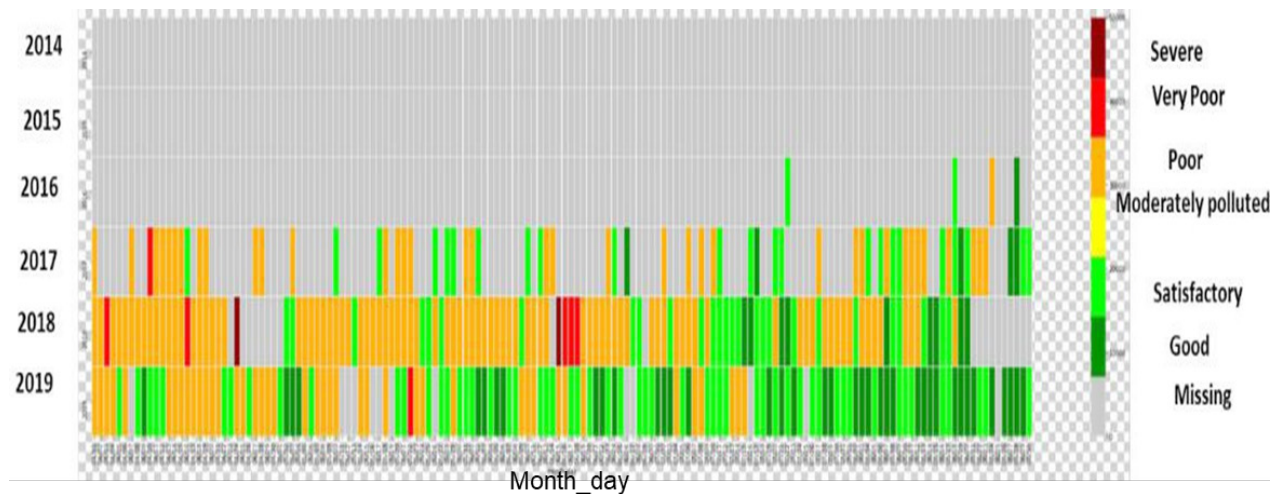
Graph 4: Mapping of seasonal pollution

A: Categorization of PM10 based on AQI categories during winter in Durgapur (01 October to 28 February) 2016–18



Source: Based on CPCB air quality data for Sidhu Kanhu Indoor stadium station, accessed at <https://app.cpcbcr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data>

B: Categorization of PM10 based on AQI categories during summer in Durgapur (01 April to 30 August), 2018–2019



Note: X-Axis represents dates of sampling. Data cycle – 01 March to 04 September of the year in the Y axis.

Source: Based on CPCB air quality data for Sidhu Kanhu Indoor stadium station, accessed at <https://app.cpcbcr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data>

Box 1: National Air Quality Index and daily emergency response

A short-term emergency response is designed to control daily pollution peaks and reduce exposure and associated health risk. Smog episodes largely occur when weather is adverse with calm atmosphere or no wind, cold temperature, and lower mixing height of air that traps air and pollution very close to the ground. This increases exposure drastically. While nothing can be done to control weather, or to remove trapped emissions already present in the atmosphere, short-term policy action can control further loading of emissions and prevent higher smog peaks. This is needed to reduce exposure and protect public health.

The National Air Quality Index (NAQI) and a corresponding health advisory were notified by the Ministry of Environment, Forest and Climate Change (MoEF&CC) in 2015. Based on this index, daily pollutant concentrations are classified and graded as good, satisfactory, moderate, poor, very poor and severe and colour-coded so that the general public can understand the gravity of the problem. The health advisory has also been framed to indicate the expected health outcomes at varying severity of daily air pollution (see *Table 2: National Air Quality Index of India* and *Table 3: Health Advisory at different AQI levels in India*).

Table 2: National Air Quality Index of India

AQI category (Range)	PM ₁₀ 24-hr	PM _{2.5} 24-hr	NO ₂ 24-hr	O ₃ 8-hr	CO 8-hr (mg/m ³)	SO ₂ 24-hr	NH ₃ 24-hr	Pb 24-hr
Good (0–50)	0–50	0–30	0–40	0–50	0–1.0	0–40	0–200	0–0.5
Satisfactory (51–100)	51–100	31–60	41–80	51–100	1.1–2.0	41–80	201–400	0.5–1.0
Moderately polluted (101–200)	101–250	61–90	81–180	101–168	2.1–10	81–380	401–800	1.1–2.0
Poor (201–300)	251–350	91–120	181–280	169–208	Oct-17	381–800	801–1200	2.1–3.0
Very poor (301–400)	351–430	121–250	281–400	209–748*	17–34	801–1600	1200–1800	3.1–3.5
Severe (401–500)	430+	250+	400+	748+*	34+	1600+	1800+	3.5+

Note: Ambient concentration values of all regulated pollutants are compared with corresponding standards, and an exceedance factor is used for qualitative assessment of air quality. Air quality for a particular pollutant is defined as good, satisfactory, moderate, poor, very poor, and severe if concentration value is < 0.5, between 0.5 and 1.0, >1.0 but <1.5, and >1.5 times the standard value for that pollutant respectively.

Source: Ministry of Environment and Forest and Climate Change

Table 3: Health advisory at different AQI levels in India

AQI	Associated health impacts
Good (0–50)	Minimal impact
Satisfactory (51–100)	Minor breathing discomfort to sensitive people
Moderately polluted (101–200)	May cause breathing discomfort to the people with lung disease such as asthma and discomfort to people with heart disease, children and older adults
Poor (201–300)	May cause breathing discomfort to people on prolonged exposure and discomfort to people with heart disease
Very poor (301–400)	May cause respiratory illness to the people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases
Severe (401–500)	May cause respiratory effects even on healthy people and serious health impacts on people with lung or heart diseases. The health impacts may be experienced even during light physical activity

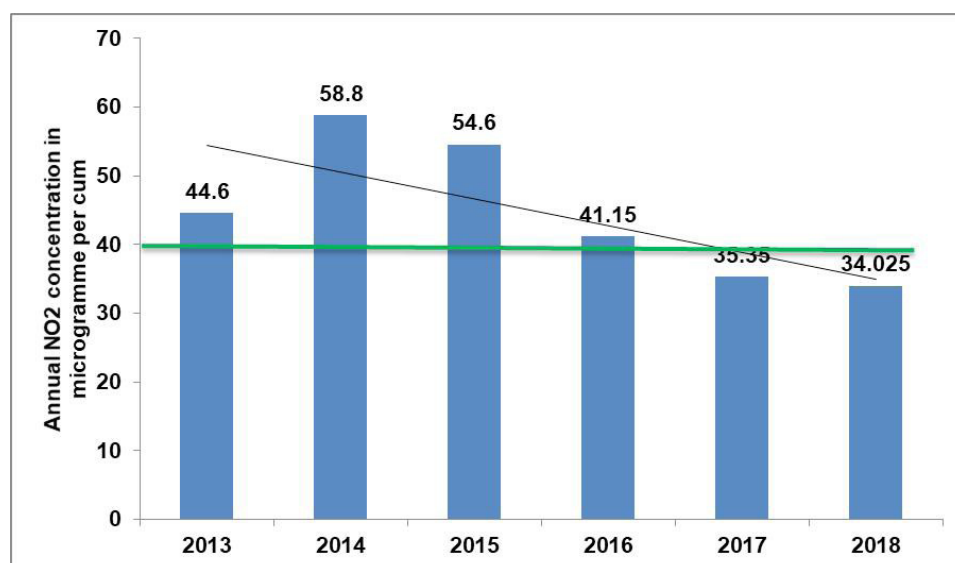
Source: Ministry of Environment and Forest and Climate Change

Long-term annual average trend of NO₂ in Durgapur

Even though the primary focus of the action plan is mitigation of particulate pollution, the trend in nitrogen dioxide has also been analysed. Nitrogen dioxide levels will require special attention as these are strongly correlated with motorization and industrialization. Nitrogen oxide also contributes towards formation of ozone, which is another very harmful gas. Based on the average of last three years, NO₂ ambient concentration is currently below the standard. Data reported by WBPCB shows that the annual average nitrogen dioxide levels have remained high but have declined over the years, and now it is within the annual standard (see *Graph 5: Long-term trend in annual average NO₂ concentration in Durgapur*).

Graph 5: Long-term trend in annual average NO₂ concentration in Durgapur

Data from West Bengal Pollution Control Board (2013–18)



Source: Based on the data provided by WBPCB—For 2013–15 the data was taken for Bidhannagar and from 2016–18 the data was taken for four monitoring stations- Bidhannagar, Benachiti, PCBL More, Angadpur

1.3 Public health evidence

There is local study in Durgapur related to health impact of air pollution. This report takes cognizance of the larger body of health evidences that have been generated in the state. According to findings of a study published in the *Lancet* journal, titled *The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the Global Burden of Disease Study 2017*, 94,534 deaths in West Bengal in 2017 can be attributed to air pollution. While the estimated number of deaths attributed to household air pollution is 49,882; those due to ambient air pollution is 38,846. This is indicative of the fact that people in West Bengal are at a greater risk from household air pollution than ambient air pollution. The report also states that life expectancy in West Bengal would increase by 1.7 years if air pollution concentrations were less than the minimum level causing health loss.

The state's first ever state-level disease burden estimates released by IHME, ICMR and PHFI in 2017 show that air pollution ranks as the third highest risk factor in West Bengal responsible for premature deaths in the state. In the disease profile of the state, ischaemic heart disease has been identified as one of the leading causes of loss of productive life years. These diseases are greatly influenced by air pollution. Air pollution is a serious short-term trigger factor for causing early deaths due to heart disease.

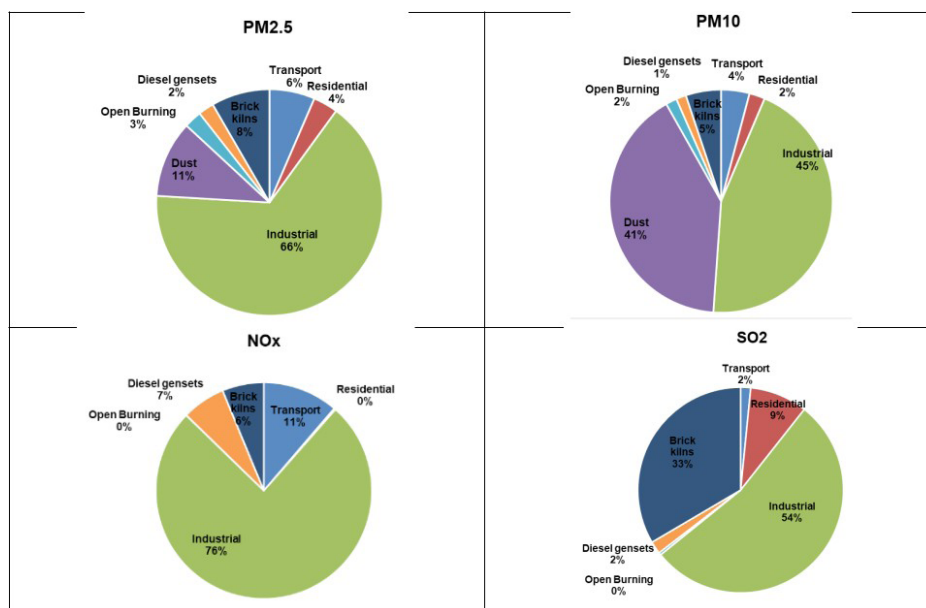
Hence, long-term clean air planning strategies are needed to avert public health emergencies stemming from exposure to high pollution levels. Longer-term systemic strategies need to be put in place to reduce pollution levels over time and reduce long-term risks of developing and worsening respiratory diseases, metabolic diseases, and cancer, which is the end point of toxic risk. Widely investigated link between air pollution and a range of disease profiles have demonstrated an insidious link between air pollution and COPD, ischemic heart diseases, hyper tension, diabetes, effect on brain and a range of cancers. In fact, in 2012 the WHO classified a group of air pollutants as Class I carcinogens and has specially classified diesel emissions as Class I carcinogen for its strong links with lung cancer. Air pollution is a serious contributory risk factor.

2. Pollution source profile and baseline policy action

Air pollution control strategy will need baseline information on the sources and their relative contribution to ambient air pollution concentration as well as population exposure. There is currently no official study on source apportionment and source inventory to bring greater precision in the assessment of the pollution profile of the city. Once these studies are carried out in the non-attainment cities, the action plan can be further modified/refined. The action plan therefore proposes detailed source apportionment and source inventory studies.

In order to draft the current action plan, the available information on the assessment of pollution sources has been taken into consideration. The latest emission inventory for Asansol–Durgapur is available from an independent think tank called Urban Emissions, as of 2018. This study shows that the contribution of the industrial sector in this industrial town to PM_{2.5} is highest at 66 per cent, which is followed by dust at 11 per cent, brick kilns at 8 per cent, transport sector (6 per cent) and residential (4 per cent). The industries are the dominant source as shown by this study for four major pollutants (see *Graph 6: Emission inventory for Asansol–Durgapur based on PM_{2.5}, PM₁₀, NO_x, and SO₂*).

Graph 6: Emission inventory for Asansol–Durgapur based on PM_{2.5}, PM₁₀, NO_x, and SO₂ (for 2018)



Source: Based on UrbanEmissions.info 2018

For the purpose of this report, field visits were organized to identify the key pollution sources in the city. Additionally, feedback was received from concerned regional offices of SPCB. This enabled mapping of the key big sources of air pollution. Even though the exact quantification is not possible without the detailed source apportionment and inventory

studies that will be carried out in the future, it is possible to define the key measures based on the best practices and the desired reduction targets, both of which require deep cuts in emissions from all sources.

2.1. Industry and power plants

The city houses a wide range of industries which includes Durgapur Integrated Steel Plant and Alloy Steel Plant (ASP), the leader in the production of alloy and special steels. The other industries include several units manufacturing sponge iron, ferro alloys, and chemicals, along with power plants, coke oven and rolling mills. The exact number and types of red category industries is elaborated in table 4. The city has access to vast coal reserves located in close proximity, and hence coal is the main fuel used by the industries. There are four thermal power plants and six captive power plants in and around the city. All the power plants use furnace oil for the initial firing process, followed by coal for the subsequent processes. There is also one fertilizer plant which is based on gas but then it is inoperative most of the time. There are no stone crushers and brick kilns in and around the city.

Different technologies are being used in the industry sector to curb the pollution. Power plants are using electrostatic precipitator (ESP). Sponge iron industries use ESP and bag filters whereas ferro alloy industries use only bag filters. Individual industries and industrial units will require mapping of the status and operation of the pollution control equipment and to decide severity of further action. Such efforts are underway. For instance, the main industrial areas in and around the city are Angadpur, Bamunara and Barjora. The area is home to the Raturia-Angadpur Industrial Estate, a major hub established under Asansol Durgapur Development Authority (ADDA).

A large number of industries are registered with the West Bengal Pollution Control Board. WBPCB maintains a record of all regulatory orders, including closure and guidance on its website. A review of the regulatory orders passed between 2015 and 2017 shows that industrial set-ups that have boilers or furnaces are equipped with air pollution control systems like electrostatic precipitators, cyclones, bag filters and scrubbers, etc. However, there are concerns around enforcement and proper operations of pollution control systems. This will require more rigorous on-site continuous emissions monitoring system (CEMS) for compliance. The issue raised by the officer was the absence of a buffer zone as industries and residential areas are often co-located. Another major issue with the industrial pollution is that though the end stack emissions can be monitored and controlled through CEMS, the fugitive emissions originating from different processes such as handling, conveying and storage continue to persist. Further, quality control and adherence to standards during CEMS installation is important.

Industrial pollution control plans and schemes in the state, especially around the targeted non-attainment industrial cities have been framed around the requirements of the designated Critically Polluted areas. Asansol is such a designated Critically Polluted Area. The MoEF&CC through its Office Memorandum dated 13 January 2010 had directed respective SPCBs to prepare Action Plans for each of the Critically Polluted Areas for abatement of pollution. West Bengal Pollution Control Board has prepared separate Action Plan for the Asansol area. Based on

‘Implementation of Action Plan for critically polluted area (Asansol)’ (prepared as of March 2015) several action points have been identified and initiated for air pollution control. Though Durgapur has not been designated a Critically Polluted Area, formulation of a similar plan is required, in the context of the current air quality scenario.

Table 4: Red category industrial units impacting air quality in Durgapur Subdivision

Industrial unit type and process	Number of units in the region
Iron & steel (involving processing from ore / integrated steel plants) and or sponge iron units	42
Mining and ore beneficiation	40
Ferrous and Non-ferrous metal extraction >1 MT/hr involving different furnaces through melting, refining, reprocessing, casting and alloy making and including metal extraction	34
Coke making, liquefaction, coal tar distillation or fuel gas making	16
Cement secondary units	11
Ceramic, refractories having coal consumption ≥ 12 MT / day	6
Industrial inorganic gases processing units namely: a) Chemical gases: acetylene, hydrogen, chlorine, fluorine, ammonia, sulphur dioxide, ethylene, hydrogen sulphide, phosphine [filling/refilling of CO ₂ gas] b) Hydrocarbon gases: methane, ethane, propane	6
Power generation plant (including waste to energy plants >15 MW capacity which attract provisions of EIA Notification, 2006 as amended) [except wind and solar renewable power plants of all capacities and mini hydel power plant of capacity <25 MW] (other than thermal power plants)	5
Steel and steel products using various furnaces like blast furnaces / open hearth furnace / induction furnace / arc furnace / submerged arc furnace / basic oxygen furnace [industries attracting EIA (Notification) 2006 as amended]	5
Industrial carbon including electrodes and graphite blocks, activated carbon, carbon black	4
Parboiled rice mills (waste water generation ≥ 100 KLD or fuel ≥ 12 MTD or both)	3
Any industry / industrial activity (irrespective of category), having solid fuel fired boiler / Thermic Fluid Heater (TFH) irrespective of capacity or oil / gas fired boiler >5 TPH	2
Industry or process involving metal surface treatment or process such as pickling / electroplating / paint stripping / heat treatment using cyanide bath / phosphating or finishing and anodizing / enamellings / galvanizing	2
Petrochemicals manufacturing (including processing of emulsions of oil and water)	2
Processes involving chlorinated hydrocarbons [including rigid PVC pipe manufacturing]	2
Aluminium smelter	1
Automobile manufacturing (integrated facilities) and heavy engineering including ship building (with investment on plant and machinery >10 crore)	1
Industries engaged in recycling / reprocessing / recovery / reuse of hazardous waste	1
Industry or process involving foundry operations (foundries having capacity ≥ 5 MT/hr and requiring coal / coke consumption ≥ 500 kg/hr)	1
Industry or process involving metal surface treatment or process such as pickling / electroplating / paint stripping / heat treatment using cyanide bath / phosphating or finishing and anodizing/enamellings / galvanizing	1
Manufacturing of explosives, detonators, fuses including management and handling activities [including manufacturing of safety match]	2
Oil and gas extraction including CBM (offshore and on-shore extraction through drilling wells)	1

Source: Analyzed from the data provided by the WBPCB and regional offices

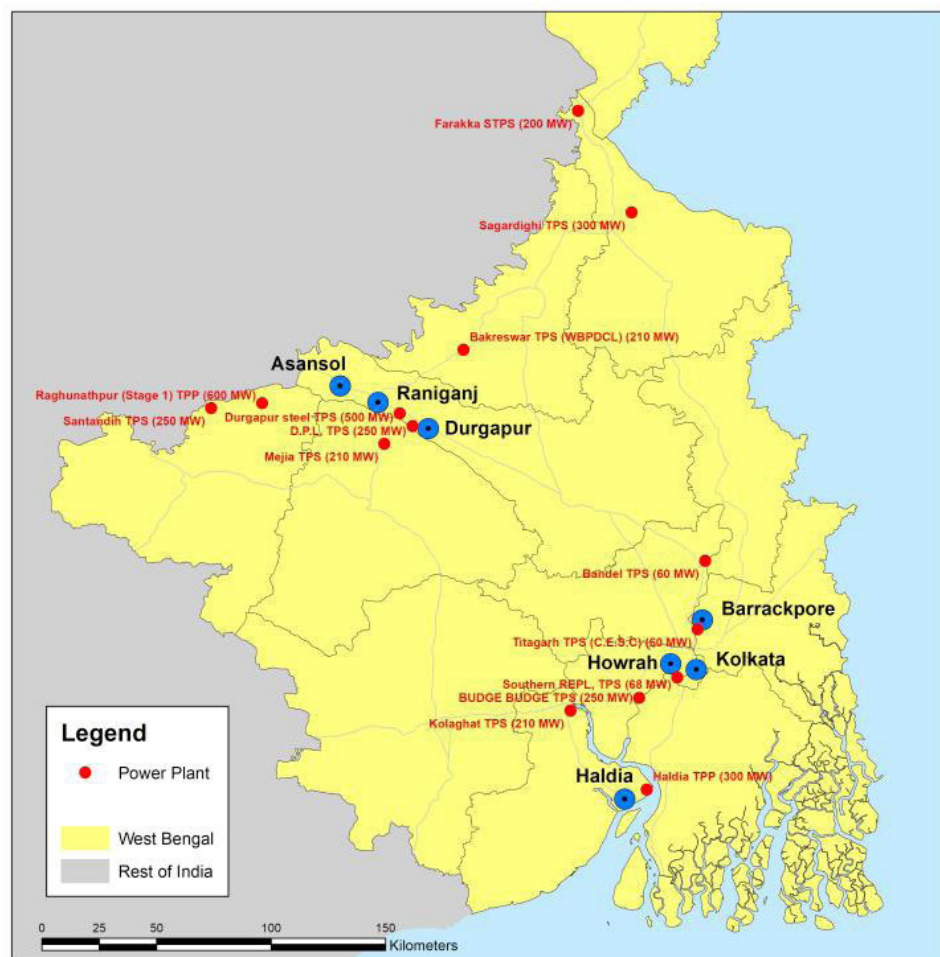
Table 5: Details of thermal power plants in and around Durgapur city

Three plants are within 32 to 58 year old, therefore, compliance to new regulations will be necessary for upgradation

Sr. no.	Name of the power plant	Capacity (cumulative)	Year of commissioning	Coal consumption
1	NTPC-SAIL Power Company Ltd	86.40 MU	February 1987	75,000 MT/month
2	Durgapur Thermal Power Station	151.20 MU	December 1982	54,744.16 MT/month
3	The Durgapur Projects Limited	660.00 MW	September 1961	280,000.00 MT/month
4	Durgapur Steel Thermal Power Station	720.00 MU/month	May 2012	400,000.00 MT/month

Source: Based on data provided by WBPCB / Regional Offices

Map 1: Location of thermal power plants in West Bengal



Emissions standards and locational policy: Industrial pollution management is governed by the emissions standards fixed by the Central Pollution Control Board. Both existing and new standards will have to be implemented with strong compliance and penal requirement. While the ongoing effort will be strengthened further, the new set of emissions standards that have been framed recently will require immediate implementation. For instance, the new SO_x and NO_x standards that have been notified by the MoEF&CC for the 16 groups of industries following the direction of the Supreme Court on 29 January 2018. Further strengthening of siting policy for industrial units will help to reduce exposure and public health risk in populated areas.

The Industrial Siting Policy in West Bengal clearly states that setting up of any red category industries is not permitted within the municipal areas of Kolkata Metropolitan Area (KMA) and Bardhaman district except at the Jamuria industrial estate. However, with adequate pollution abatement technologies/systems, red category industries can be set up outside the KMA and Bardhaman district.

Industrial fuel quality: In addition to improving and advancing the emission control systems in industry, ensuring use of cleaner fuels will provide a more systemic solution. Often due to wide difference in pricing of industrial fuels, the dirty bottom of the barrel fuels like petroleum coke and fuel oil, etc. are widely used. In smaller units unregulated fuels like tyre oil, etc. are used. The WBPCB is considering a switch to cleaner fuels like oil or gas to reduce particulate emission load from industrial operations. Some of the industries in the city have already begun using coalbed methane but continuous supply remains a challenge. This is a step in the right direction and in line with the action being taken in other states to control and discourage dirty fuels.

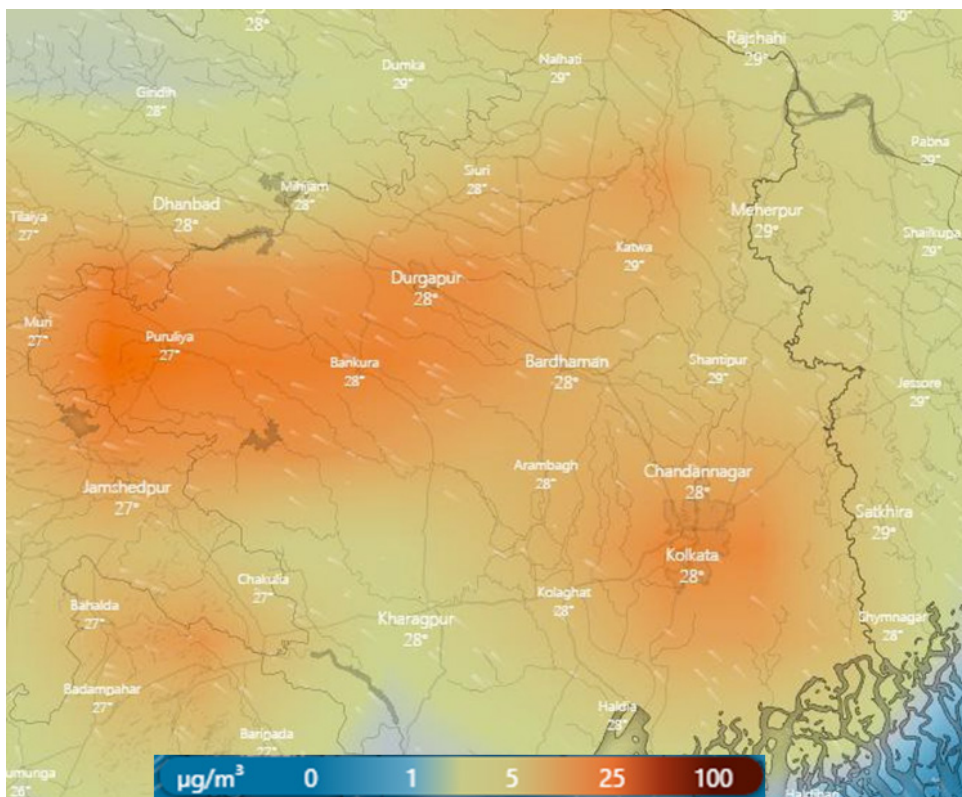
Clean fuel strategy along with stringent emissions control systems will require an incentive policy to make a supply plan and infrastructure for cleaner fuels. Adoption of a favourable taxation and pricing policy to make cleaner fuels competitive vis-a-vis the dirty fuels will aid a gradual shift to clean fuels for industries (such as natural gas, electricity, and low-sulphur fuels). Access to natural gas and oil is improving in the state and may be leveraged to promote their usage in the industrial sector as much as possible with a proper pricing and regulatory policy. Usage of coal will require stringent emission control system and monitoring.

Dirty fuels are also used in small and unauthorized units without pollution control systems. There are also risks of several unregulated oils like recycled oil, tyre oil, etc. causing enormous toxic pollution.

In view of the growing use of heavy furnace oil in the sector it is important to take on board the national level development in this regard for future reference and roadmap. The concerns over the growing use of pet coke and furnace oil in industry that have very high sulphur and heavy metal content have led to the notification on the emissions standards for SO_x and NO_x following the direction of the Hon'ble Supreme Court. This is needed to enable effective uptake of improved emissions control systems to control these gases. Testing of petroleum coke and fuel oil used for combustion was found to contain as high as 75,000 ppm and 20,000 ppm of sulphur respectively.

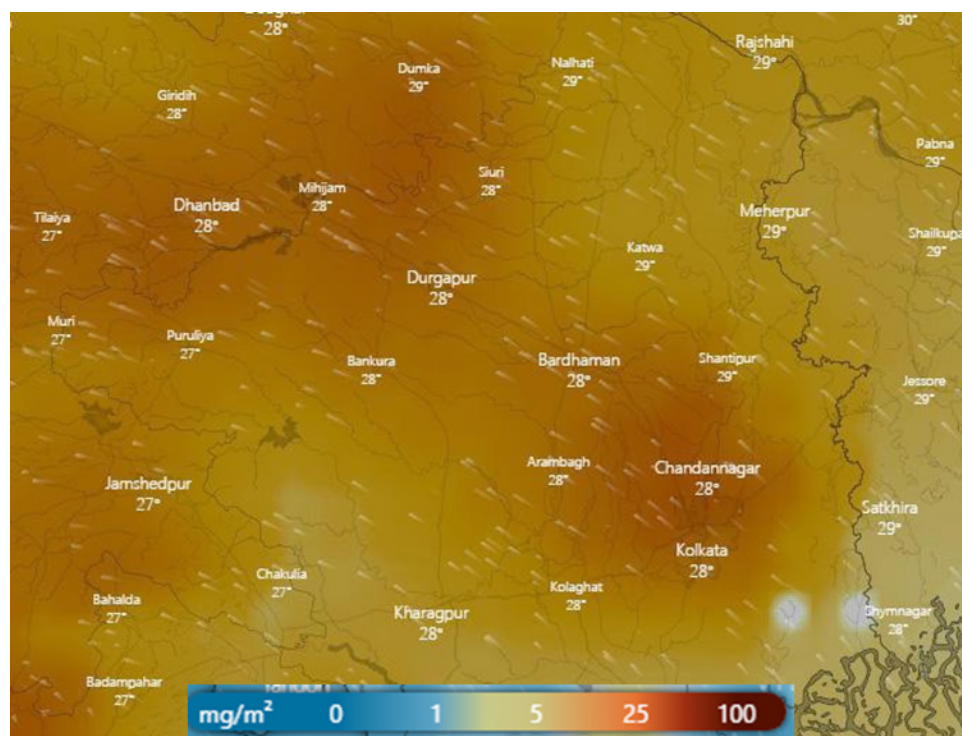
Current transport fuels have 50 ppm sulphur that will be further lowered to 10 ppm sulphur in 2020. Fuels containing high levels of sulphur lead to high emission of particulates, gaseous emissions like SO_x and contribute to 'secondary' particulate load. High-sulphur fuels also contain heavy metals, which add to the toxicity and contamination of the environment. The Supreme Court of India vide order of 24 October 2017 has banned use and sale of petroleum, coke and fuel oil in Haryana, Rajasthan and Uttar Pradesh. Delhi had banned these fuels in 1998. Only the cement industry is allowed to use this as feedstock but not fuel. Further, by the order dated 13 July 2018, the Supreme Court has asked for a ban on import of pet-coke into India, with specific exemptions given to four categories of Industries. The Ministry of Commerce, GOI has issued an order dated 17 August 2018 to this effect. Further, under India's commitments to the WTO, the country's laws are bound to treat imported and domestic pet coke equally. As of November 2018, the Ministry of Commerce & MoEF&CC are considering restricting the usage of all pet coke in India—domestic and imported. In the future, policy instrumentssuchastaxincentivesmightbeexploredasanoptiontoincentivize industries to upgrade technologies and fuel that will bring down emissions. Use of dirty fuels has a significant effect on the concentrations of ambient SO₂ and NO₂. Satellite data help to visualize the regional level build up of pollutants. The satellite measures the total amount of pollution from the Earth's surface to the top of the atmosphere, which is related to, but not the same as, the concentration at the surface. The Windy data shows how pollution can travel with the wind and is a visualization of the dispersion of pollution due to the wind and not the absolute pollution that is present in a region.

Figure 1: NO₂ spread as on 04 September 2019



Source: Windy.Com, as accessed on September 4, 2019

Figure 2: SO₂ spread as on 04 September 2019



Source: Windy.Com, as accessed on September 4, 2019

Analysis of emissions from red category industries located in Durgapur (including Raturia-Angadpur Industrial Estate)

Based on the data provided by WBPCB / Regional Offices, there are 192 industrial units operating in the region, including thermal power plants, sponge iron units and foundries. Area under study included the Raturia-Angadpur Industrial Estate managed by Asansol Durgapur Development Authority. WBPCB has shared emissions data from the industrial units. These have been analyzed to i) assess the exceedence from the emissions standards and therefore the level of non-compliance; and ii) estimate pollution load from the industrial units to understand relative contribution of the different units to the total pollution load.

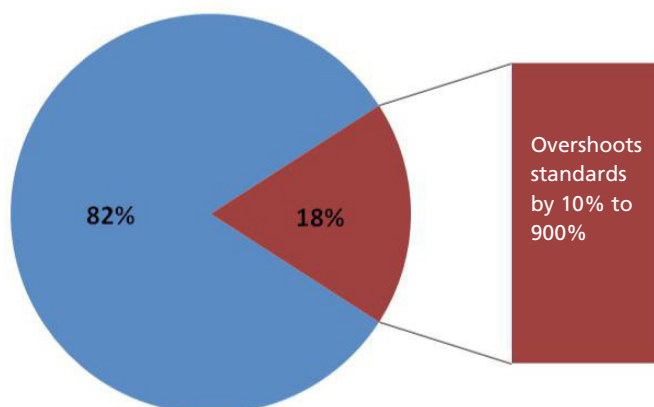
Average sampling time for PM was 31 minutes. Out of all industries surveyed, non-compliance was observed in steel plants, rolling mills, sponge iron units, ferro-alloy manufacturing units, paper mills and thermal power plants. Total PM emission load for the area was found to be 19.816 tonnes per day (within an area of 154 sq. km covering 192 units under DMC).

The CPCB Standards for PM emissions is <150 mg/Nm³. About 82 per cent of industries have been found to be compliant with the standards. Durgapur has a fair share of non-compliant units in terms of PM emissions. The non-compliant industries have been found to be exceeding emissions standards from over 10 per cent to 900 per cent (see *Graph 7: Extent of compliance with the standard*).

The detail of status of compliance is available. This includes names of firms and cause of high pollution. Even though the names of different units might be similar, it has been possible to identify different units (see *Table 6: PM emissions from non-compliant units*).

Graph 7: Extent of compliance with the standards

■ Compliant Units (PM <150 mg/Nm³) ■ Non Compliant Units (PM >150 mg/Nm³)



Source: Based on the data provided by the Department of Environment for 2016 and 2017

Table 6: PM emissions from non-compliant units for 2016 and 2017

Name of firm	Cause of high Emission	PM (mg/ Nm ³)	Exceeds CPCB standards by (%)
Bhaskar Sharachi Alloys Ltd	Oxidation of coal and reduction of manganese ore	168.46	12.306
C.P. Sponge Iron Pvt. Ltd.	Unspecified process activity	1621.37	980.913
NTPC SAIL Power company Pvt Ltd	Burning of coal	286.46	90.973
NTPC SAIL Power company Pvt Ltd	Burning of coal	538.27	258.846
Graphite India LTD	Furnace operations	166.25	10.8333
Durgapur Chemicals Ltd	Burning of coal	339.78	126.52
Durgapur Thermal Power Station (DVC)	Burning of coal	280.98	87.32
Alloy Steel Plant	Melting of scrap	722.72	381.813
The Durgapur project limited	Combustion of coal	552.12	268.08
NTPC SAIL Power company Pvt Ltd	Combustion of coal	321.46	114.306
NTPC SAIL Power company Pvt Ltd	Combustion of coal	437.3	191.533
Jaishree Steels (P)Ltd (unit II)	Unspecified process activity	582.62	288.413
KIC Metaliks Ltd	Combustion of BF Gas & Coke	228.52	52.346
KIC Metaliks Ltd	Dosing process	327.47	118.313
Durgapur project Ltd	Combustion of coal	400.2	166.8
Pinax Paper Mill (P) LTD	Combustion of paddy husk	530.91	253.94
Jai Balaji industries Ltd unit (IV)	Oxidation of coal & Reduction of Fe ore	620.71	313.806
Jai Balaji industries Ltd unit (IV)	Oxidation of coal & Reduction of Fe ore	367.41	144.94
Jai Balaji industries Ltd unit (IV)	Combustion of coal	232.65	55.1
Durgapur Steel Plant	Burning of coal and BF gas	288.22	92.146
NSPCL (NTPC-SAIL Power Co Ltd)	Burning of coal	324.94	116.626
NSPCL (NTPC-SAIL Power Co Ltd)	Burning of coal	434.38	189.586

Name of firm	Cause of high Emission	PM (mg/ Nm ³)	Exceeds CPCB standards by (%)
Philips Carbon Black Ltd	Process activity	692.41	361.606
Durgapur Steel Plant	Burning of coal and BF gas	162.95	8.6333
Durgapur Projects Ltd	Combustion of coal	226.8	51.2
Durgapur Projects Ltd	Combustion of coal	436.75	191.166
NSPCL Durgapur	Burning of coal	1577.74	951.826
NSPCL Durgapur	Burning of coal	190.02	26.68
Pinax Paper Mills (P) Ltd	Combustion of paddy husk	4080.28	2620.186
NSPC-SAIL Power Company Ltd (Captive Power Plant-II)	Combustion of coal	542.71	261.806
Durgapur Chemicals Ltd	Combustion of coal	190.81	27.206
Rishav Trade Fin Ltd	Reduction of Fe ore & combustion of coal	714.49	376.326
Haldia Steel Pvt Ltd (unit II)	Oxidation of coal & reduction of Fe ore	216.44	44.293
Rishav Trade Fin Ltd	combustion of coke & reduction of Fe ore	155.14	3.4266

Source: Based on the data provided by the Department of Environment

All non-compliant units bypass CPCB standards, despite having APC devices.

It is suggested to check for quality of these measures and alter processes with best practices associated with the industry type. Currently most non-compliant units use bag filters, ESPs, gas cooling systems and multi-cyclones. However, 34 non compliant units alone contribute to an enormous 14.609 tonnes/day of PM emissions.

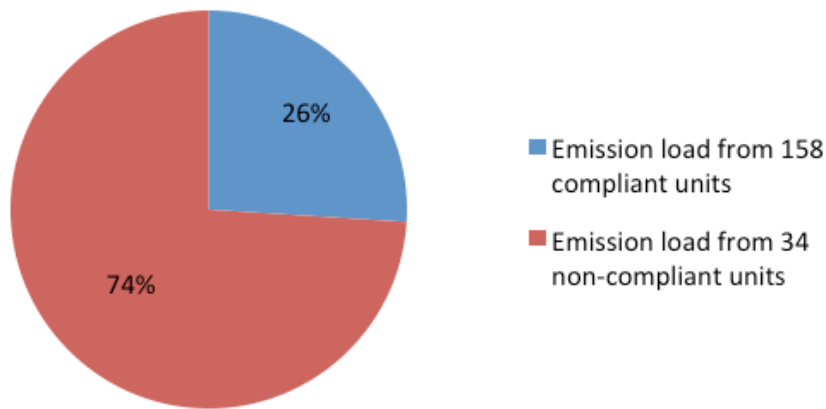
Contribution of non-compliant units to total pollution load from the industrial units

Additional analysis has been carried out to assess contribution of the non-compliant units to the pollution load from the industrial units assessed in Durgapur. Out of the total operating units that have been assessed in the area, 158 or 82 per cent are compliant. But 34 units or 18 per cent that are not non-compliant contribute as much as 73.7 per cent particulate load from all units. This indicates more stringent and targeted action and compliance can substantially improve the overall pollution level in this industrial town.

Table 7: Analysis of emission load from non-compliant units for 2016 and 2017

Parameter(s)	Values
Total units operating in the area	192
Number of compliant units	158
Number of non-compliant units	34
Total load	19.816 tonnes/day
Combined emission load of non-compliant units	14.609 tonnes/day
Combined emission load of remaining compliant units	5.207 tonnes/day
Percentage contribution by non-compliant units	73.7

Source: Based on the data provided by the Department of Environment

Graph 8: Contribution of non-compliant industrial units to total particulate load from the industrial units

Source: Estimated based on the emissions data from the Department of Environment based on 2016 and 2017

Analysis of stack height

Stack height determines higher dispersal of emissions to minimize local impacts. Central Pollution Control Board recommends that all industrial units (except thermal power plants), must have a minimum stack height of 30 metres from ground. In case of power plants, if production is 200/210 MW or less than 500 MW, minimum stack height is 220 metres. For capacity above 500 MW, stack height should be above 275 metres. Stack height may also be determined by rate of SO₂ emissions using the equation:

$$H = 14 \cdot (Q)^{0.3}$$

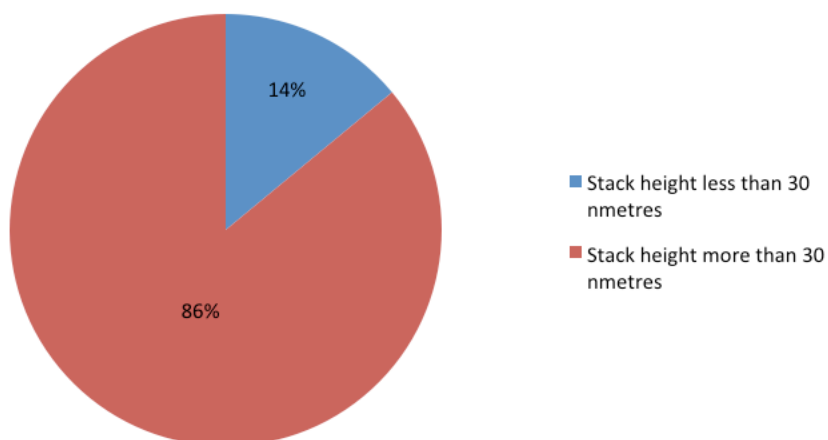
Where:

H = Stack height in metres

Q = Emission rate of SO₂ in kg/hr

For Durgapur, a total of 27 units have been found to have stack height below 30 metres. Some stack heights are below 10 metres, which is unacceptable for any industry type (see *Graph 9: Status of compliance with the requirements of stack height*).

Graph 9: Status of compliance with the requirements of stack height



Source: Based on the data provided by the Department of Environment for the years 2016 and 2017

Fugitive emissions

Stack emissions are only one part of the problem. There is also an additional and huge problem of fugitive emissions. Usually information on fugitive emissions is limited and not available. There are records for TSPM ($\mu\text{g}/\text{m}^3$) and RSPM ($\mu\text{g}/\text{m}^3$) only for some industrial units. SO_x and NO_x concentrations were not recorded. It is suggested to monitor SO_x and NO_x for all units. A generic advisory for management of fugitive emissions within industries has been provided in the Action Plan (see *Table 8: Generic guidance to reduce fugitive emissions from key industries in West Bengal*).

Table 8: Generic guidance to reduce fugitive emissions from Key industries in West Bengal

Sr. no.	Industry type	Key sources of fugitive emissions	Suggested strategies for reduction
1.	Cement	Limestone and coal crushers, vents and tunnels in raw mill and coal mill sections, clinker silo vents, vents in clinker silos, surge bins and cement silos. Packing machines (silos to cement bags). Non process emissions from roads, internal transfers, raw material stockpiles and product stockpiles.	Use of DSS, bag filters on all vents. All transfer points to be fully enclosed, windbreak walls or greenbelt on three sides of open stock piles. Dry fly ash to be transported by closed tankers. Fly ash to be removed immediately after drying. Provisions for dust extraction arrangement for packing machines to be made. All silo vents to be provided with a bag filter type system to vent out the air borne fines. All roads on which vehicle movement of raw materials or products takes place to be paved. Use of mobile road cleaners and use of tarpaulin covers for open stock piles to be made mandatory.
2.	Parboiled and regular rice mills (waste water generation ≥ 100 KLD or fuel ≥ 12 MTD or both)	Open storage bins, de-stoner machines, different stages of lifting and discharging of paddy /rice through bucket elevators, aspirators used for husk removal, boiler ash conveyance from boiler to trolley, uncovered and unprotected disposal sites, rice graders in the milling section, leakages in the ducts/flanges from boiler to stack.	Ash generated in furnace to be manually taken out in pits. Storage of rice husk only in closed areas. Cyclone cum bag-filters in pre-cleaning areas. Dust extraction systems for de-stoners, paddy weighing machines, paddy separator / huller and aspirators. Blowing of husk in storage areas to be done in a closed room. During transportation of husk through vehicles, it should be covered from all sides with tarpaulin to prevent wind blowing of husk. During loading & unloading of ash, water to be sprayed periodically to keep the ash heap in wet condition so that top layer remains wet thereby prevent blowing of ash particles due to wind. Mill location to be in line with CPCB guidelines (away from highways). The industry to carry out thick plantation of spreading crown trees all along the boundary wall of the plant. For large rice mills, a green belt of 3 m width shall be developed. For other rice mills, at least 2 rows of trees shall be developed along the boundary wall of plant.
3.	Iron & steel (involving processing from ore / integrated steel plants) and/or sponge iron units AND Steel and steel products using various furnaces like blast furnaces / open hearth furnace / induction furnace / arc furnace / submerged arc furnace / basic oxygen furnace [industries attracting EIA (Notification) 2006 as amended]	Loading/unloading of granular raw materials, leakage from coke oven battery doors, lids and gas off-takes, pushing of coke, quenching of coke, crushing and screening of slag, tapping of molten metal and slag, charging of furnace, pressure relief devices in gas/vapour service.	Use of hoods and enclosure for all process equipment, use of covered or enclosed conveyors and transfer points, hooding of emission controls of the blast furnace tapping operations and discharge of molten metal and slag, covering of ladles containing molten metal, Scrap Management Program for the prevention or minimization of contaminants in steel scrap and other feed materials, enclosures for emission controls of the charging and tapping operations. Minimizing the number of flanges by welding piping connections wherever possible and using appropriate sealing for flanges and valves, wet quenching of coke as opposed to conventional quenching, use of larger oven chambers and regulation of pressure within oven chambers.

Baseline industrial policy measures

Several policy measures have been initiated to address industrial pollution.

- Strategies for pollution control for the designated critically polluted areas.
- Stricter location policy for new industrial units and restriction on setting up of red category industries in municipal area of Kolkata Metropolitan Area and Bardhaman district except Jamuria industrial estate. But with adequate pollution abatement technologies/systems, red category industries can be set up outside the KMA and Bardhaman district.
- Efforts to ensure regulatory compliance for grossly polluting industries.
- West Bengal Pollution Control Board notified stricter emission standards for boilers, ceramic kilns, foundries and rolling mills with effect from 11 May 2001. These emission standards are stricter than national emission standards.
- **Mandatory use of clean fuels:** Replicate Kolkata model of incentivizing small and medium-scale units to improve and replace boilers and coal fired down draft kilns. Create awareness on use of solar energy for commercial and industrial application. Incentivize renewable energy practitioners with tax incentives to add to the long term cost effectiveness of solar energy. Rooftop and community based solar devices to be encouraged, as envisaged in West Bengal Renewable Energy Policy.
- **Promote use of LPG in small industries:** As per data received from West Bengal Industrial Development Cooperation, 133,828 LPG connections were issued as of October 2019 by Hindustan Petroleum Cooperation Limited. This is a welcome move and small-scale units should be encouraged to use LPG wherever feasible. Exemption of registration fees may be given after discussions with HPCL.
- Financial assistance to the small industries for pollution control by the WBPCB and the state government. The WBPCB is encouraging the industries to go 'beyond compliance' and good performers are honoured with 'environmental excellence awards'.
- **CEMS monitoring and data:** WBPCB, through its online CEMS (continuous emission monitoring system) portal, provides stack emission and effluent discharge information. However, at this stage this information is not available for most industries. This is certainly an opportunity for better management and monitoring of CEMS portal for the listed industries for improved monitoring.
- **Enforcement of new NO_x and SO_x standards in the industry:** MoEF&CC has notified new NO_x and SO_x standards for 16 groups of industries in March 2018. This opens up new opportunity for disciplining industrial emissions and accelerating use of clean fuels.
- **Comprehensive consent mechanism:** All industries of the state are required to go through a comprehensive consent mechanism prior to

establishment as well as prior to operation following the transparent ‘industrial siting policy’ prevalent in the state. Once the industries are established and operational, they are subject to priority surveillance and monitoring of their environmental performance. All non-compliant industries are subjected to regulatory action.

- In addition, Central emission regulation Part-3 is to be implemented. An order issued to all state and Union Territory pollution control boards to not issue renewal notices or mention it in the consent to establish or consent to operate document, and to provide stack monitoring facility to all stacks with boilers in accordance with the order.
- **Data reporting and storage:** A comprehensive and lucid data recording and sharing policy must be drafted for industrial pollution management. This will include detailed data protocol for recording emissions from industries along with a systematic data maintenance system. This may be uploaded to a central server with limited access to compliance officers.

Table 8: Best available technology for abating pollution levels in industries

Industry Type	Existing technology/ process and emission challenges	Strategies for Improvement	
		Suggested immediate changes	International BAT (Long term)
Iron & Steel (involving processing from ore / integrated steel plants) and or Sponge Iron units	Installation of Coke Dry Quenching (CDQ); Installation of Top Gas Recovery Turbine (TRT); Introduction of Coal Dust Injection (CDI); Waste Heat Recovery in Sinter Plant; Waste Heat Recovery at Blast Furnace Stove and; Use of By-product Fuel for power generation	Direct Reduction Electric Arc Furnace ¹⁰ and Pulverized coal injection method	Direct Reduction Iron-making (DRI) ¹¹
Ferrous and Non-ferrous metal extraction >1 MT/hr involving different furnaces through melting, refining, reprocessing, casting and alloy making and including metal extraction	Nothing specific, each industry may have specific processes. Most coal fired boilers have been converted to Oil/Gas fired driers, preferably with Coal Bed Methane (CBM)	More data/information needed on type of metal being extracted.	Generic Process include: Boliden Norzink process for Mercury removal, Selenium Filter, Activated Carbon, Jeritt Process ¹² for removal of other HAPs.
Coke making, liquefaction, coal tar distillation or fuel gas making	Most coal fired boilers have been converted to Oil/Gas fired driers, preferably with Coal Bed Methane (CBM)	Switch to Coke Dry Quenching System (CDQ), already used by Tata Steel ¹³	The Kress Indirect Dry Cooling (KIDC), Inert Gas Blanketing ¹⁴
Cement	Bag Filter with Ball Mill & Cyclone Separator with Coal fired Slag drier	Rotary dry-process kilns, use of alternative fuel such as biomass, Refuse Derived Fuel (RDF), Use of additive materials such as fly ash / blast furnace as clinkers	Use of alternative fuel such as rice husk, utilization of red mud as alternative fuel, etc ¹⁵ . Consider development of Limestone based cement and low carbon cement as a possible long term strategy ¹⁶ .

Industry Type	Existing technology/ process and emission challenges	Strategies for Improvement	
		Suggested immediate changes	International BAT (Long term)
Ceramic, Refractories having coal consumption ≥ 12 MT / day	Wet scrubber with coal fired DD Kilns furnace. Refractory manufacturing units have switched over to new generation producer gas fired Shuttle kiln, Tunnel Kiln or Push-bat kiln which are much more fuel efficient kilns for environment friendly operations	Shift to natural gas or CBM, maintain power factor at 0.99, Replacement of Existing Standard Efficiency Motors by Energy Efficient Motors, Install automatic air-fuel ratio system in kiln 17	Use of spray drying, reduce channelled emissions from hot off-gases by applying electrostatic precipitators or wet dust separators, applying flue-gas cleaning with a fabric filter and spray glazing ¹⁸
Steel and steel products using various furnaces like blast furnaces/open hearth furnace/induction furnace /arc furnace/ submerged arc furnace/basic oxygen furnace [industries attracting EIA (Notification) 2006 as amended]	Similar to iron and steel (involving processing from ore / integrated steel plants) and or Sponge Iron units		
Industrial carbon including electrodes and graphite blocks, activated carbon, carbon black	More data/information needed	Shift from inefficient induction furnaces to electric arc furnaces.	More data/information needed
Industry or process involving metal surface treatment or process such as pickling, electroplating, paint stripping, heat treatment using cyanide bath, phosphating or finishing and anodizing, enamelling or galvanizing	More data/information needed	More data/information needed	Closed conveyors, pneumatic conveying, Sealing of furnaces and reactors, Use of dust extraction system to remove dust and particulates from working areas/ buildings ¹⁹
Aluminium smelter	More data/information needed	Control of fluorides by using dry scrubbing system for the smelter gases, controlling pollution and also recycling the fluorides thus affecting economy in the consumption of cryolite and aluminium fluoride.	Use of inert electrodes; Use of wetted cathodes; multipolar cells; carbothermic reduction; kaolinite reduction; low-temperature reduction; use of ionic liquids ²⁰
Industry or process involving foundry operations(foundries having capacity ≥ 5 MT/hr and requiring coal / coke consumption ≥ 500 kg/hr)	Nothing specific, coal-fired boilers have been converted to oil/gas fired drier, primarily using CBM	Use of cupola furnace in place of Induction furnace; Installation of automatic air flow controller/flue gas monitoring to check excess air: Replace conventional cupola with Divided blast cupola; Install LEDs/magnetic lamps in place of conventional lights. ²¹	Use of enclosed conveyors, Use of induction furnaces, use of cupola furnaces, and direct oxygen induction. ²²

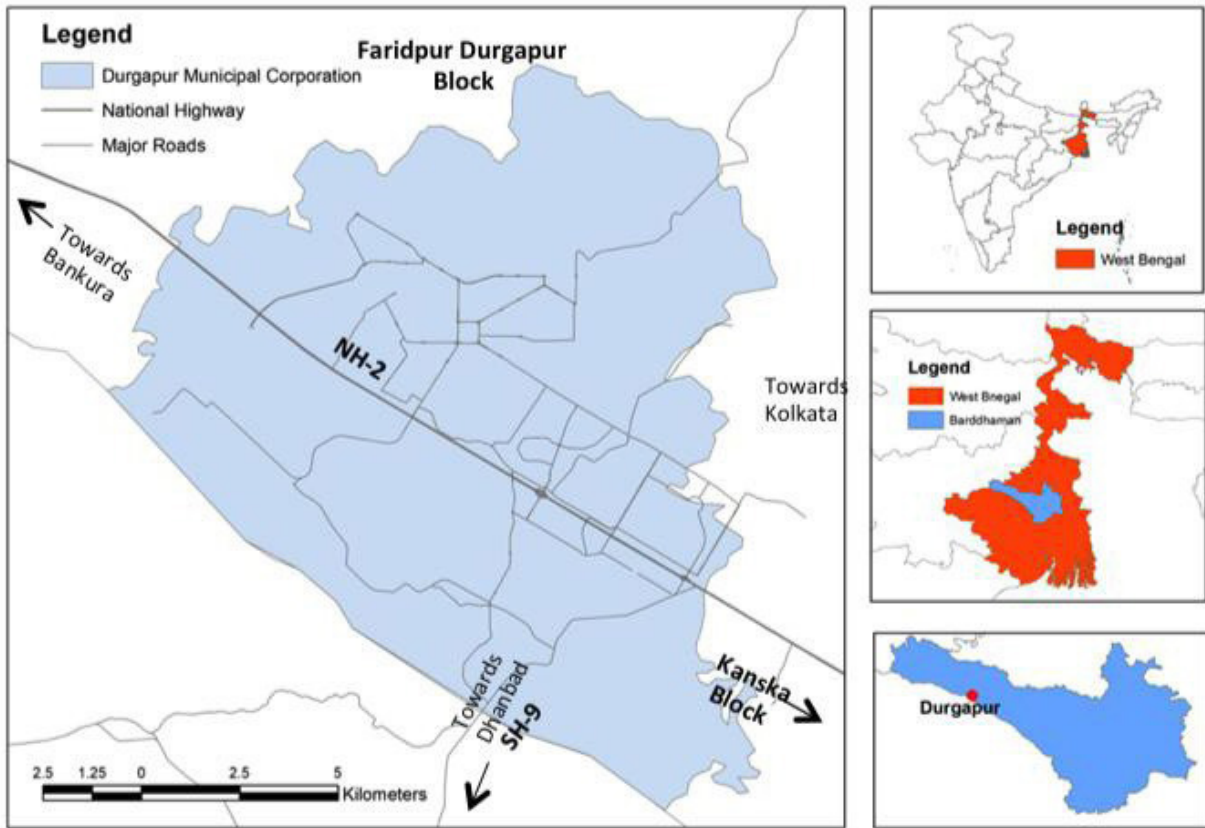
Industry Type	Existing technology/ process and emission challenges	Strategies for Improvement	
		Suggested immediate changes	International BAT (Long term)
Processes involving chlorinated hydrocarbons [including rigid PVC pipe manufacturing]	More data/information needed	Only generic methods available for overall plastic industry. More data/information needed on type of industries present	Chlorine to be sourced from membrane cell or asbestos-free diaphragm cell chlorine production processes. Chlorine should be sourced from production plants using non-graphite anodes. Chlorine produced by mercury cell processes shall not be sourced. VCM shall be sourced from non-mercury production processes ²³
Power generation plant (including waste-to-energy plants >15 MW capacity which attract provisions of EIA Notification, 2006 as amended) [except Wind and Solar renewable power plants of all capacities and mini hydel power plant of capacity<25 MW] (Other than Thermal Power Plants)	More data/information needed	More data/information needed on each type of plant to suggest suitable interventions	More data/information needed on each type of plant to suggest suitable interventions
Industrial inorganic gases processing units namely: (a) chemical gases: acetylene, hydrogen, chlorine, fluorine, ammonia, sulphur dioxide, ethylene, hydrogen sulphide, phosphine [filling/refilling of CO ₂ gas] (b) Hydrocarbon gases: methane, ethane, propane	More data/information needed	Use of bag filters, as recommended by CPCB	More data/information needed on each type of plant to suggest suitable interventions as each gas has multiple optimum processes
Parboiled rice mills (Waste Water generation ≥100 KLD or fuel ≥12 MTD or both)	More data/information needed	Use of dust extraction systems fitted with bag filters at each step of production, such as belt conveyors, bucket elevator, storage silo vents etc. Use of a closed room type enclosure for blowing & storage of rice husk. Creation of value chains for Rice Husk Ash (RHA) such as use in cement industry and alternative fuel. Comply with CPCB guidelines ²⁴ for rice mills	More data/information needed
Any industry / industrial activity (irrespective of category), having solid fuel fired boiler / Thermic Fluid Heater (TFH) irrespective of capacity or oil / gas fired boiler >5 TPH	More data/information needed on present interventions	More granular data/ information needed on nature of industries to suggest strategies	More granular data/ information needed on nature of industries to suggest BATs

Industry Type	Existing technology/ process and emission challenges	Strategies for Improvement	
		Suggested immediate changes	International BAT (Long term)
Mining and ore beneficiation	More data/information needed on specific ore type	More data/information needed on specific ore type	More data/information needed on specific ore type
Petrochemicals Manufacturing (including processing of Emulsions of oil and water)	More data/information needed	More data/information needed	More data/information needed
Industries engaged in recycling / reprocessing / recovery / reuse of Hazardous waste Automobile manufacturing (integrated facilities) and heavy engineering including ship building (with investment on plant and machinery >10 crores	More data/information needed present interventions More data/information needed on present interventions	More data/information needed on type of waste Specific Industry EHS Standards	More data/information needed on type of waste More data/information needed to suggest BATs
Manufacturing of explosives, detonators, fuses including management and handling activities [including manufacturing of safety match]	More data/information needed on present interventions	Specific Industry EHS Standards	More data/information needed to suggest BATs
Oil and gas extraction including CBM (offshore & on-shore extraction through drilling wells)	More data/information needed on present interventions	Specific Industry EHS Standards	More data/information needed to suggest BATs

2.2 Vehicles and mobility

As an industrial town Durgapur is vulnerable to pollution from freight traffic. The DMC is well connected with Bardhaman, Asansol, Dhanbad and Kolkata through a four-lane Durgapur Expressway which is part of NH-2. The Durgapur Expressway has reduced the roadway journey time to Kolkata to only two hours. Durgapur is also a major road junction as the intersection of Panagarh-Morgram Highway originates from Panagarh, a suburb of Durgapur, and NH-60 falls within the jurisdiction of DMC. Moreover, SH-9 joins with NH-60 and connects Durgapur with Odisha and south India. It is one of the few cities that have an Asian Highway passing directly through the city jurisdiction (see *Map 2: Regional road connectivity of DMC area in Paschim Bardhaman district*).

Map 2: Regional road connectivity of DMC area in Paschim Burdwan district

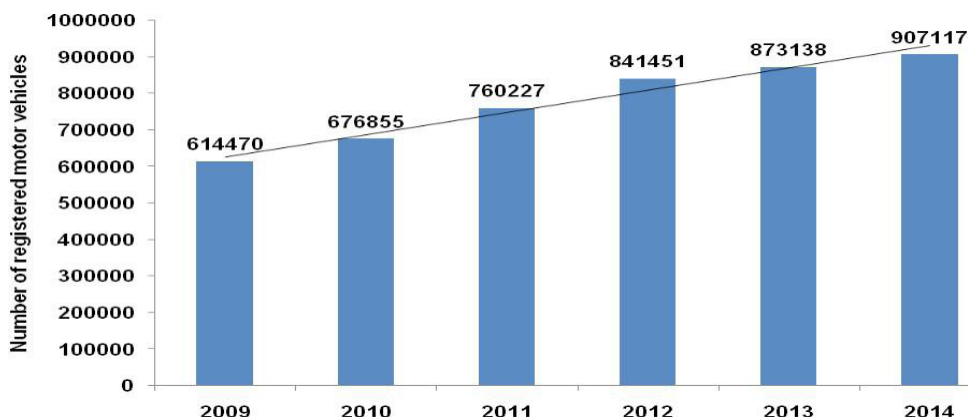


Source: Asansol-Durgapur Development Authority

Vehicle registration growth and motorization

Due to the lack of vehicle registration data at the municipal corporation level, Pashchim Bardhaman district average for vehicular growth has been taken into consideration. The growth rate observed for the district in 2012–13 was 3.76 per cent which is low as compared to other district in West Bengal viz. Purba Medinipur (25.8 per cent), Howrah (12.8 per cent), North 24 Parganas (16.26 per cent) (see *Graph 10: Share of Paschim Bardhaman district*).

Graph 10: Share of Pashchim Bardhaman district



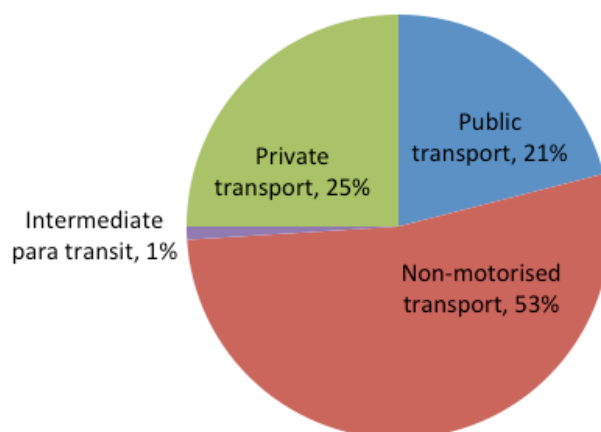
Source: Statistical handbook 2013, Department of Planning & Statistics, Government of West Bengal

Urban trip characteristics

A lot of emissions from urban commute depend on the modal share of the city. Due to the lack of mode share data at the municipal corporation level, Paschim Bardhaman district modal share average has been taken into consideration for this study. The district modal share shows a high share of non-motorized transport (NMT) and public transport (PT) (see *Graph 11: Modal share of Pashchim Bardhaman district*). Share of personal vehicles fleet is only 25 per cent. The rest of the trips are by public transport, walking and cycling. This is an opportunity to build on to avoid pollution (see *Graph 12: Modal share of Pashchim Bardhaman district*).

As per the Land Use and Development Control Plan (LUDCP) of Andal, Pandabeswar, Durgapur, Faridpur and Kansa CD Blocks, the core of the City Centre is now congested and there is little space for movement of vehicular and pedestrian traffic

Graph 11: Modal share of Pashchim Bardhaman district



Source: Statistical Handbook 2013, Department of Planning and Statistics, Government of West Bengal

Road accidents

Public transport strategy can work only if there is accessible and safe walkable space. A total of 210 fatal accidents and 220 non-fatal road accidents were recorded in the year 2015, which means road fatality per lakh population is 5.57. Compared to the Service Level benchmark (SLB) developed by Ministry of Housing and Urban Affairs (MOUHA), the DMC falls under LOS. DMC needs considerable improvements in road design and available road infrastructure, traffic management and in other such reasons which significantly contribute to road safety.

Public transport and intermediate para-transit (IPT): South Bengal State Transport Corporation, which has headquarters in the city, has a separate depot, in Trunk Road Area. These largely operate intercity bus services as these towns do not have dedicated city bus services. Frequent bus services of SBSTC, run by a private operator have eased daily commute between DMC and other urban centers such as Asansol and Kolkata.

As per the SBSTC, there are a total of 40 CNG buses covering Asansol, Durgapur and Raniganj area and all the buses are 0–5 years old. The operational statistics of the intra-state bus service are available. Overall

fleet utilization is low at 70 per cent and average service frequency of 25 minutes. This reduces the attractiveness of the service.

There is paucity of bus service connectivity in some areas within Durgapur Municipal Corporation and its urban sprawl. Private minibuses are very few and many routes completely lack bus connectivity after dusk. In addition to this, regular auto-rickshaw and taxi services are also not developed. The expansion of city with industrial, commercial and official activities along with lack of public transport connectivity has caused explosive growth in number of motor vehicles.

Table 9: Operational statistics of SBSTC

Fleet utilization	Average frequency	Average daily ridership	Fuel efficiencies (km/unit of fuel)	Load factor	Breakdown rate	Other upgrade
70%	25 minute	2912	4.75 km/kg	80%	1.25%	NA

Source: Transport Department, West Bengal

This city is largely dependent on small para-transit vehicles. The city's private mini-buses are the cheapest and most convenient mode of transportation. Recently, CNG autos have been introduced plying between City Center and other parts of the city. 900 auto-rickshaws are also available for commuting. Cycle-rickshaws and private cars are available for traveling smaller distances, as a preferred commute.

2.3 Strategies to reduce tailpipe emissions

Emissions standards for new vehicles: As per the national roadmap, West Bengal has implemented the Bharat Stage IV (BS IV) emission norms for new vehicles in April 2017, though it was implemented only in Kolkata in April 2010. It is scheduled to introduce Bharat Stage VI (BS VI) norms and fuels in April 2020. The BS VI norms are slated to reduce emissions from new vehicles by 80–90 per cent. On-road fleet will also benefit from the introduction of clean BS VI compliant 10 ppm sulphur fuels by April 2020. These emissions standards will come with stronger real-world emissions requirements and management to ensure that vehicles remain low emitting on road. As these new generation vehicles will be equipped with more advanced emissions control system, commensurate improvement in emissions inspection and maintenance will be needed at the city level.

Emission management of on-road fleet: With continuous ageing of vehicles, keeping vehicles low emitting throughout their lifetime on road will require multiple strategies including in-use emissions inspection, monitoring of real world emissions, phase out of old vehicles and scrappage, clean fuel substitution and control of heavy duty traffic.

PUC programme: The current in-use emissions inspection programme is the Pollution under Control Certificate (PUC) system. Under, this programme idling carbon monoxide and hydrocarbon (HC) concentrations are measured in petrol vehicles and smoke density is measured in diesel vehicles. The status of implementation of lambda tests as per the 2004 notification of the Ministry of Road Transport and Highways (MoRTH)—that is needed to maintain the optimum air to fuel ratio for proper functioning of catalytic converters in petrol cars—is not yet available. Ground assessment shows

that there are quality control challenges with regard to the testing methods, calibration of equipment and overall compliance with the programme.

Since the PUC centres are decentralized and limited, they need frequent inspections and robust audit programmes to ensure that credible and authentic tests are being done. Such steps have been initiated by the Department of Transport. Steps are needed to further reform the system and also expand the online networking of PUC centres to link with centralized data server for proper audit.

On-road smoky vehicle inspection: The city needs strong on-road smoky vehicle inspection to identify visibly polluting vehicles and remove them from roads for inspection and repair. A small number of grossly polluting vehicles contribute significantly to the pollution load from on-road vehicles. If these can be identified and addressed, substantial emissions reduction is possible.

Advancement in on-road emissions monitoring: Introduction of BS IV and BS VI vehicles with more advanced emissions control systems will require advancement in emissions monitoring of on-road vehicles. The current PUC programme will not be adequate for that. The Ministry of Road Transport and Highways has already sent out an advisory to the State Transport Departments that all vehicles manufactured after 2013 that are equipped with On-board Diagnostic System (OBD) should be checked for malfunctioning light on the dashboard of the vehicle when they come for PUC check. If the light is on the vehicle should be returned for proper check in workshop and repair. This needs to be implemented in PUC centres immediately. In addition, this system can be further upgraded in PUC centre to check if the OBD itself is functioning properly or has been tampered with. The OBD in vehicles has the capacity to sense and record the emissions performance of the vehicles to alert the driver if there is any anomaly. While full scanning of the OBD for such diagnostic exercise can be done in the designated workshops to be identified, PUC centres can do simple tests to ensure if the OBD is functional. This kind of upgradation has become important after the introduction of BS IV and upcoming BS VI emissions standards that will bring more advanced and sophisticated emissions control technologies that cannot be adequately monitored through PUC programme that was designed for older generation of vehicles.

Similarly, as is being discussed in Delhi, the on-road fleet will require more rigorous monitoring for real world emissions to ensure that vehicles do not emit more than they are designed to emit. This may require selective and pilot introduction of on-road remote sensing monitoring to check the emissions as the vehicles are passing by to catch the most grossly polluting vehicles and characterize the fleet emissions.

Regulating movement of heavy-duty vehicles: Another area of intervention is the heavy duty truck movement through cities that can contribute hugely to the urban pollution. Usually, cities restrict truck movement during the day and allow them to pass through or do loading and unloading during night. But explicit interventions are needed to design highway alignment in a way that they bypass the highly populated cities and do not cut across them. Industrial areas will require focused freight movement plan, and freight terminal and dust control measures to control re-suspension

of dust. Truck movement and dust control from loading and unloading will be of special concern in industrial cities and mining areas and will require spatial planning, and paving of roads to reduce exposure. Long-term solution will emerge in shift from road based freight system to rail based freight movement.

Phasing out of old vehicles: Currently, cities in West Bengal except Kolkata do not have age restriction on vehicles. Vehicles more than 15 years of age are not prohibited from plying within cities. After crossing the 15 years registration time frame, these vehicles are not removed; instead, they are re-registered for a span of another five years. The non-attainment cities require a phase out plan either through age restrictions or tax policy or restrictions on their movement in city centres. The phase out plan will need to be supported by a scrappage policy especially for the old commercial vehicles and buses. Currently, the Union Ministry of Road Transport and Highways is also working on a national scrappage policy. However, state level policies are also important for scrappage infrastructure. Recently, Delhi has framed a similar policy. Regulatory and fiscal measures are needed to discourage use of old vehicle vintage meeting very old emissions standards.

2.4 Solid waste management

Durgapur Municipal Corporation reports that approximately 192 MT per day of solid waste is generated in the city and there is no scientific way of treating the waste in the city. There is one dumping site at Sankarpur where all the waste is dumped. Byelaws have been prepared and is awaiting the final approval. The landfill has now become a point source of pollution. This open landfill site is not equipped with the network of pipes that could drain out the methane being generated at the waste dumping site.

Any instance of natural burning on the landfill site is reported to the municipal corporation. Open burning of waste is the common practice in the city. Absence of alternate waste management practices besides traditional dumping, leading to massive open landfills, is not just an aesthetic issue anymore. It is now exposing residents of the city to toxic, lethal smoke fumes. Decentralized waste segregation, collection and recycling will have to be the urgent focus of action plan to reduce toxicity risk. The following roadmap may be implemented for management of municipal solid waste. Further, successful case studies of cities like Indore and Ambikapur may be studied, to identify potential synergies.

1. Identification of Clusters of Municipal bodies: a cluster of municipal bodies may be formed with a common waste processing facility. This will also bring down costs considerably and also do away with requirement of land in every municipal body
2. The cluster approach would entail additional transportation of solid waste for some municipal bodies
3. Till the cluster approach is implemented, construction of community bio-gas plants and compost plants should be encouraged
4. Create an ecosystem, of start-ups based on waste-to-energy projects (capacity {waste utilization + power generation}, calorific value and type of waste used)

2.5 Construction and demolition (C&D) waste

With the construction boom and on-going urbanization, generation of construction and demolition waste is on the rise in the DMC but there is no scientific estimate of the quantum. All the waste is either re-used or directly dumped at the Sankarpur dumping ground. It is necessary to adopt policy for recycling and reuse of C&D waste and set up infrastructure for recycling. State policy on Construction and Demolition waste management is under preparation as per C&D Guideline 2016.

2.6 Suspended road dust

Unpaved and dug up roads, and suspension of dust due to vehicular movement are a significant source of particulate matter in DMC.

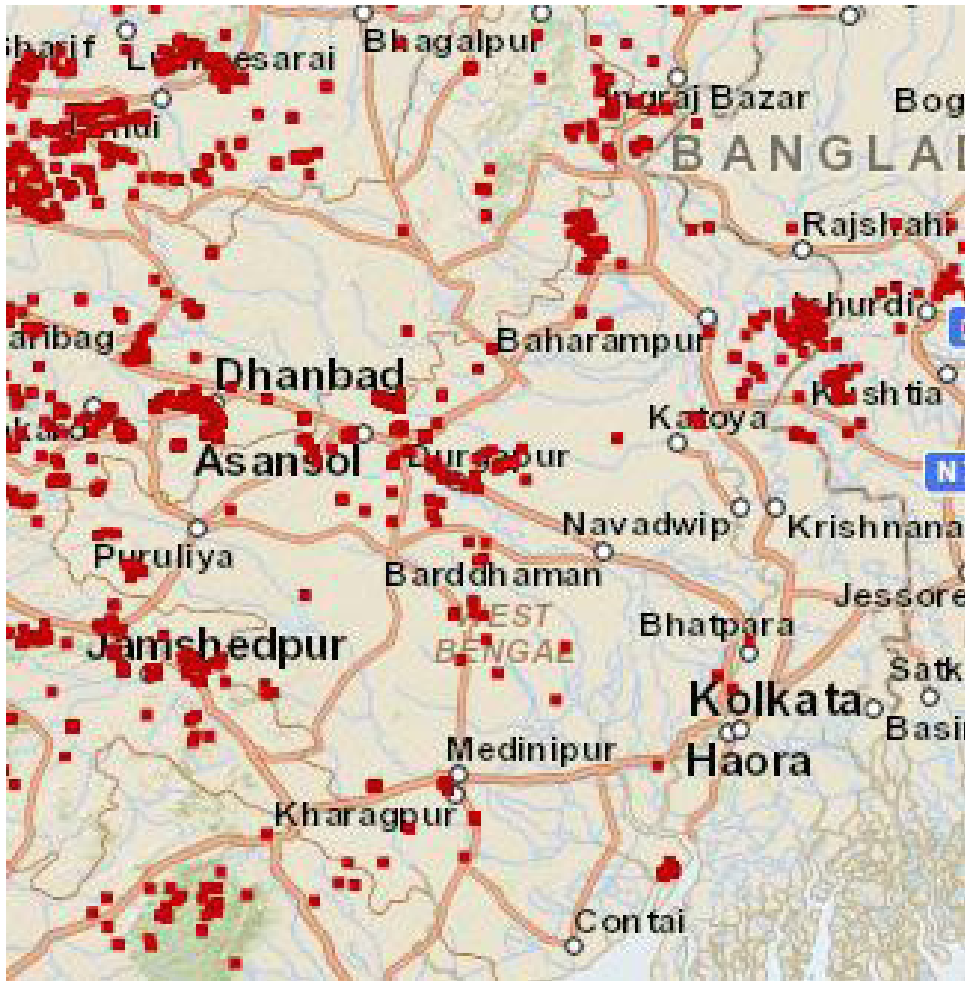
As far as the baseline policy action is concerned, urban local bodies have an ongoing programme of street and pavement development. But these will have to be made more holistic and widely implementable in terms of paving, street-scaping, vegetative barriers and manual and mechanical road sweeping without compromising the pedestrian and vehicular movement. The street design guidelines can holistically help to address these co-benefits. However, it is more important that for any infrastructure project all the concerned agencies be made responsible and accountable to adopt dust control measures in terms of keeping dug earth covered, sprinkling of water and also responsible for restoring the place according to the predefined street design guidelines within a specified period after completion of projects.

2.7. Crop fires

Urban air quality of cities is also impacted by the pollution at the regional level due to trans-boundary movement of pollution. From that perspective any large-scale open fire in the region can have serious impacts. While the impact of the problem of agricultural stubble burning or crop residues is well known in northern India, it has not been properly evaluated in other parts of India. There is also the aspect of forest fire in the region that requires scrutiny. Pollution from such fires is seasonal and episodic.

The satellite image of NASA shows large numbers of open fires in West Bengal in the months of October and April. While fires in March–May may be attributed to seasonal changes, as well as to naturally occurring forest fires, the same cannot be said for fires in October–April. During these months, the geographic distribution of fires also changes, with many more fire incidences detected in central and central-eastern West Bengal, coinciding with river flood plains. The timing of these fires also coincides with deterioration in the urban air quality of cities in West Bengal, which may be within the influence zone of these fires. Such incidents are expected with growing mechanization of agriculture.

Snapshot showing cumulative fire incidences/spots in April 2019



Source: NASA Firemapper

PART II

COMPREHENSIVE CLEAN AIR ACTION PLAN (CAP) AND GRADED RESPONSE ACTION PLAN (GRAP)

Comprehensive Clean Air Action Plan (CAP)

Against the backdrop of the challenges outlined in each sector, this pollution source-wise comprehensive action plan has been developed for industrial town of Durgapur. Keeping in view the air pollution reduction targets in the city detailed strategies have been identified to indicate the nature, scale, scope and depth of action needed for effective reduction to make an impact overtime. In view of this instead of listing only broad action points, detailed indicators and action points have been included for all sectors to guide implementation.

This plan has integrated and built on the on-going action and action plans of the state government in each sector that are already underway. Action plan has also been improved further based on emerging good practices. In several sectors good practices have emerged that need to be leveraged and aligned to meet the clean air objective. This creates a good template for upscaling and replication in other cities. This action plan has integrated all ongoing efforts to chart the roadmap.

Special care has been taken to ensure that sufficient indicators are included in the plan itself to indicate the nature and scope of the strategies outlined for each sector that are needed for implementation to make an effective impact. For instance, often it is not clear how different aspects of transportation and urban planning are linked with air pollution control. It is important to ensure that clean air action plan ensures convergence of planning for road building, public transport infrastructure and non-motorized transport planning to guarantee that people-oriented design is integrated all across to prevent lock in of pollution in the infrastructure itself. Similarly, actions in renewable energy sector, urban forestry and a plethora of clean energy and industrial emissions management strategies have been integrated.

Alignment of inter-sectoral action will be critical to leverage the available resources of funding for maximum impact. In all sectors—transport, industry, power plants, construction industry, municipal solid waste management, air quality monitoring, road building and traffic management—budgetary resources have been earmarked for investment, or, investments from other private or bilateral sources are coming in. If these investments are better informed and aligned with this clean air action planning process and objective, significant change at a scale is possible.

This plan also opens up the opportunity for developing fiscal strategies based on polluter pay principle to generate additional resources for funding of the plan. For instance, in other cities such as Delhi, fiscal measures such as environment compensation charge on trucks, big diesel cars and diesel fuel have helped to create dedicated funds that are now available for pollution control efforts. Such measures can be adopted to top up the resource needs in addition to the state and central government funding. In areas where the action depends on private sector participation and investments the detailed guidelines under this plan can guide such investment. This plan has identified the agencies responsible for implementation of each action point and has also indicated the timeline for implementation. This can be monitored for reporting and compliance.

Graded Response Action Plan (GRAP)

Based on the National Air Quality Index Graded Response Action Plan has been framed for daily response to air quality changes. This has predefined the set of measures to be taken for different air quality categories—satisfactory, moderate, poor, very poor, severe, and emergency. Once notified these measures will come into force automatically. Available data shows that in most non-compliant cities, barring hotspot areas in industrial cities, the daily levels vary between moderate to poor; sometime touching the very poor level. The GRAP measures will be implemented accordingly. GRAP also includes the advisory for people to take precaution for self-protection.

For proper implementation and oversight the high-powered committee will coordinate with the city level authorities in each of the six non-compliant city for direction, compliance monitoring, and reporting. Each concerned department in a city will appoint a high level officer as a nodal official for coordination, implementation, and periodic reporting.

COMPREHENSIVE CLEAN AIR ACTION PLAN (CAP)

Source-wise clean air action plan and compliance strategy for Durgapur to meet clean air standards. The following table indicates the short, medium, and long-term action along with agencies responsible.

1. AIR QUALITY MONITORING AND ASSESSMENT

Sr. no.	Action points	Agency responsible	Timeline	Financial outlay
Short-term priority action				
1.1	To set up two more real-time monitoring stations: The grid plan should be representative of population distribution and land use including residential, commercial, industrial, roadside and sensitive areas. Also include hot spots such as near traffic areas and landfill sites such as Sankarpur. Refer to the CPCB's thumb rule as prescribed in IS:5182 (Part 14), 2000 on Recommended minimum number of stations, population-wise (Also mentioned in Guidelines for Ambient Air Quality Monitoring, CPCB, 200327). Among all twelve pollutants to be monitored, special focus is needed on PM _{2.5} and ozone monitoring. Use air quality sensors at probable hotspots to complement air-quality monitoring (based on CPCB/MoEF&CC guidelines). Durgapur has a population of 5,66,517 and based on the CPCB criteria, but it has only one CAAQMS and four manual stations. Two more CAAQMS need to be installed based on the new criteria set by CPCB in 2019.	WBPCB, supported by CPCB	6-12 months	3 crore
1.2	Use air quality information provided by satellite-based monitoring to complement ground-based air quality monitoring and also unmonitored areas. This is useful to identify agricultural burning/forest fires, regional pollution, etc. that have impact on urban air quality. Satellite-based monitoring being done in Kolkata is to be expanded for Durgapur.	WBPCB, CPCB, IMD,	6-12 months	To be finalized
1.3	Develop capacity for pollution forecasting for implementation of graded response action plan. This will also require monitoring of weather data. Extend programs like SAFAR for Durgapur.	MOES, IMD, Department of Environment, WBPCB, and IITM, Pune, supported by CPCB	6 months to 1 year	To be finalized

Sr. no.	Action points	Agency responsible	Timeline	Financial outlay
1.4	Set up daily air quality public information dissemination system based on National Air Quality Index and health advisory. Further develop online reporting of daily and annual data for all pollutants and pollution forecasting on SPCB website. Set up system for dissemination of information to public through website and local media.	WBPCB, CPCB, IMD	6 months to 1 year	Regular activity
1.5	To commission a source apportionment and pollution inventory study for the city. This will capture source-wise contribution, seasonal variations in source contribution, assess regional impacts and assess carrying capacity. Additionally, a mechanism to assess trans-boundary emissions must be established.	WBPCB	6 months to 1 year	3 crore
1.6	The National Clean Air Programme (NCAP) from MoEF&CC has recommended rural air quality monitoring. Air shed approach may address this.	WBPCB & CPCB	1-2 years	1.6 crore
1.7	Assess application of low cost sensor based monitors in areas that are not being monitored to create baseline local data to inform local area action.	WBPCB & CPCB	1 year	To be finalized
Long-term action				
1.8	Research studies including emission inventories and source apportionment, health impact studies, exposure impacts, carrying capacity assessment of air shed and regional impacts, hot spot assessments and other relevant studies may be undertaken to further inform the action plan: Government to support research works/scientific studies by academic/research institutions. Expertise will be sought from various institutions to develop protocols for assessment of the research proposals.	WBPCB, DoE	1 years	2 crore
1.9	Database management for implementation of action plan: Data collection, sharing and analysis protocol must be set up for effective implementation of clean air action plan. Prepare detailed data protocol for systematic recording of emissions data from industries and other sources.	WBPCB, DoE in coordination with all relevant departments	1-2 years	Regular activity

2. INDUSTRIES

Sr. no.	Action points	Agency responsible	Timeline
Short-term priority action			
2.1	Implement SOx and NOx standards notified by MoEF&CC on January 29, 2018 for 16 categories of industries in and around the city. Strengthen and implement strategies needed for critically polluted industrial areas. Strengthen the current siting policy for industries to be notified in future, in order to address Durgapur-wide air quality issues.	WBPCB	6 months
2.2	Implement existing standards for PM and ensure compliance through regular testing & CEMS enabled monitoring (see action 2.4) – as applicable. Also take precautions for minimizing fugitive emissions through the preparation of a checklist for industrial zones and units, specific to each type of industry. Carry out regular inspection.	WBPCB, Department of ICE and MSME	3 months
2.3	Prepare a clean fuel policy and provide incentives for clean fuels for the state: for this identify approved and non-approved fuels. Notify a list of approved fuels. Promote relatively cleaner fuels like gas (Coalbed Methane, natural gas, etc.) and electricity. Discourage fuels with very high sulphur and heavy metals like furnace oil, pet coke, tyre oil, etc. (except where petcoke is used as feedstock like cement). Need for a favourable taxation and pricing policy to make cleaner fuels more competitive. Incentivize replacement of boilers to switch to cleaner fuels. Clean fuel strategy needed for small and medium-scale units with nominal or no emission control systems.	WBPCB, Department of ICE and MSME	6 months

Sr. no.	Action points	Agency responsible	Timeline
2.4	<p>Identify the units that need to install CEMS across all targeted and applicable polluting industries: Ensure calibration and working of CEMS in all industries in the urban airshed or area of influence and provide information to monitoring agencies to take appropriate actions.</p> <p>Specify the mechanism for quality control and quality assurance of CEMS data and ensure that data is available online and the reported data is compared with applicable prescribed limits and not the older standards. Compliance checking to be enforced routinely to prevent tampering with the CEMS. This needs to be done for all sectors including sponge iron units, cement units, iron and steel industries, rice mills, and jute mills.</p>	WBPCB, Department of ICE and MSME	6 months
2.5	<p>Identification of cumulative impact of industrial emissions such as total load from a specified area.</p> <p>Prescribe more stringent pollution control action for each type of industry. For instance different actions for sponge iron units and rice mills.</p>	WBPCB, Department of ICE and MSME	6 months
2.6	Identification and implementation of fugitive emission control measures in ancillary units, material transfer and handling and emissions during industrial processes. Informal industrial units will require stringent monitoring. Hold quarterly inspection.	WBPCB, Department of ICE and MSME	6 months
2.7	Enforce restrictions on operations of intensively polluting industries within urban airshed zones during high pollution periods. Upgrade all existing air pollution control devices.	WBPCB, Department Of ICE and MSME	6 months
Medium-term action			
2.8	Prepare and implement action plan specific for small and medium scale industrial units.	WBPCB, Department of ICE and MSME	1 year
2.9	Prepare and implement local area action plan for pollution hotspots and strict enforcement of air pollution control measures in all industries, including those located in unauthorized areas. Build schedule for inspection of areas of concern and reporting.	WBPCB, Department of ICE and MSME	1 year
2.10	Strengthen the current siting policy for industries to address Durgapur wise air quality problems. Restrict expansion and diversification of old polluting units that are near residential areas until robust pollution control devices have been installed and are routinely inspected.	WBPCB, Department of ICE and MSME	1 year
2.11	Training and awareness program for onsite emergency preparedness and environmental issues for industrial workers.	WBPCB, Department of ICE and MSME	1 year
2.12	Construction of paved roads around all major industrial estates. Installation of dust suppression system. Provision for water sprinkling and dust mitigation.	WBPCB, Department of ICE and MSME, ADDA	1 year
2.13	Development of adequate green belt around all major industrial estates by planting at least 1000 saplings.	WBPCB, Department of ICE and MSME, ADDA	1 year
2.14	Inspection of bag filters wherever installed, replacement of older bag filters and overhauling of ESPs when applicable.	WBPCB, Department of ICE and MSME, ADDA	1 year

3. BRICK KILNS, HOT-MIX PLANTS AND STONE CRUSHERS

Sr. no.	Action points	Agency responsible	Timeline
Short-term priority action			
3.1	There are brick kilns in close vicinity of the city. Enforce restrictions on operations of brick kilns within urban airshed zones during high pollution periods; allow only those brick kilns that comply with rectangular zig-zag design with induced draft or those with improved technology. Initiate phasing out of traditional brick kilns	Dept. of land and Land Reform, WBPCB, ADDA, DMC, Department of MSME	6 months
3.2	Relocate hot-mix plants to areas outside Durgapur boundaries. Shut down small and mobile hot-mix plants.	DMC, WB PWD, NHAI and other road operating agencies	Immediately
Medium-term action			
3.3	Convert all brick kilns to rectangular design zigzag technology—from FCBT natural draft kilns to induced draft kilns with rectangular zigzag design.	Department of Land and Land Reform, WBPCB, CPCB, ICE and MSME	1 year
3.4	Prescribe design specifications for improved kilns and ensure compliance checking. Ensure conversion has actually taken place. Ensure provision of infrastructure in terms of viewing platform and chimney emission testing point for compliance.	CPCB, WBPCB, Department of ICE, MSME	1 year
3.5	Remove stone crushers that are close to the city; adopt stringent dust control measures and greening	District Administration, WBPCB, West Bengal Department of Industries, Commerce and Enterprises, MSME	1 year
3.6	Establish a protocol for using cleaner fuels and technology for asphalt mixing and minimizing the number of hot-mix plants	MoRTH, DMC, WB PWD, NHAI and other road operating agencies	1 year

4. ACTION ON POWER PLANTS

Sr. no.	Action points	Agency responsible	Timeline	Current status
4.1	Power plants standards notified in 2015 for PM, SOx and NOx should be met by 2022	WBPCB, Plant Management	2022	Actions to comply with standard in 2022 has already begun
4.1.1	<p>Mejia Thermal Power Station – 2,340 MW The power plant has four units of 210 MW (Units 1-4), two units (Unit 5-6) of 250MW, and two units (Units 7-8) of 500 MW.</p> <p>Step 1: Collect major milestone plan/Gantt chart for FGD installation, PM and NOx control and measures to meet water norms</p> <p>Step 2: Prepare action plan for monitoring at relevant intervals, issue notice to collect a suitable bank guarantee amount – 1 per cent of the project cost</p> <p>Step 3: Collect bank guarantee, engineering documents and feasibility study – for FGD, NOx control and measures to meet water norms</p> <p>Step 4: Ensure tenders are awarded</p> <p>Step 5: Ensure civil works completed</p> <p>Step 6: Ensure P&G test initiated for Unit 7-8</p> <p>Step 7: Ensure P&G test initiated for Unit 1-6</p>	WBPCB	<p>Units 1-6: 2022 Units 7-8: 2021</p> <p>By Feb 2020</p> <p>By June 2020</p> <p>By October 2020</p> <p>By January 2021</p> <p>By June 2021</p> <p>By December 2021</p> <p>By June 2022</p>	Power Station is exploring possibility to install pollution control equipment.
4.1.2	<p>Durgapur Power Plant Ltd. – 680 MW The power plant has three units - Unit 6 of 110 MW capacity, Unit 7 of 250 MW capacity, and Unit 8 of 250 MW capacity. Unit 7 and 8 were recently commissioned in 2007 and 2014 respectively. Unit 6 is 35 years old.</p> <p>Step 1: Collect major milestone plan/Gantt chart for FGD installation, PM and NOx control and measures to meet water norms</p> <p>Step 2: Prepare action plan for monitoring at relevant intervals, issue notice to collect a suitable bank guarantee amount – 1 per cent of the project cost</p> <p>Step 3: Collect bank guarantee, engineering documents and feasibility study – for FGD, NOx control and measures to meet water norms</p> <p>Step 4: Ensure tenders are awarded</p> <p>Step 5: Ensure civil works completed</p> <p>Step 6: Ensure P&G test initiated</p>	WBPCB	<p>2022</p> <p>By June 2020</p> <p>By October 2020</p> <p>By December 2020</p> <p>By March 2021</p> <p>By December 2021</p> <p>By December 2022</p>	The old unit - Unit no. 6 is under reserve shut down. The plant is currently exploring the possibility to install pollution control system to meet the norms.

Sr. no.	Action points	Agency responsible	Timeline	Current status
4.1.3	Durgapur Steel TPS – 1000 MW The power plant has two units of 500 MW commissioned in 2011-12.	WBPCB	2021	The plant has awarded tenders to install FGD. Plant is complying with the SPM norms.. NOx control plan should be provided
	Step 1: Collect major milestone plan/Gantt chart for FGD installation, PM and NOx control and measures to meet water norms		By Feb 2020	
	Step 2: Prepare action plan for monitoring at relevant intervals, issue notice to collect a suitable bank guarantee amount – 1 per cent of the project cost		By June 2020	
	Step 3: Collect bank guarantee, engineering documents and feasibility study – for FGD, NOx control and measures to meet water norms		By October 2020	
	Step 4: Ensure civil works completed		By January 2021	
	Step 6: Ensure P&G test initiated		By December 2021	
4.1.4	Bakreshwar Thermal Power Plant – 1,050 MW The power plant has five units of 210 MW commissioned in the year 2000.	WBPCB	2022	Power station is operating at 70-80 per cent plant load factor. It is currently doing feasibility study to explore the possibility to install pollution control equipment.
	Step 1: Collect major milestone plan/Gantt chart for FGD installation, PM and NOx control and measures to meet water norms		By June 2020	
	Step 2: Prepare action plan for monitoring at relevant intervals, issue notice to collect a suitable bank guarantee amount – 1 per cent of the project cost		By October 2020	
	Step 3: Collect bank guarantee, engineering documents and feasibility study – for FGD, NOx control and measures to meet water norms		By December 2020	
	Step 4: Ensure tenders are awarded		By March 2021	
	Step 5: Ensure civil works completed		By December 2021	
	Step 6: Ensure P&G test initiated		By December 2022	
4.2 FUGITIVE EMISSIONS				
4.2.1	Coal handling: A. Issue modified consent condition and direct storage of coal in enclosed space. B. Collect bank guarantee and timeline from power station to implement measures to enclose coal handling area.	WBPCB	A. By March 2020 B. By June 2020	
4.2.2	Fly ash management: A. Form a committee and set terms of reference (ToRs) for inspection and improve fly ash management and utilization in the thermal power stations. Allow only bulk container transport of fly ash – issue notice. B. Inspect fly ash pond and roads leading to the pond, audit the need for any improvement in the fly ash pond structure. Collect plans from power station to improve fly ash utilization C. Collect bank guarantee and timeline from power station to implement measures	WBPCB	A. By March 2020 B. By June 2020 C. By October 2020	
4.3 FUEL QUALITY IMPROVEMENT				
4.3.1	Advice use of low sulphur coal (coal with sulphur content less than 0.2 per cent), co-firing of coal with biomass. On availability of natural gas switch-over coal-based power stations to natural gas-based power stations.			

5. ACTION TO REDUCE VEHICULAR EMISSIONS

Sr. no.	Action points	Agency responsible	Timeline
5.1	Emission And Fuel Quality For New Vehicles: Ensure on-schedule implementation of BS VI fuel and emission standards on April 1, 2020. Ensure that only BS VI compliant vehicles are registered from this date. Supreme Court order of October 24, 2018 has directed that no vehicle that is not BS VI compliant can be registered from April 1, 2020.	Transport Department	1 year
5.2	ALTERNATIVE CLEAN FUEL POLICY FOR VEHICLES		
5.2.1	Expand gaseous fuel programme for vehicles: Move auto rickshaws and local taxis to LPG/CNG as applicable. Buses can run on CNG when CNG is available. Expand gas refuelling infrastructure for delivery and use – as applicable. GAIL is expected to expand natural gas to West Bengal, prepare roadmap for Durgapur for the same.	Transport Department, Department of ICE, MoPNG	1-2 years
5.2.2	Target medium and short term goals for electrification of new vehicles fleet in specific segments using a mixture of mandates and subsidies. State level policy may also inform this process. This may include for eg. - Provision of additional state subsidy for procurement of commercial electric vehicles - 100% Exemption of duty/tax on electricity tariff for an initial period of 5 years for EV manufacturers (vehicle and battery) - Seek to drive rapid adoption of battery electric vehicles in a manner that they contribute to 25% of all new vehicle registration by 2023 - Build requisite infrastructure	Transport Department, Department of ICE, MoPNG, Department of Power and NES, Central Policy guidance from DHI and Niti Ayog	1 year
5.2.3	Identify and notify commercial areas with high footfall and good public transport and goods transport connectivity to pedestrianize supported by zero emission battery-operated vehicles. Ensure organized deployment to reduce congestion. Designated parking spaces for electric vehicles with exempted parking fees for Evs and charging facilities. Legalize domestic charging of e-rickshaws: to control power theft due to illegal charging and eradicate informal proliferation of units	Transport Department, Department of ICE, MoPNG, Department of Power and NES, Central Policy guidance from DHI and Niti Ayog	1 year
5.2.4	Explore potential of generating biogas from waste and sewage to run buses in cities.	Transport Department, Department of Energy, Oil marketing companies	1 year
5.2.5	Introduce favourable fiscal measures to promote clean fuels and zero emission vehicles such as reduction in road tax, etc.	Transport Department, Department of Power and NES and Finance	1 year
5.3	EMISSION CONTROL MEASURES FROM ON-ROAD VEHICLES		
5.3.1	Assess and implement adequate number of PUC centres for emissions testing of on-road vehicles. Strengthen periodic auditing and oversight of PUC centres and calibration of equipment and third-party checks.	Transport Department	6 months-1 year
5.3.2	Link PUC certificates with mandatory third party insurance for vehicles or any other method to ensure 100 per cent compliance. Develop a mechanism for ensuring that no vehicle is allowed to ply without valid PUC certificate. Ensure real-time updates for all WB registered vehicles with the VAHAN database for compliance.	Transport Department, MoRTH	Immediately

Sr. no.	Action points	Agency responsible	Timeline
5.3.3	Improve and enforce PUC programme: Leverage universal linking of PUC centres with remote server and eliminate manual intervention in PUC testing. Implement testing of all notified emissions parameters including Lambda testing for petrol cars as notified by MoRTH in 2004 and make sure that centres have updated PUC norms for BS VI vehicles notified in 2019.	Transport Department	1 year
5.3.4	Upgrade in-use emissions testing for petrol and diesel vehicles by using additional methods of screening such as remote sensing.	Transport Department, MoRTH, ARAI	1 year
5.3.5	Advancement of the system: Integrate on-board diagnostic (OBD) system fitted in new vehicles with vehicle inspection. As per the MoRTH advisory PUC centres have to check malfunctioning indicator light on dash boards of vehicles. If the light is found on vehicles to be sent back for testing in authorized workshops. Additionally, PUC centres need to check if the OBD is functioning properly. Also keeping in view that BS VI vehicles will roll from April 2020, there is need for system upgradation for more effective screening of on-road vehicles. It is recommended that remote sensing measurements of on-road emissions be introduced. Carry out training programmes and auditing of PUC centres to check for preparedness for BS VI norms.	Transport Department	6 months-1 year
5.3.6	Enforcement against visibly polluting vehicles: remove them from road, impose penalty, and launch extensive awareness drive against polluting vehicles.	Transport Department, Traffic Police	6 months-1 year
5.3.7	Set up modern centralized vehicle inspection centres for upgraded emissions, fitness and road worthiness tests for commercial vehicles and diesel vehicles.	Transport Department, MoRTH	1 year
5.4	Phase out old vehicles and develop a state vehicle scrappage policy: Phase out old vehicles with the help of age cap and age linked road tax policy. Set up scrapping infrastructure for scientific dismantling and disposal of old vehicles. Set up recycling units that are authorized with proper guidelines and integrate the current informal scrapping units.	Transport Department, MoRTH, CPCB	1 year
5.5	FRIEGHT TRANSPORT		
5.5.1	Adopt freight master plan to organize freight movement and logistics. For example, the following truck terminals exist: Truck Terminal: 2 nos, Sagarbhanga, near BCPL; Bus Terminal: 2 nos: 54 foot for SBSTC and Durgapur Station.	District and local administration, Municipal Corporation, PWD, NHAI	Within 6 month
5.5.2	Provide truck rest areas/parks along national and state highways to prevent entry of trucks into cities during peak hours. Use of off-peak passenger travel times to move freight and restrict the entry of heavy vehicles into cities during the day to continue. Pave all roads to control fugitive dust.		
5.5.3	Introduce age and emission standards-based restrictions on the operations of commercial vehicles within the city. Install procedures and monitoring equipment to ensure better quality and more efficient vehicles operate on the roads.	NHAI, District and local administration	Within 6 months
5.5.4	Check overloading: Use weigh-in-motion bridges / machines (WIM) and weighbridges at entry points of the city to check the payload of commercial vehicles. As per the CMVR, a penalty of 10 times the applicable rate for overloaded vehicles is applicable.	District and local administration, Transport department, Traffic Police	Within 6 months
5.5.5	Create management systems for loading and unloading of goods in city areas.	District and local administration, Transport department	6 months
5.5.6	Ensure fitness and road worthiness of trucks and compliance to set standards is adopted and enforced. Important for industrial cities.	Transport Department	6 months

Sr. no.	Action points	Agency responsible	Timeline
	Medium to long term action		
5.5.7	Promote high capacity trucks for long-distance freight transport of mining material instead of smaller trucks.	NHAI, District and local administration	Within 6 months
5.5.8	Diversion of truck traffic: Check feasibility of diversion of non-destined trucks into the city. Alternate routes need to be identified and improved to ensure that non-destined commercial traffic does not enter the city.	District and local administration, Transport department, Traffic Police	Within 6 months
5.5.9	Radio frequency identification tag (RFID) based toll or entry tax collection: install RFID based toll collection system and also link it with VAHAN database. This will enable lesser congestion at toll gates. Further, by using this technology vehicle identification by vintage, emission norm compliance, etc. will be easier. Asansol-Durgapur Development authority can adopt such measures to make toll collection cashless and regulate entry based on age. This also allows scope of introducing environment pollution charge at the entry point.	District and local administration, Transport department, Traffic Police	1 year
5.5.10	Develop urban freight consolidation centres in relation to location of warehouses relative to suburban areas.	District and local administration, Transport department	1 year
5.5.11	Prepare a freight master plan: Prepare a detailed logistic plan which includes detailed assessment of freight connectivity, requirement of dedicated freight corridor and allied freight infrastructure such as logistic park / truck terminals, cold storage facilities, warehouses, etc.	Transport Department, Railways	1-3 years
	FUEL QUALITY TESTING TO CHECK ADULTERATION		
5.6	Prepare an action plan to check fuel adulteration and random monitoring of fuel quality data. Ensure that periodic, routine, and surprise fuel testing is done for all transport and non-transport fuels. For this, an action plan needs to be prepared in consultation with oil companies and ministry of petroleum and natural gas.	ICL, MoPNG, Oil marketing companies	6 months
	EMISSION CONTROL AT REFUELLING STATIONS		
5.7	Install vapor recovery systems in refuelling outlets to reduce benzene and VOC emissions in cities. CPCB has issued direction for installation of Stage I and Stage II vapor recovery system in all retail outlets with capacity 3000 kiloliter and more in 46 million plus cities by December 2017. Retail outlets across the city should comply with this.	Transport department, State Oil Coordinator	6 months

6. URBAN MOBILITY

Sr. no.	Action points	Agency responsible	Timeline
6.1	PUBLIC TRANSPORT SYSTEM		
Short-term action			
6.1.1	Improve existing public transport service infrastructure by upgrading existing Bus Queue Shelters in the city and also install bus post in all bus stop locations, etc. as per the central guidelines.	Durgapur Municipal Corporation (DMC), Public Works Department (PWD), National Highway Authority of India (NHAI)	6 months
Medium-to long-term action			
6.1.2	Introduce an organized public transport service (as proposed in Asansol Action Plan) connecting Asansol, Raniganj municipality and Durgapur of appropriate fleet size and desirable bus type replete with Global Positioning Device (GPS) and passenger Information System (PIS).	Asansol-Durgapur Development Authority (ADDA), DMC, PWD	18 months
6.1.3	Designing the major interchange location or transfer points in such a way that it helps in smooth transition of commuter from one mode to another mode (specifically Bus & IPT integration)	Durgapur Municipal Corporation (DMC), Public Works Department (PWD), National Highway Authority of India (NHAI)	18 months
6.1.4	For strengthening public transport bus priority lane can be considered as per feasibility. Arterial roads may be identified for such operation. Bus nodes may be connected with para-transit for efficient last mile connectivity.	Transport Department	1 year
6.2	INTERMEDIATE PARA TRANSIT (IPT)		
Short-term action			
6.2.1	Prepare an operational plan for IPT services for the city which shall include route details, operation period, no. of IPT services allowed in each route, IPT parking area, etc. Standardize IPT fares and enforce the safety standards for IPT.	ADDA, DMC, Traffic Police, RTO – Transport Department	6 months
6.2.2	Facilitate IPT driver training and licensing procedures.	RTO – Transport Department	6 months
6.2.3	Demarcate proper IPT parking locations near major junctions or interchange points.	ADDA, DMC, PWD	6 months
6.2.4	Enforce IPT service providers to abide by latest fuel economy standards (i.e. Bharat Stage IV and upcoming Stage VI).	RTO, Traffic Police	6 months
Medium term action			
6.2.5	Prepare a policy framework for future IPT development, with specific consideration on regulating numbers of IPT modes, restricting vehicles more than15 years old from plying and laying down detailed steps for diesel to electric conversion.	ADDA	1-3 years
6.3	ADOPTION OF ELECTRIC MOBILITY		
Short term action			
6.3.1	Spread awareness on state funded incentive based electric rickshaw/auto scheme for quicker adaptation of electric mobility in the city. Identify areas to be served by e-vehicles only, and prepare a pilot project.	DMC / Regional Transport Authority	6-12 months
6.3.2	Promote e-rickshaws and electric auto-rickshaws as feeder services to the bus services to facilitate first and last mile connectivity.	Bus SPV / ADDA	6 months

Sr. no.	Action points	Agency responsible	Timeline
Medium to long term			
6.3.3	Prepare regulatory mechanism for provision of dedicated parking space for electric rickshaws/vehicles.	DMC	1 year
6.3.4	Take initiative to develop electric ecosystem such as charging infrastructure, better tariff regime, etc.	DMC / Electricity Department	1 year
6.4	ROAD DESIGN		
6.4.1	Non-motorized transport and safe access		
6.4.1.1	Prepare and implement plans for developing an NMT network. This should include following action: - Pedestrian infrastructure shall be designed based on the Indian Road Congress (IRC): 103-2012 - Target specific lengths of footpaths to be completed in a phased manner and cover the entire city. - Upgrade pedestrian crossing at least every 250 m, with pedestrian signals and signages. These should preferably be at grade. - Create a cycle network by connecting existing cycle tracks. - Make safety audit of walking infrastructure mandatory. - Provide roadside public docking space for bicycles. - Make encroachment of NMT lanes punishable offence under the current provision of law. - Dedicated municipal budget shall be made for making streets safe. Reference: Indian Road Congress (IRC): 103-2012	ADDA, DMC, PWD	1-3 years
6.4.2	MULTI-UTILITY ZONES (MUZ)		
6.4.2.1	All the stationary elements on the street shall be organized in a dedicated space which results in obstruction free streets. This should include the following elements. - It shall have dedicated space provision for bus stops, tree plantation, street furniture, auto rickshaw stands, parking, hawkers, public toilets, information kiosks, underground and overhead utility services like electricity, water, telephone, gas, etc. - Space provision for all the street elements shall have to be done by activity mapping, surveys, and stakeholder consultations. - A minimum width of 1.8 m shall be maintained for MUZ. Reference: Urban Street Design Guidelines Unified Traffic and Transportation Infrastructure (Planning & Engineering) Centre prepared by Delhi Development Authority.	ADDA, DMC, PWD	1-3 years
6.5	TAKING COGNIZANCE OF THE PROPOSED LAND USE MAP FOR DURGAPUR MUNICIPAL CORPORATION, COMPACT CITY DEVELOPMENT SHALL BE ADOPTED TO REDUCE DISTANCES AND IMPROVE ACCESS		
Medium- to long-term action			
6.5.1	Adopt compact urban form for new development to create high density, mixed-use, mixed-income development and high-density accessible streets to shorten travel distances and reduce emissions.	ADDA, DMC	12 months
6.5.2	In low density areas as well as new development and urban sprawl, maximize densities with good transport connectivity in order to facilitate maximum number of people walking or cycling, or using NMT or feeder services easily to access public transport.	ADDA, DMC	12 months
6.5.3	Enable a balanced mix of jobs and housing along bus corridors coupled with caps on parking supply, higher housing affordability through design and technology options. Design these spaces with adequate green spaces and high-density street network.	ADDA, DMC	12 months

Sr. no.	Action points	Agency responsible	Timeline
6.6	Maintenance and Management of Parking Places Rules: Implement Parking Area Management Plan (PAMP) for all delineated neighbourhoods and land uses for demarcation of all types of legal parking spaces for all modes as well as essential street amenities – on-street, off-street and multi-level parking facilities, vending zones, multi-modal integration facilities, green open spaces along with the allied traffic and pedestrian/NMT circulation plans, signage plans and pricing strategy. PAMPs to be prepared in consultation with local stakeholders, planning bodies/departments.		
Short term action			
6.6.1	Demarcate the emergency vehicle route on all public roads within the neighbourhood. Demarcate on ground legal on-street parking based on the local area plan.	ADDA, DMC	6 months
6.6.2	Ensure no parks and green areas are converted to parking	ADDA, DMC	6 months
6.6.3	Where shared Multilevel Parking facility is provided demarcate ingress-egress plan and ensure that no major disruption occurs on main thoroughfare traffic. Also indicate pedestrian circulation plan.	ADDA, DMC	6 months
6.6.4	Eliminate free parking and introduce effective variable parking charges based on duration of parking and 'user pay' principle as per the National Urban Transport Policy.	ADDA, DMC	6 months
6.6.5	Do not allow gross-cost basis annual or monthly lump sum payment for parking in commercial areas. Annual passes allow unlimited use and do not reduce parking demand.	ADDA, DMC	6 months
Medium- to long-term action			
6.6.6	Physically demarcate legal parking areas. Equip them with metering systems, proper signage, IT for information on parking availability to reduce cruising time and on-street management	ADDA, DMC	6 months
6.6.7	Penalty for illegal/wrong parking esp. parking within the emergency lanes and non-designated areas to be prohibitive.	ADDA, DMC	1-3 years
6.6.8	Bundle existing and planned public parking facilities and on-street and off-street parking (including multi-level) facilities for management by a single agency/operator. Any new stand-alone parking only sites need to be linked with the parking area management plan.	ADDA, DMC	1-3 years
6.6.9	Earmark a part of parking revenue for local area improvement that includes footpaths, public amenities, and parking facilities within the PAMP area.	ADDA, DMC	1-3 years
6.6.10	Introduce residential parking permit for regular parkers for use of public parking space and these may be monitored.	ADDA, DMC	1-3 years
6.6.11	In order to optimize utilization of land, ensure that in all new projects (e.g. commercial, institutional, housing, etc.), at least 50% of the available parking spaces is made available for shared parking facility.	ADDA, DMC	1-3 years
6.6.12	Ensure in the parking contractual agreement that the revenue sharing model is dynamic and flexible, allowing for flexibility in charging and varied usage and rates of the parking spaces; specify the investment that the contractor will have to make for upgradation of the PAMP area including metering, ITS application for commuter information and signage.	ADDA, DMC	1-3 years
6.6.13	Plan and implement parking provision for buses, commercial vehicles, and IPT-NMT modes and for the differently-abled.	ADDA, DMC	1-3 years
6.6.14	Parking charges should be optimal and ensure that at least 85 per cent of the available parking spaces are occupied during peak time. About 15% of parking spaces can be vacant and available at any time to encourage short term parkers.	ADDA, DMC	1-3 years
6.6.15	Parking charges should be optimal and ensure that at least 85 percent of the available parking spaces is occupied during peak time. About 15% of parking spaces can be vacant and available at any time to encourage short term parkers.	ADDA, DMC	1-3 years

Sr. no.	Action points	Agency responsible	Timeline
6.6.16	Introduce and further upgrade variable time-based pricing, as per market demand. Coordinated off-street and on-street / surface pricing in commercial and residential areas, and parking permits in residential areas. Parking should be charged as per duration, location in city and size of the vehicle. Parking rates (even if differential) should be applied to the entire PMAP area and not to a few streets.	ADDA, DMC	1-3 years
6.6.17	Multilevel parking structure shall be equipped with smart technology such as real-time information on vacant parking slots, smart meters, etc.	ADDA, DMC	1-3 years
6.7	TRAFFIC MANAGEMENT		
Short-term action			
6.7.1	Conduct independent/third party audit of geometry of all city roads and intersections and provide specific solutions.	Traffic Police	6 months
6.7.2	Conduct audit of all intersections and install functional traffic signals at all major intersections.	Traffic Police	6 months
6.7.3	Enforce lane driving through heavy fining.	Traffic Police	6 months
Medium-to long-term action plan			
6.7.4	Prepare Traffic Impact Assessment (TIA) guidelines and permit new developments based on the formulated TIA guidelines.	Traffic Police / ADDA	1 year
6.7.5	Prepare traffic management plan for special days, i.e. during Durga Puja festival/during urban flood situation.	Traffic Police, ADDA, DMC	1 year
6.8	TRAFFIC IMPACT ASSESSMENT		
Medium-to long-term action plan			
6.8.1	Permit new developments based on the impact of traffic on the surrounding transport infrastructure and neighborhoods.	DMC / SEIAA	1-3 years
6.8.2	Make necessary infrastructure augmentations based on traffic impact assessments and levy costs to the developer, if needed and possible.	DMC, Traffic police	1-3 years
6.9	FINANCING OF URBAN TRANSPORT		
Medium-to long-term action plan			
6.9.1	Create dedicated and ring-fenced urban transport fund for meeting Urban Transport needs by adopting innovative financial instruments to mobilize local resources including land value capture and polluter pay principle and resources from private participation.	Transport Department, DMC	1-3 years
6.9.2	Rationalization and reallocation of funds from road capacity augmentation projects towards public transit systems and complete streets.	Transport Department	1-2 years
6.9.3	Encourage involvement of the private sector in activities such as operation and maintenance of road infrastructure, parking facilities, vehicle testing and certification facilities, repair facilities, construction and management of terminal facilities among others. Regulatory monitoring will be required for quality control, quality assurance and performance guarantee. The private sector will be involved in providing public transport services, but under well-structured procurement contracts along with strong supervision of their service level and compliance strategy.	Transport Department, DMC	1-3 years
6.10	DATA ON URBAN COMMUTE		
Medium-to long-term action plan			
6.10.1	Regular update of the database and information would be one of the important tasks. This will require standardization of database for recording of travel and transport related activities to be able to assess travel activities—generation of daily number of trips, nature of travel demand, and share of different travel modes, average trip distance, and changes in modal share.	Transport Department, DMC	1-3 years

7. GENERATOR SETS

Sr. no.	Action points	Agency responsible	Timeline
Short-term priority action			
7.1	Ensure that only those DG sets that meet the standards in terms of emission or design of chimneys/exhaust and acoustic enclosures are allowed to operate. Verify and check whether design specifications are followed and only thereafter the genset is to be allowed to operate.	Durgapur Municipal Corporation	6 months
7.2	Curtail use of DG sets in social events by providing temporary electric connections. Also restrict use of DG sets during high pollution episodes.	WBPCB and Municipal Corporation	6 months
Medium-term action			
7.3	Alternate power systems should be promoted in cell towers, and use of DG sets discouraged.	Department of Energy, Distribution Companies, Department of Power and NES	1 year
7.4	Leverage rooftop solar programme to reduce dependence on DG sets.		1 year
7.5	Ensure access to quality electricity supply.		year

8. OPEN BURNING (INCLUDING SOLID WASTE AND AGRICULTURE RESIDUES)

Sr. no.	Action points	Agency responsible	Timeline
Short-term priority action			
8.1	Enforce a complete ban on garbage burning in the entire region. Evolve a monitoring mechanism for this. Take stringent action against open burning of biomass, leaves, tyres, etc. to control such activities. Garbage burning has to be significantly controlled.	Durgapur Municipal Corporation, Development Authority, Resident Welfare Associations, WBPCB	6 months
8.2	Ensure proper collection of horticulture waste (biomass) and composting-cum-gardening approach; municipal zonal offices should be responsible for controlling burning of leaves and garbage on roads / parks. All horticulture agencies should have compost pits in parks. Implement strong public outreach programme to promote household and community based composting systems (composting pits, shredders, etc.). There are large open grounds and houses with compounds in the city with considerable tree cover that cause extensive leaf litter. Open burning of leaves must stop.		6 months
8.3	Decentralized waste management for hotels, apartments, institutions as per Solid Waste Management Rules, 2016. Implement provisions of Solid Waste Management Rules 2016 to implement penal provisions to spot fine on waste burning. Strictly ban open burning of hazardous industrial waste. Fine system will be start after finalization of bylaws		6 months
8.4	Use of satellite based monitoring as well as mobile spot check squads for enforcement.	Durgapur Municipal Corporation, Metropolitan Development Authority, RWAs	6 months
8.5	Proper management of landfill sites at Kalipahari to prevent spontaneous fire. Further dumping of waste at open landfill sites should be restricted.	Durgapur Municipal Corporation, Metropolitan Development Authority, RWAs	6 months
8.6	Adopt roadmap for zero landfill policy to promote decentralized waste segregation, reuse and recycling.	Police Department, WBPCB GIS cell, Municipal Corporation, Metropolitan Development Authority, RWAs, State Police Department	6 months
8.7	With good decentralized and segregated waste management system in place, waste-to-energy plants will not be needed in the city. In case any location requires such plant, strong siting policy should be adopted to keep it away from habitation including neighbourhoods of low income groups. Strict implementation of emissions norms, use of state-of-the-art technology and provision of real-time emissions data to SPCB.		6 months

9. COMMON BIOMEDICAL AND TREATMENT FACILITY

Sr. no.	Action points	Agency responsible	Timeline
9.1	Implement emission norms for incinerators and examine the feasibility of less polluting alternatives in compliance with biomedical waste treatment rules.	WBPCB, Municipal Corporation, incinerator facility operators	6 months
9.2	Implement CEMS for incinerators and provide data on emissions on an open platform progressively.		6 months
9.3	Develop a siting policy for biomedical incinerators.	WBPCB, supported by Durgapur Municipal Corporation	6 months

10. COOKING FUELS AND OPEN EATERIES

Sr. no.	Action points	Agency responsible	Timeline
Medium to long term action			
10.1	A targeted programme to be implemented for 100 per cent coverage of households by distribution of LPG/PNG in all non-compliant cities.	Department of Power & NES, District and local administration	1-2 years
10.2	In low-income neighborhoods, as well as roadside eateries, dhabas, restaurants, etc. promote and give access to LPG and electricity. Mandate and link commercial license to clean fuels.	Dept. of Power & NES, Natural gas, municipal corporation, urban local bodies	1-2 years

11. ROAD DUST

Sr. no.	Action points	Agency responsible	Timeline
Short-term action			
11.1	Sprinkling of recycled water (without compromising other uses); introduce water fountains at major traffic intersections, wherever feasible. Adopt dust control measures for dug up areas.	District and local administration, PWD, road owning agencies	6 months
11.2	Phase-in mechanical / vacuum-based street sweeping wherever feasible; introduce wet / mechanized vacuum sweeping of roads.		6 months
Medium- to long-term actions			
11.3	Implement truck loading guidelines, use of appropriate enclosures for haul trucks, and gravel paving for all haul routes.	Department of Transport, Traffic Police	1-2 years
11.4	Maintain pothole-free roads for free flow of traffic to reduce emissions and dust. At present, 90% roads are free from pot holes	Durgapur Municipal Corporation, District and local administration	1-2 years
11.5	Increase green cover in the region. Undertake greening of open areas, gardens, community places, schools and housing societies. Minimum 20% green area is to be maintained in open spaces in individual complexes.	West Bengal State Council for Science and Technology, DMC, local bodies, RWAs	1-2 years
11.6	Enforcement of air pollution control in concrete batching (use of water spray and wind breakers, bag filter at silos and enclosures, hoods, curtains, etc.) or use of clean alternative technologies	WBPCB	1-2 years
11.7	Adopt street design guidelines for paving of roads and footpaths (hard and soft paving) with vegetative barriers. Mandate restoration according to the guidelines after completion of all infrastructure projects.	Road Owning Agencies, Department of industries	1-2 years

12. RENEWABLE ENERGY

Sr. no.	Action points	Agency responsible	Timeline
Medium- to long-term action			
12.1	West Bengal has a solar energy policy. As per the policy, it is mandatory for all housing societies having a total contract demand of 500 KW to install solar rooftop systems to meet at least 1.5 percent of their total electrical load. This should be further strengthened and implemented. This should be linked with transition from diesel genset to solar power, also the electric public transport can be linked with solar power plans to shift to zero emission target. Identify and target institutional/industrial and residential consumers for faster adoption. Identify open areas in the city where solar power generation is possible.	WBREDA, Department of Power & NES, District and local administration	1-2 years
12.2	WB RE policy requires commercial and industrial establishments with more than 1.5 MW of contract demand to install solar rooftop systems to meet at least 2 per cent of their total electrical load. This should be further strengthened and implemented. This should be linked with transition from diesel genset to solar power. Identify the mandated entities to encourage adoption through awareness camps and introduce relevant penalties in case of non-compliance.	WBREDA, Department of Power & NES, District and local administration	1-2 years
12.3	Introduce a stand-alone scheme for state run institutions - schools, colleges, hospitals, etc. that meet the criteria and facilitate their adoption through a state tender; the tenders must be based on the aggregated demand and must occur at defined intervals to ensure developer participation.	WBREDA, Department of Power & NES, District and local administration	1-2 years
12.4	Facilitate uptake of solar PV on existing residential households and commercial establishments (for example - where there is a lack of rooftop space or single grid-connection for multiple houses) by introducing encouraging regulatory measures such as virtual and group metering.	WBREDA, Department of Power & NES, District and local administration	1-2 years
12.5	Introduce an online portal, where prosumers can apply for solar rooftop, interact with installers, and track the installation process [to check delays at discom and SNA's end] - inspections, grid connection, and subsidy disbursement.	WBREDA, Department of Power & NES, District and local administration	1-2 years
12.6	Setup a Solar Command Centre (SCC) within the WBREDA that provides guidance, facilitates redressals and acts as a watchdog for solar rooftop adoption, especially tracking progress under schemes and mandates (including Renewable purchase obligation).	WBREDA, Department of Power & NES, District and local administration	1-2 years

13. EPISODIC EVENTS

Sr. no.	Action points	Agency responsible	Timeline
13.1	Measures to control forest fires/biomass/crop residue burning: Use satellite based monitoring and on-ground enforcement to control such burning episodes. An assessment needs to be carried out to identify the reasons and kind of technological and fiscal measures needed to curtail the fires. This is part of regional action.	WBPCB, Agriculture and allied Industries, District and local administration	Ongoing
13.2	Firecrackers: regulate and control their usage including restrictions on timing as per the Supreme Court and CPCB and PESO guidelines.	District and local administration, Police Department, WBPCB, RWAs, Supported by Chief Controller of Petroleum and Explosive Safety Organization (PESO)	Ongoing

14. URBAN GREENS AND FORESTS

Sr. no.	Action points	Agency responsible	Timeline
Medium-term action			
14.1	<p>Avenue plantation along roads with more traffic.</p> <p>Urban planning to integrate urban greens (parks, district forests, etc.) and urban forests in the Master Plans of the cities and all infrastructure development and urban redevelopment projects. At least 15-20 percent of the new urban redevelopment projects should be set aside for urban green and tree cover.</p> <p>Urban planning to provide for green roofs and vertical greens linked to infrastructure development. Green walling with plantations around dust generators and also to be dust barriers to be integrated with the Urban forestry and forest policy.</p> <p>Approx. 15,000 sqm greenery with plantation was developed in last three years under Green city & Amrut scheme.</p>	Forest, DMC, ADDA, PWD, NHAI	1 year

15. IMPROVE TRAINING AND CAPACITY

Sr. no.	Action points	Agency responsible	Timeline
15.1	Training and skill development will be required of public officials and other public functionaries for planning and management and execution of the plan. This will also require extensive capacity building in all sectors and infrastructure planning.	West Bengal State Council for Science and Technology, Department of Personnel and Training, District and local administration	Ongoing

16. NEED FOR PUBLIC AWARENESS AND COOPERATION

Sr. no.	Action points	Agency responsible	Timeline
16.1	Organizing deeper public engagement and forums for public consultation for public understanding of the nature of solutions needed to address the complex problem of sustainable industrial development and urban mobility.	West Bengal State Council for Science and Technology, WBPCB, District and local administration	Ongoing
16.2	Formation of a public grievance redressal portal for redressal of public complaints on air pollution along with a supervisory mechanism for its disposal in a time bound manner.		

17. ACTIONS FOR MANAGEMENT OF CONSTRUCTION DUST

Sr. no.	Action points	Agency responsible	Timeline
Short-term action			
17.1	Adopt and implement dust control measures for all types of construction - buildings and infrastructure. The preventive measures as mentioned in CPCB guidelines. Construction agencies to be made liable. Impose penalty for non-compliance. Fine system will be started after finalization of bylaws	Durgapur Municipal Corporation	6 months
17.2	Undertake control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units. Introduce steeper penalties for non-compliance. Needs enforcement. Fine system will be started after finalization of bylaws.	Durgapur Municipal Corporation	6 months
17.3	Enforce restrictions on construction activities within urban airshed zones during high pollution period. Fine system will be started after finalization of bylaws.	Durgapur Municipal Corporation/ WBPCB	6 months
Medium- to long-term action			
17.4	Notify rules to segregate construction and demolition waste. Provide a network of decentralized C&D waste segregation and collection sites across the city. Fine system will be started after finalization of bylaws.	Durgapur Municipal Corporation	1-2 years
17.5	For material handling, construction and demolition, it should be obligatory on part of the developers to provide evidence of debris on-site recycling and/or disposal at designated sites. Fine system will be started after finalization of bylaws.	Durgapur Municipal Corporation	1-2 years
17.6	Set up facilities to recycle construction and demolition waste. Mandate certain percentage of the material for new construction to be recycled construction waste. Implement provision of Central regulations for construction and demolition waste management rules 2016. Set up facilities for recycling of C&D waste. Fine system will be started after finalization of bylaws.	District and local administration, Durgapur Municipal Corporation, WBPCB	1-2 years
17.7	Notify the requirement for a comprehensive waste management plan (WMP) from bulk waste generators mentioning the estimated amount of generation, provision of dust control measures, details of the transporting entities, information about the location of waste disposal, etc. The WMP should be combined with building permits and made compulsory before any construction/ demolition/remodeling activity. Fine system will be started after finalization of bylaws.	Durgapur Municipal Corporation	1-2 years

A draft graded response action plan has also been prepared which shall be finalized as and when the air quality forecasting is available and the emission sources are ranked on basis of SA study. In addition, the finalization of GRAP also requires reconciliation with IMD forecasted data on air quality. It is already noted that the observed air quality is grossly different from the IMD forecasts. This draft plan is attached only as a specimen, which may also need further refining based on SA study and current year's experiences on air quality management:

GRADED RESPONSE ACTION PLAN (GRAP) FOR REDUCING AIR POLLUTION IN NON-ATTAINMENT CITIES OF WEST BENGAL

The proposed graded measure approach for each pollution source according to the Air Quality Index (AQI) categories includes appropriate measures for each level of pollution (PM₁₀ / PM_{2.5}). While the comprehensive clean air action plan must be implemented round the year, the GRAP measures are meant to be temporary measures for duration of smog episodes and are implemented according to the severity of the air pollution levels. Once the levels come down and stabilize, measures are withdrawn. The objective of the GRAP is to prevent pollution from getting worse when adverse weather conditions trap and spike pollution. A GRAP has been prepared, which may be implemented as and when required and when severe conditions are forecasted.

The proposed GRAP includes set of measures to be implemented with greater vigour and stringency to prevent and avoid high level of air pollution in cities. This is linked to the national air quality index that categorizes daily air quality as good, satisfactory, moderate, poor, very poor, severe, and emergency. All actions suggested for each category are cumulative and add up to the level of emergency as air quality worsens. For implementation of GRAP, the scientific Task Force under WBPCB will advise the District Level monitoring committee on the daily pollution levels and forecasting based on real-time monitoring. Accordingly, the Committee may issue notices to the city authorities to implement the pre-defined action. Each implementing department will appoint a nodal officer to facilitate implementation. The action notified for moderate and poor categories that are largely about stringent enforcement in different sectors can become default action for continuous implementation throughout the year. Additional measures meant for very poor and severe may be notified when such situation develops especially during calm and inversion conditions.

Moderate to poor Poor - When PM2.5 levels are between 91-120 microgramme per cum or PM10 levels are between 251-350 microgramme per cum; Moderate - When PM2.5 is between 61-90 microgramme per cum or PM10 is between 101-250 microgramme per cum	
Action to be taken	Agency responsible
Stringently enforce/stop garbage burning in landfills and other places and impose heavy fines on person responsible	Municipal Corporations
Close/stringently enforce all pollution control regulations in brick kilns and industries	State Pollution Control Board
Stringently enforce pollution control in thermal power plants through Pollution Control Board monitoring	State Pollution Control Board
Do periodic mechanized sweeping on roads particularly in roads with heavy traffic and water sprinkling every two days	Municipal Corporations, Traffic Police, PWD
Strict vigilance and no tolerance for visible emissions – stop plying of visibly polluting vehicles by impounding or heavy fine	Department of Transport, Traffic Police
Stringently enforce rules for dust control in construction activities and close non-compliant sites	District Administration, Police
Deploy traffic police for smooth traffic flow at identified vulnerable areas	Traffic Police
Divert non-destined truck traffic	Municipal Corporations, Traffic Police
Strictly enforce Supreme Court orders on firecrackers	SPCB, District Administration in consultation with Chief Controller of Explosives, Petroleum and Explosive Safety Organization (PESO); Police
Ensure fly ash ponds are watered every alternate day during summer months (March-May)	Plant in charge of Power Plants
Information dissemination, social media, mobile apps should be used to inform people about the pollution levels, contact details of control room, enable them to report polluting activities/sources to the concerned authorities, and actions that will be taken by government based on the level of pollution.	State Pollution Control Board, District Administration

Very Poor When PM2.5 levels are between 121-250 microgramme per cum or PM10 levels are between 351-430 microgramme per cum	
Action to be taken	Agency responsible
Control use of diesel generator sets by improving electricity supply	State Pollution Control Boards
Restrict parking and enhance parking fee by 3-4 times in commercial areas to reduce usage of personal vehicles	Municipal Corporations
Augment public transport services by increasing frequency and ensure adequate para transit services	Department of Transport, State Transport Corporation
Stop use of coal/firewood in hotels and open eateries	Municipal Corporations
Alert in newspapers/TV to advise people with respiratory problems and cardiac patients to avoid polluted areas and restrict outdoor movement	State Pollution Control Board

Severe When PM2.5 levels are above 250 microgramme per cum or PM10 levels are above 430 microgramme per cum	
Action to be taken	Agency responsible
Close brick kilns, hot-mix plants, stone crushers and other highly polluting units or as applicable locally	State Pollution Control Board, District Administration, Police
Shut down / minimize operation of polluting coal based power plant if the plant is not complying with emission standards.	State Pollution Control Boards
Intensify public transport services. Introduce differential rates to encourage off-peak travel	Transport Department, State Transport Corporations
Increase frequency of mechanized cleaning of road and sprinkling of water on roads. Identify road stretches with high dust generation.	All road owning agencies including Municipal Corporations, Public Works Department and National Highway Authority of India
Restrict movement of trucks inside the coal field mine areas	State pollution control board, Department of steel and mines

Severe + or Emergency When PM2.5 levels cross 300 microgramme per cum or PM10 levels cross 500 microgramme per cum (or 5 times above the standard) or persist for 48 hrs or more.	
Action to be taken	Agency responsible
Stop entry of diesel truck traffic into city (except essential commodities)	Traffic Police, Municipal Corporations
Stop construction activities	Pollution Control Board, Municipal Corporations
Introduce some form of vehicle restraint measures for private vehicles based on license plate numbers, or introduce low emissions zones in the city to stop entry of polluting vehicles (old and ageing and polluting diesel vehicles etc). For this purpose introduce sticker system as per MoRTH guidelines to indicate fuel and date of manufacture of vehicles	Transport Department, Traffic Police
State Pollution Control Board Task Force to take decision on any additional steps including shutting of schools	

Actions to be taken by public

While the National Air Quality Index and health advisory will inform people about the dangers of exposure, people are also expected to take precautionary measures to protect themselves. Suggested actions by public are listed below:

Level according to AQI	Action
Very poor, severe and emergency	Those suffering from heart diseases, asthma, and other respiratory disease may consider avoiding undue and prolonged exposure
	Schools to suspend all outdoor activities and sport events
	Report visible emissions from vehicles, industries, power plants, garbage burning, and other non compliances to the respective control rooms
	Do not use diesel and kerosene generators
	Maintain vehicles properly (PUC certificate, replace car air filter, maintain right tyre pressure)
	Minimize unnecessary travel, use public transport & avoid using private vehicles

INSTITUTIONAL MECHANISM FOR IMPLEMENTATION OF GRAP

In order to implement and monitor progress of the proposed actions, a district level monitoring committee is proposed, which will also provide for the institutional mechanism for implementation. The committee may co opt members if situation demands.

Air Quality Monitoring network design criteria

Population (Census 2011)	Minimum No. of manual station under NAMP	Minimum no of proposed CAAQMS	Total
1,00,000- < 5,00,000	1-Background 2-Residential/ Commercial	1-Residential	4
5,00,000- <10,00,000	1-Background 2-Residential/ Commercial	1-Residential 1-Traffic dominant area 1- Commercial	6
10,00,000- <50,00,000	1-Background 2-Residential/ Commercial	2-Residential 1-Traffic dominant area 1- Commercial 1-Industrial area	8
≥50,00,000	1-Background in upwind direction 1-Background in down wind direction 2-Residential/ Commercial	4-Residential 3-Traffic dominant area 3- Commercial 2-Industrial area	16

Annexure 1

Department of Environment
Government of West Bengal
5th Floor, PraniSampad Bhavan, Bidhan nagar -106

No. /194/EN/T-IV-8/01/2019

Date: 19 /06/2019

NOTIFICATION

Whereas, air pollution is a serious concern,

Whereas, the Ministry of Environment Forest and Climate Change, GoI has launched National Clean Air Programme on 10th January 2019 and requested for constitution of Steering Committee, Monitoring Committee, Implementation Committee through communication dated 24.04.2019

Whereas, Kolkata has been identified as the 'Non-attainment city' in West Bengal under NCAP

Whereas, a weekly monitoring committee has been constituted for review of air quality and monitoring during winter months in Kolkata through notification vide memo no 2799/EN/T-IV-8/001/2015 dated 22.12.2017

Whereas, Comprehensive Action Plan (CAP) has already been prepared as per Hon'ble NGT order for Kolkata

Whereas, a monitoring committee AQMC (Air Quality Monitoring Committee) has been constituted as per order of Hon'ble National Green Tribunal (PR) in connection to OA 681/2018 vide memo no EN/3678/(1-10)/3C-38/2018 date 05.12.2018

Now, therefore, Governor is pleased to constitute the following Steering committee, Monitoring Committee, Implementation Committee as follows:

1) **Steering Committee for Implementation of National Clean Air Programme in West Bengal**

- Chief Secretary **Chairman**
- Additional Chief Secretary /Principal Secretary, Transport Department
- Additional Chief Secretary /Principal Secretary, Department of Urban Department and Municipal Affairs
- Commissioner, Kolkata Police
- Commissioner, Howrah Police
- Member Secretary, West Bengal Pollution Control Board
- Additional Chief Secretary/Principal Secretary, Department of Environment **Convener**

The Committee shall provide overall guidance for NCAP as applicable in West Bengal and review it on quarterly basis.

2) **Monitoring Committee for Implementation of National Clean Air Programme in West Bengal**

The roles and responsibilities of AQMC, which has been constituted vide *notification 3678/EN/(1-10)/3C-38/2018 dated 05.12.2018 (copy attached as Annexure A)* is extended also to monitor the NCAP in West Bengal and also to function as:

“Monitoring Committee for Implementation of National Clean Air Programme” in West Bengal under the Chairmanship of Additional Chief Secretary/Principal, Department of Environment. The Committee shall monitor NCAP as applicable in West Bengal closely and meet on monthly basis.

3) **Implementation Committee for Implementation of National Clean Air Programme in West Bengal**

The roles and responsibilities of weekly monitoring committee, which has been constituted vide *notification 2799/EN/(1-10)/T-IV-8/001/2015 dated 22.12.2017 (Copy attached as Annexure B)*, is extended also for daily monitoring and implementation of the NCAP in Kolkata and also to function as:

“Implementation Committee for National Clean Air Programme in Kolkata” under the Chairmanship of Commissioner, Kolkata Municipal Corporation. The committee shall be responsible for day to day monitoring and implementation of NCAP as applicable in Kolkata and meet on regular basis.

All three committees may co-opt subject specialist(s) from reputed scientific/technical institution, concerned government department/organization/civil society or Non Governmental Organization, if situation demands.

Sd/-

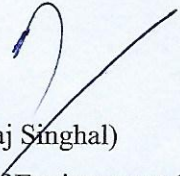
Chief Secretary
Government of West Bengal

Copy forwarded for kind information to:

No. 1194 / (13) / EN/T-IV-8/01/2019

Date: 19/06/2019

1. Additional Chief Secretary, Industry, Commerce & Enterprises
2. Additional Chief Secretary, Micro, Small and Medium Enterprises & Textile Department
3. Principal Secretary, Department of Environment
4. Principal Secretary, Department of Urban Department and Municipal Affairs
5. Secretary, Agriculture Department
6. Commissioner, Kolkata Municipal Corporation
7. Secretary, Transport Department
8. Commissioner, Howrah Municipal Corporation
9. Commissioner, Kolkata Police
10. Commissioner, Howrah Police
11. Member Secretary, West Bengal Pollution Control Board
12. Shri Prabir Kr Barai, Senior Scientist, West Bengal Pollution Control Board
13. Sr. PS to Chief Secretary


(Niraj Singhal)
Chief Environment Officer
Environment Department

Department of Environment
Government of West Bengal
Notification

No. EN/3678(...)/3C-38/2018

Date: 05/12/2018

Whereas air quality of Kolkata has not attained National Ambient Air Quality Standards (NAAQS)

And whereas the Hon'ble Principal Bench in its order dated the 8th October, 2018 has directed the State Government to constitute an Air Quality Monitoring Committee (AQMC) for preparation of an appropriate action plan for attaining NAAQS

Now therefore, a ten member AQMC is constituted for preparation of Air Quality Action plan for Kolkata for attaining NAAQS with following members:

- Additional Chief Secretary, Environment *Chairperson*
- Secretary or his nominee, Transport
- Secretary or his nominee, Urban Development & Municipal Affairs (UD&MA)
- Secretary or his nominee, Industry, Commerce & Enterprise
- Secretary or his nominee, Micro Small and Medium Enterprises (MSME)
- Secretary or his nominee, Agriculture
- Commissioner or his nominee, Kolkata Police
- Commissioner or his nominee, Kolkata Municipal Corporation (KMC)
- Member Secretary, West Bengal Pollution Control Board (WBPCB)
- Chief Environment Officer, Environment *Convenor*

The nominee of any department should be a senior level officer at least in the rank of Joint Secretary/ Joint Commissioner/ Director

The Committee shall start functioning with immediate effect and shall submit the action plan to Central Pollution Control Board by 31.12.2018.

Sd/-
Chief Secretary
Government of West Bengal

**Department of Environment
Government of West Bengal**

No. 1279 /EN/T-IV-8/001/2015

Date 22/12/2017

NOTIFICATION

Whereas, the cities of Kolkata and Howrah are exposed to air pollution

Whereas, air quality of Kolkata and Howrah are of serious concern

Whereas, air pollution worsens every winter

Whereas, level of air pollution is already showing deteriorating impact

Whereas, the situation demands collaborative effort and intensified action

Now, therefore, the following committee is hereby constituted for weekly monitoring and follows up of status of air quality and initiation of action to control air pollution

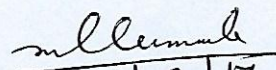
Committee for weekly monitoring of air quality situation, mitigation action and follow up

- Commissioner, Kolkata Municipal Corporation Chairman
- Commissioner, Howrah Municipal Corporation
- Representative of Transport Department
- Representative of Kolkata Police
- Representative of Howrah Police
- Prabir Kr Barai, Senior Scientist, West Bengal Pollution Control Board Convenor

The Committee shall review the status of area wise air quality on weekly basis. They shall monitor constructions sites, which are not properly following the guidelines for arresting emission from construction sector; the vehicles, which are not following emission norms; roadside dust suspensions; burning of coal or wood in restaurants, eateries and industries; and other actions recommended in the short term action plan. They shall initiate and take corrective action to improve air quality.

The Committee shall submit a weekly report to the Chief Secretary, Government of West Bengal.

The Committee shall hold the weekly meetings up to end of March 2018.


21/12/17
Chief Secretary
Government of West Bengal

Annexure 2

Government of West Bengal
Environment Department

Prani Sampad Bhavan, 5th floor, L.B-2, Sec-III, Salt Lake, Kolkata-700106

NOTIFICATION

No. EN/137/T-IV-8/01/2019

Kolkata. 16.01.2020.

Whereas, the Ministry of Environment Forest and Climate Change, GoI has launched National Clean Air Programme (NCAP) on 10th January 2019 and requested for constitution of Steering Committee through communication dated 24.04.2019

Whereas, different municipalities in different districts are being identified as the 'Non-attainment city' in West Bengal under NCAP

Whereas, District Level Committees (DLC) are to be constituted as per order of Hon'ble National Green Tribunal (PR) in connection to OA 681/2018 for NACs

Whereas, Comprehensive Action Plan (CAP) has already been prepared as per Hon'ble NGT order for Kolkata and other 6 NACs, namely: Howrah, Haldia, Durgapur, Asansol, Ranigunge, Barrackpore

Now, therefore, In compliance with the aforesaid directions of the Hon'ble National Green Tribunal, Principal Bench New Delhi, the Governor is pleased to constitute DLCs for districts of West Bengal with NACs (except Kolkata) comprising of the following members-

1. Representative of the District Magistrate of respective districts of West Bengal - member
2. Representative of the Superintendent of Police of respective districts of West Bengal - member
3. Regional Officer of West Bengal Pollution Control Board of respective districts of West Bengal - member
4. Representative of the Chairman of the District Legal Service Authority (DLSA) - member.

The committee will function under the under the overall supervision and coordination of the District Magistrate of the respective districts of West Bengal.

By Order,

sd/-

Chief Secretary to the Government of West Bengal

Bibliography

1. West Bengal Pollution Control Board, http://webtest.wbpcb.gov.in/writereaddata/files/siting%20policy_2016_30-6-2016_3.pdf, as accessed on September 26, 2019
2. CPCB, Schedule VI, https://cpcb.nic.in/displaypdf.php?id=R2VuZXJhbFN0YW5kYXJkcy5wZGY=3http://cpbenviis.nic.in/scanned%20reports/COINDS-18%20EMISSION%20REGULATIONS%20PART_2.pdf
4. https://cpcb.nic.in/uploads/Thermal_Power_Plant_overview.pdf
5. Central Pollution Control Board, Program Objective Series, (PROBES), 2007, Assessment of Fugitive Emissions & Development of Environmental Guidelines for Control of Fugitive Emissions in Cement Manufacturing Industries. Available at: <https://cpcb.nic.in/openpdffile.php?id=UHVibGljYXRpb25GaWxlLzQwMl8xNDU3NDE4NTc3X1B1YmxpY2F0aW9uXzQ4NV9wYWNRYWdlX2NlbWVudF9mdWdpdGl2ZV9lbWlzc2lvbi5wZGY=>
6. Comprehensive Industry Document Series by Central Pollution Control Board, 2012, Guidelines for (i) Siting of rice shellers/mills; (ii) handling and storage of rice husk and (iii) handling, storage and disposal of ash generated in boiler using rice husk as fuel. Available at: <https://cpcb.nic.in/openpdffile.php?id=UHVibGljYXRpb25GaWxlLzI0XzE0NTY5ODU1NjBfUHVibGljYXRpb25fNTE5X0d1aWRlbGluZVJlcG9ydC5wZGY>
7. Environment and Climate Change Canada, 2015, Code of Practice to Reduce Fugitive Emissions of Total Particulate Matter and Volatile Organic Compounds From The Iron, Steel and Ilmenite Sector, Available at: https://www.ec.gc.ca/lcpe-cepa/C8DD8207-98B0-453A-931C-760CF9C22255/CoPSteel-CdPFer-2015Dec_eng.pdf
8. Sebastian Plickert, German Federal Environment Agency, 2015, BAT in the Iron and Steel Industry, Available at: https://www.unece.org/fileadmin/DAM/env/lrtap/capacity_building/BAT_Workshop_2016/7_BAT_in_the_Iron_and_Steel_Industry.pdf
9. Michael Hein and Manfred Kaiser, 2012, Environmental Control and Emission Reduction for Coking Plants, Open Access, Available at: <https://www.intechopen.com/books/air-pollution-a-comprehensive-perspective/environmental-control-and-emission-reduction-for-coking-plants>
10. B. M. Sarangi, B. Kesav and M. K. Sheshadri, 2002, Environmental Control Measures in Sponge Iron Industry with Particular Reference to Tata Sponge Iron Limited, Environmental & Waste Management, Available at <http://eprints.nmlindia.org/4542/1/139-152.PDF>
11. Phil J. Marsosudiro, Pollution Prevention in the Integrated Iron and Steel Industry and its Potential Role in MACT Standards Development, TRC Environmental Corp., Available at: <https://p2infohouse.org/ref/15/14423.pdf>

12. UN Environment, 2016, Guidance on best available techniques and best environmental practices Smelting and roasting processes used in the production of nonferrous metals (lead, zinc, copper and industrial gold as specified in Annex D to the Convention), Available at: http://www.mercuryconvention.org/Portals/11/documents/forms-guidance/English/BATBEP_nonferrous.pdf
13. Japanese Smart Energy Products & Technologies, Details of Coke Dry Quenching, Available at: https://www.jase-w.eccj.or.jp/technologies/pdf/iron_steel/S-10.pdf
14. Phil J. Marsosudiro, Pollution Prevention in the Integrated Iron and Steel Industry and its Potential Role in MACT Standards Development, TRC Environmental Corp., Available at: <https://p2infohouse.org/ref/15/14423.pdf>
15. CII, Shakti Sustainable Energy Foundation, 2011, Case Study Manual on Alternative Fuels and Raw Materials Utilization in the Indian Cement Industry. Available at: <https://shaktifoundation.in/wp-content/uploads/2017/06/afr-utilisation-in-cement-industry-final-10-jan-2012.pdf>
16. National Productivity Council, India, 2017, Good Practices Manual on Greenhouse Gases Emission Reduction for Cement Sector. Available at: <http://www.npcindia.gov.in/wp-content/uploads/2014/07/GHG-Manual-Cement-sector.pdf>
17. CKinetics, 2017, State of Sector, GHG Emmissions in Indian SMEs: Ceramics, Foundry, Forging & Steel re-rolling. Available at: http://ckinetics.com/files/2017_Energy-GHG_Tracker.pdf
18. Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, Working Group on Strategies and Review, 2012, Guidance document on control techniques for emissions of sulphur, NOx, VOCs, dust (including PM10, PM2.5 and black carbon) from stationary sources, UNECE, Available at: [unece.org/fileadmin/DAM/env/documents/2012/air/WGSR_50th/ Informal/Informal_document_no2_stationary_sources_rev.pdf](http://unece.org/fileadmin/DAM/env/documents/2012/air/WGSR_50th/Informal/Informal_document_no2_stationary_sources_rev.pdf)
19. Environment Protection Agency, Ireland, 2008. BAT Guidance Note on Best Available Techniques for Non-Ferrous Metals and Galvanising (1st Edition), Available at: [https://www.epa.ie/pubs/advice/bat/BAT%20Guidance%20Note%20Non%20Ferrous%20Metals%20 &%20 Galvanising.pdf](https://www.epa.ie/pubs/advice/bat/BAT%20Guidance%20Note%20Non%20Ferrous%20Metals%20&%20Galvanising.pdf)
20. Cecilia Springer and Ali Hasanbeigi, 2016, Emerging Energy Efficiency and Carbon Dioxide Emissions Reduction Technologies for Industrial Production of Aluminum, Lawrence Berkeley National Laboratory. Available at: [https:// china.lbl.gov/sites/all/files/06-06-16_lbl_ ceg_aluminum_ee_techs.pdf](https://china.lbl.gov/sites/all/files/06-06-16_lbl_ceg_aluminum_ee_techs.pdf)
21. CKinetics, 2017, State of Sector, GHG Emmissions in Indian SMEs: Ceramics, Foundry, Forging & Steel re-rolling. Available at: [http://ckinetics.com/ files/2017_Energy-GHG_Tracker.pdf](http://ckinetics.com/files/2017_Energy-GHG_Tracker.pdf)

22. World Bank, 2007, Environmental, Health, and Safety Guidelines for Foundries. Available at: <http://documents.worldbank.org/curated/en/741011490086417947/text/113620-WP-ENGLISH-Foundries-PUBLIC.txt>
23. Green Building Council Australia (GBCA), 2010, Literature Review and Best Practice Guidelines for the Life Cycle of PVC Building Products, Available at: <https://www.gbca.org.au/uploads/156/2716/Literature%20Review%20and%20Best%20Practice%20Guidelines%20for%20the%20Life%20Cycle%20of%20PVC%20Building%20Products.pdf>
24. Comprehensive Industry Document Series by Central Pollution Control Board, 2012, Guidelines for (i) Siting of rice shellers/mills; (ii) handling and storage of rice husk and (iii) handling, storage and disposal of ash generated in boiler using rice husk as fuel. Available at: <https://cpcb.nic.in/openpdf.php?id=UHVibGljYXRpb25GaWxlLzI0XzE0NTY5ODU1NjBfUHVibGljYXRpb25fNTE5X0d1aWRlbGluZVJlcG9ydC5wZGY>
25. Ministry of Road Transport & Highways Transport Research Wing, Government of India, 2015, Road Accident in India-2015, Available at: <http://www.indiaenvironmentportal.org.in/files/file/road%20accidents%20in%20India%202017.pdf>
26. Asansol Durgapur Development Authority, 2010, Land Use and Development Control Plan for Andal, Pandabeswar, Durgapur Faridpur & Kansa CD Blocks, Available at: <http://addaonline.in/wp-content/uploads/2015/02/FINAL-LUDCP-REPORT1.pdf>
27. April 2003, Guidelines for Ambient Air Quality Monitoring, CPCB, MoEF, http://www.indiaairquality.info/wp-content/uploads/docs/2003_CPCB_Guidelines_for_Air_Monitoring.pdf
28. November 2017, Guidelines on Dust mitigation measures in handling Construction material and C&D wastes, CPCB, <http://jkspcb.nic.in/WriteReadData/userfiles/file/cand%20D%20guidelines/CPCB%20guidelines%20for%20dust%20control.pdf>
29. Air Quality Index Website, West Bengal dashboard. Available at: <https://www.aqi.in/dashboard/west-bengal/asansol>
30. India Environmental Portal, Airpocalypse II – Assessment of Air Pollution in Indian Cities 2018. Available at: http://www.indiaenvironmentportal.org.in/files/file/Airpocalypse_II.pdf
31. Urban Emissions Info website, India – Air Pollution Knowledge Assessment (APnA) city program, Asansol section. Available at: <http://www.urbanemissions.info/india-apna/asansol-india/>
32. Central Pollution Control Board website, Action Plans and Progress Reports, West Bengal. Available at: <https://cpcb.nic.in/displaypdf.php?id=QXNhbnNvbF9BUF9zZXB0XzIwMTYucGRm;https://cpcb.nic.in/progress-report-action-plans/>
33. Bardhaman Government website, Industries. Available at: <http://bardhaman.gov.in/indus/industry.htm>

**Environment Department
Government of West Bengal
2020**