

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

VISAKHAPATNAM CITY



ANDHRA PRADESH POLLUTION CONTROL BOARD

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COMPREHENSIVE ACTION PLAN FOR CLEAN AIR – VISAKHAPATNAM CITY

1. Introduction:

Andhra Pradesh Pollution Control Board (APPCB) as a regulatory body to control air pollution as per the provisions of the Air (Prevention and Control of Pollution) Act, 1981, is monitoring ambient air quality in cities and important towns including district head quarters of the State of Andhra Pradesh. Details of cities and towns monitored for ambient air quality are as follows:

Table – 1.1

S. No.	City/town	NAMP	SAAQM	CAAQMS	Total
1	Visakhapatnam	9	1	2	12
2	Vijayawada	9	---	1	10
3	Srikakulam	4	---	---	4
4	Vizianagaram	3	1	---	4
5	Kakinada	4	---	---	4
6	Rajahmundry	3	---	1	4
7	Eluru	4	---	---	4
8	Guntur	4	---	---	4
9	Ongole	4	---	---	4
10	Nellore	4	---	---	4
11	Tirupathi	4	---	---	4
12	Tirumala	---	---	1	1
13	Chittoor	3	---	---	3
14	Ananatapuram	4	---	---	4
15	Kurnool	4	---	---	4
16	Yerraguntla	1	---	---	1
17	Kadapa	3	---	---	3
18	Amaravathi	---	---	1	1
Total:		67	2	6	75

2. Identified non-attainment cites in Andhra Pradesh:

Central Pollution Control Board (CPCB) has identified 102 cities and towns in India as non-attainment for not meeting the National Ambient Air Quality Standards (NAAQS). Five of them namely, Visakhapatnam, Vijayawada, Guntur, Nellore and Kurnool in Andhra Pradesh have been identified as non-attainment cities by CPCB in respect of Respirable Suspended Particulate Matter (PM10) and issued directions to APPCB under Section 18 (1) (b) of the Air (Prevention and Control of Pollution) Act, 1981 for preparation of action plans, in coordination with stake holder Departments to control air pollution in the said cities and towns.

Table – 2.1

S. No.	Cities	Particulate Matter (PM10) ug/m3					Annual Average Standard
		2011	2012	2013	2014	2015	
1	Guntur	74	75	75	79	100	60
2	Kurnool	82	74	76	77	82	
3	Nellore	63	62	62	63	66	
4	Vijayawada	90	97	104	100	110	
5	Visakhapatnam	80	65	67	64	61	

3. Hon'ble National Green Tribunal directions on non-attainment cities:

Hon'ble National Green Tribunal, Delhi in its Order, dated 08.10.2018 in O. A. No. 681 of 2018 on non-attainment cities has issued the following directions to comply with:

1. All the States and Union Territories with non-attainment cities must prepare appropriate action plans within two months aimed to bring down the air pollution levels to the prescribed norms within six months from the date of finalization of action plans.
2. Action plans may be prepared by six-member Committee comprising of Directors of Environment, Transport, Industries, Urban Development, Agriculture and Member Secretary, State Pollution Control Board or Committee of the concerned State. The Committee may be called Air Quality Monitoring Committee (AQMC). The Committee will function under the overall supervision and coordination of Principal Secretary, Environment of the concerned State or the Union Territory. This may be further supervised by the Chief Secretaries concerned or their counter parts in Union Territories by ensuring intra-sectorial coordination.
3. The action plans thus prepared may be forwarded to CPCB by 31.12.2018 for examination and approval.
4. The action plan will indicate steps to be taken to check different sources of pollution having speedy, definite and specific timelines for execution.
5. The Chief Secretaries of the State and Administrators / Advisors to Administrators of the Union Territories will be personally accountable for the failure to formulate action plans, as directed.

4. Constitution of Air Quality Monitoring Committee:

In compliance to the directions of Hon'ble National Green Tribunal, Environment, Forests, Science & Technology Department, Govt. of Andhra Pradesh has issued the G. O. R. T. No. 167, dated 14.11.2018 constituting the Air Quality Monitoring Committee with the following members for preparation of action plans to control air pollution in five non-attainment cities in Andhra Pradesh.

Table – 4.1

S. No.	Member of the Committee	Designation
1	Commissioner, Transport	Member
2	Commissioner, Industries	Member
3	Commission & Director, MA&UD	Member
4	Commissioner & Director, Agriculture	Member
5	Member Secretary, APPCB	Member Convener
6	Special Secretary to Government Environment, Forest, Science & Technology Department	Member

5. Visakhapatnam city & its air quality:

Visakhapatnam city is located in North-Eastern coast of Andhra Pradesh and the entire city lies within two major hill ranges, i.e., Yarada and Adavivaram (Simhachalam). These two hill ranges cause inversion conditions particularly during winter season. Major habitation and industries co-exist in the bowl area. (habitation developed in the surroundings of all major industries). Major industries were established in the bowl area during the period 1970 – 1980. Due to rapid urbanization and industrialization, the population in the city increased from 7.52 to about 20 lakhs and vehicular population has increased from 74,000 to 10,00,000 during last two decades. At present industrialization is taking place outside the bowl area.

Visakhapatnam is the most industrialized city in Andhra Pradesh. It has emerged as one of the leading industrial centers in southern India. Based on the 2009 assessment of environmental performance index of industrial areas, Visakhapatnam was categorized as a critically polluted area with a CEPI score of 70.82. Results of the 2013 CEPI assessment indicate that Visakhapatnam is not as critically polluted as it once was, but the CEPI scores still lie in the severely polluted range.

APPCB prepared an action plan to curtail the critical levels of pollution in the city. With respect to air pollution the following industries were identified as causing significant pollution: Visakhapatnam Port Trust; Visakhapatnam Zinc

Ltd; Coromandel Fertilizers; Hindustan Petroleum Corporation limited; Rain Calcining Ltd; Hindustan Polymers; Essar Steel (also has its captive power plant).

A time-bound plan was drafted in 2010 for these plants to monitor and curtail their stack and fugitive emissions. Recommendations were made to reduce stack emissions by installation / upgradation of stack control equipment, reduction of fugitive emissions at junction / transfer points by installation of bag scrubber, using containers instead of wagons while unloading raw material and enhancement of online pollution monitoring capacities of these plants.

In addition to the above industrial pollution, re-suspension of road dust, emissions from vehicle movement, burning of biomass, municipal solid waste & garbage, construction activities, transportation of construction material such as sand, crusher metal, soil, vehicle service centres, use of wood & coal for domestic & commercial cooking activities, etc. are also contributing to ambient air pollution in Visakhapatnam city.

Andhra Pradesh Pollution Control Board is regularly monitoring the ambient air quality of Visakhapatnam city at the following locations:

S. No.	Location	NAMP / CAAQMS
1	ESI Hosptital	NAMP
2	Mindi	NAMP
3	Seethammadhara	NAMP
4	Gnanapuram	NAMP
5	Police Barracks	NAMP
6	Industrial Estate	NAMP
7	Pedagantyada	NAMP
8	Ramky Pharmacy	NAMP
9	MVP Raitu Bazar	NAMP
10	GVMC building	CAAQMS
11	APIIC (104 area)	CAAQMS

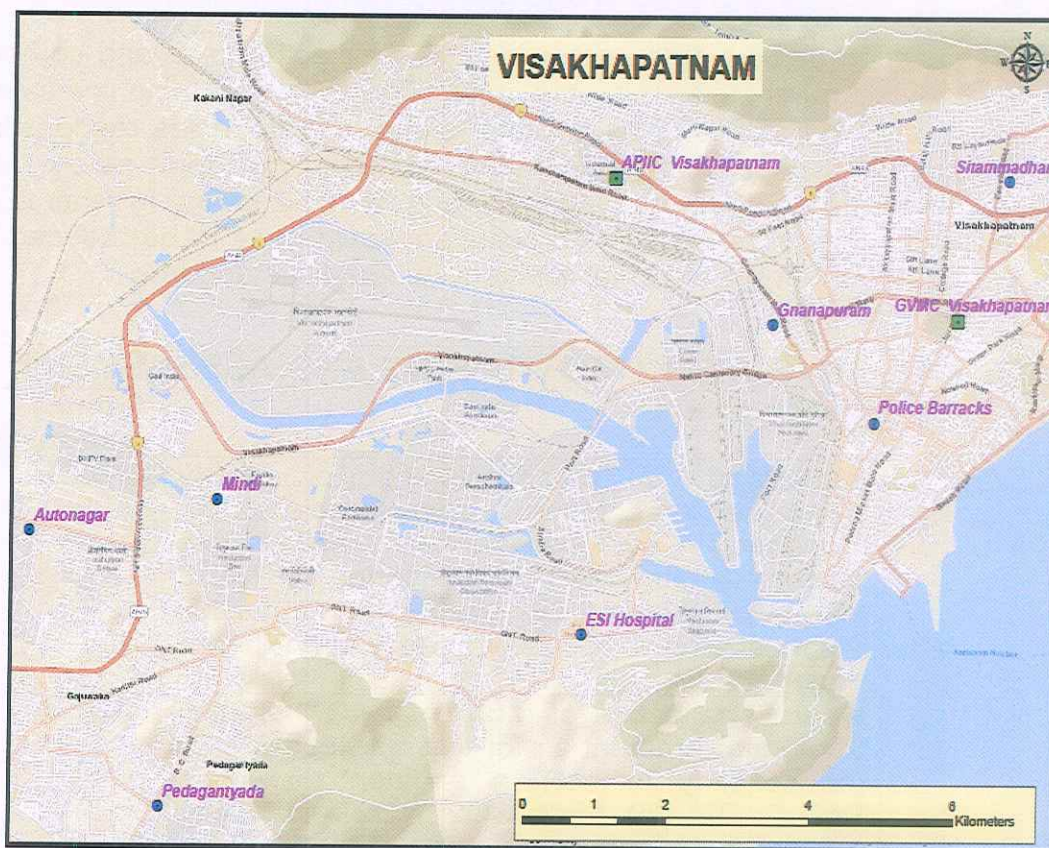
Particulate Matter (PM₁₀ & PM_{2.5}) has been identified as main air pollutant as it is found above the prescribed national standards. The main reason for the suspended particulate matter may be attributed to the above mentioned industrial and domestic activities. The gaseous emissions are well within the limits of NAAQ standards. It has been observed that air quality of Visakhapatnam during winter season becomes very poor & severe due to condensation of fine particulate matter in the lower portions of the atmosphere and particularly Visakhapatnam city is geographically BOWL shaped area. The atmospheric inversion of is also contributing for increase in AAQ levels.

Table – 5.1: Air quality monitoring results of Visakhapatnam city.

S. No.	Parameter	2013	2014	2015	2016	2017	2018	Annual average standard
1	PM10	68	70	67	81	77	81	60
2	SO ₂	13.4	13.7	9.7	9.6	9.4	9.8	50
3	NO _x	13.4	19.7	13.3	14.7	11.5	23.3	40
4	NH ₃	80	63	61	58	56	69	100
Average of no. of stations		8	10	10	10	10	10	---
5	PM _{2.5}	---	54	43	55	48	46	40
6	CO	---	0.95	0.85	0.9	1	0.7	2
7	Ozone	---	32.2	28.6	22.1	22.3	38.7	100
8	Benzene	---	2.95	5.2	5.16	3.06	4.8	5
Average of no. of stations		---	2	2	2	2	1	---

Note: All values are expressed in ug/m³ except CO. CO is expressed in mg/m³.

Visakhapatnam city Map



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

Against the above backdrop, this pollution source-wise comprehensive action plan has been developed for the non-attainment city of Visakhapatnam. While framing the action plans, kept in view the air pollution reduction targets for Visakhapatnam 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.

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.

6.1 Comprehensive Action Plan (CAP):

This section deals with source-wise clean air action plan and compliance strategy to meet clean air standards. The following table indicates the short, medium and long term action along with agencies responsible for the city of Visakhapatnam. This plan indicates short term as six months, medium term as up to one year and long term 1-2 years. In relation to the current baseline the particulate pollution would need to be reduced by 30 per cent to meet the National Ambient Air Quality standards.

6.1.1	AIR QUALITY MONITORING AND ASSESSMENT		
S. No.	Action points	Agency responsible	Timeline
6.1.1.1	Installation & commissioning of newly sanctioned additional one ambient air monitoring stations under NAMP to Visakhapatnam city and monitoring of PM2.5 SPM in all NAMP stations. With this Visakhapatnam will have nine stations in all under NAMP.	APPCB	Six months
6.1.1.2	Operationalization of Mobile CAAQM Station to monitor ambient air for the individual VOCs (about sixty in no.) in addition to PM10, PM2.5, O3, CO, NH3, SO2, NO2 & Benzene on real time basis in pollution potential areas of Visakhapatnam city and industrial areas.	APPCB	Six months
6.1.1.3	Develop capacity for pollution forecasting for implementation of graded response action plan. This will also require monitoring of weather data.	APPCB in consultation with CPCB, IMD, Andhra Pradesh	one year

	Set up daily air quality public information dissemination system based on National Air Quality Index and health advisory.	Space Application Centre (APSAC), EFS&T	
6.1.1.4	Carry out one emission inventory, source apportionment study, health impact studies, exposure impacts, etc.	APPCB in consultation with CPCB	One to two years

6.1.2	Industries		
6.1.2.1	Carry out pollution load estimation from industrial sector to enable setting of target for emission reduction.	APPCB	6 months
6.1.2.2	Implementation of SOx and NOx standards notified by MOEF&CC on 29 January 2018 for 35 categories of industries.	APPCB	6 months
6.1.2.3	To enable stronger local action to meet the clean air targets, the State Government can consider tighter emission standards for concerned industry that is permissible under the current national regulations.	APPCB	6 months
6.1.2.4	Assess the number of industrial units that are non-compliant and prepare unit/plant wise action plan for time bound compliance or be shut down.	APPCB	6 months
6.1.2.5	Create inventory of informal units and create site and cluster plan and shift them away from habitation.	APPCB	6 months
6.1.2.6	To strengthen the star rating programme to include full compliance with standards and switchover to low sulfur fuels/ natural gas	APPCB	6 months
6.1.2.7	Prepare a clean fuel policy and provide mandate incentives for clean fuels for the state: for this identify approved and non-approved fuels. Promote relatively cleaner fuels like oil, gas and electricity. Discourage fuels with very high sulphur and heavy metals concentrations like, furnace oil, pet coke, tyre oil, etc. Need favourable taxation and pricing policy to make cleaner fuels more competitive	APPCB	6 months
6.1.2.8	Strengthen the current siting policy for industries and industrial estates to be notified in future	APPCB, Department of Industries	1 year

6.1.3	Power Plants		
6.1.3.1	<p>Implementation of new thermal power plant standards in all power plants by an early date. The power plants need to comply with the new emission standards by the outer date of 2022. Check status of compliance and prepare a transition plan for each power plant to meet the new standards.</p> <ul style="list-style-type: none"> Plants need to devise time bound emission reduction targets keeping the power load generation in mind. Plants found not meeting set emission reduction targets to be penalized. Prepare plan for full utilization of fly ash, and effective management of fly ash pond for reduction of fugitive emissions, -- sprinkling of water (recy- cled water) especially during summer months, plantation and other stabili- sation methods to curtail wind-blown ash. 	APPCB, MoEF & CC, Ministry and Department of Energy	2 years
6.1.3.2	Progressively close the older and more polluting thermal power plants and to move to cleaner natural gas, if possible.	APPCB and Department of Energy, EFS&T	2 years
6.1.3.3	Chart a roadmap for cleaner plants and Incentivize their operation by giving them the priority over other polluting plants	APPCB, EFS&T, Department of Energy, power generating companies	2 years
6.1.4	Brick Kilns		
6.1.4.1	There are brick kilns in close vicinity of the city. Enforce restrictions on operations of brick kilns within urban air-shed zones during high pollution periods; allow only those Brick kilns that comply with zig-zag or improved technology.	APPCB, EFS&T, Department of Industries	1 year
6.1.4.2	Convert all brick kilns to zigzag technology-- from natural draft kilns to induced--draft kilns (zigzag technology).	APPCB, EFS&T, Department of Industries	

6.1.4.3	Prescribe design specifications for improved kilns and ensure compliance checking. Ensure conversion has actually taken place.	APPCB, EFS&T, Department of Industries	
6.1.4.4	Remove stone crushers that are close to the city; adopt stringent dust control measures and greening.	APPCB, EFS&T, Department of Industries	
6.1.5	Control of vehicular emissions		
6.1.5.1	Emission standard 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 BSVI compliant can be registered from April 1, 2020.	Department of Transport	2 years
6.1.5.2	ALTERNATIVE CLEAN FUEL POLICY FOR VEHICLES Electric vehicle programme: Need zero emissions mandate for targeted vehicle segment-wise phase in of electric vehicles — two-wheelers, three-wheelers/para transit, and large delivery fleet. <ul style="list-style-type: none">• Development of Kurnool E-rickshaw/ Green e-mobility plan• Mandate registration policy for auto-rickshaws, taxis, delivery fleet, and two-wheelers.• Plan infrastructure for charging and battery disposal.• This can be incentivized by lower road tax, motor vehicle taxes and registration charges, preferential licensing and permit system, allowing them in low emissions zones etc.• Identify and notify commercial areas with high footfalls and good public / paratransit connectivity to pedestrianize supported by zero emission battery-operated vehicles: Ensure organized deployment to reduce congestion.	Transport department, APGENCO, APTRANSCO, NREDCAP, Kurnool Municipal Corporation	1 year

6.1.5.3	Introduce gaseous fuel programme when gas becomes available. Plan CNG refuelling infrastructure for delivery and use. Kurnool has proposed a Green mobility plan for auto rickshaws, which will be implemented by 2020. Such initiative can be further encouraged.	Transport department, Department of Energy, Infrastructure and Investment, Civil Supplies Department MoPNG	1-2 years
6.1.5.4	Bio fuel policy: There is potential of generating biogas from waste and sewage to run buses in cities.	Department of Energy, Infrastructure and Investment, Oil marketing companies	1 year
6.1.5.5	Need favorable tax measures to promote clean fuels and vehicles and zero emissions vehicles.	Department of Energy and Finance and Infrastructure	1 year
6.1.6	Emission control measures from on-road vehicles		
6.1.6.1	Plan and implement adequate number of PUC centres and strengthen periodic auditing and oversight of PUC centres and calibration of equipment and third party checks. Reportedly, there are no designated pollution checking centres in Visakhapatnam.	Transport Department	6 months
6.1.6.2	Improve and strengthen PUC programme: Ensure universal linking of PUC centres with remote server and eliminate manual intervention in PUC testing. Ensure implementation of all test parameters for diesel and petrol vehicles including Lambda testing for petrol cars as notified by MORTH in 2004.	Transport Department	1 year
6.1.6.3	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.	Transport Department	1 year

6.1.6.4	Improve compliance with PUC programme. Link PUC certificates with annual vehicle insurance to ensure 100 per cent compliance as per the Directive of the Hon'ble Supreme Court. Need strong penalty for non-compliance with PUC. Vehicles without valid PUC certificates should be prohibited from plying.	Transport Department and MoRTH	1 year
6.1.6.5	Enforcement of law against visibly polluting vehicles: remove them from road, impose penalty, and launch extensive awareness drive against polluting vehicles.	Transport Department, Traffic Police	1 year
6.1.6.6	Set up modern centralized vehicle inspection centres for upgraded emissions and fitness tests for commercial vehicles and diesel vehicles.	Transport Department, MoRTH	1 year
6.1.6.7	Phase out old vehicles and 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 guide- lines.	Transport Department	1 year
6.1.6.8	Vehicle labelling or sticker programme: The July 26, 2018 directive of the Supreme Court has approved the MoRTH's Colour Coded HSRP Hologram Stickers. This programme to come into effect on April 1, 2019, across the country will require, each vehicle, both old and new to be provided with colour coded non-tamperable High Security Stickers, along with the number plates. At a later date, older and polluting vehicles may be discouraged in city centres or earmarked low emission zones by using these stickers for identification of vehicles.	Transport Department, Traffic Police	1 year
6.1.7	Freight transportation		
6.1.7.1	Use of off-peak passenger travel times to move freight and restrict the entry of heavy vehicles into cities during the day to continue	District and local administration, Municipal Corporation	Within 6 month
6.1.7.2	Provide truck rest areas / parks along national and state highways to prevent entry of trucks into cities during peak hours.	PWD, NHAI	Within 6 months

6.1.7.3	<p>Install weigh-in-motion bridges and monitoring equipment. Ensure better quality and more efficient vehicles.</p> <p>Promote high capacity trucks for freight transport of mining material instead of smaller trucks to reduce numbers.</p>	NHAI, district and local administration	Within 6 months
6.1.7.4	<p>Diversion of truck traffic: Visakhapatnam is a city with the main arterial/ highway cutting through the city. Some parts are also unpaved. Entire truck traffic comes into the city. This creates enormous pollution.</p> <p>Check feasibility of diversion and realignment of roads to divert substantial number of trucks from the city. Alternate routes need to be identified and improved to ensure that commercial traffic does not enter the city.</p> <p>Also fix entry and exit timings of trucks and a management plan for ware- housing, loading unloading.</p>	District and local administration, Traffic Police, Transport Department	Within 6 months
6.1.7.5	<p>Check overloading: Use weigh-in-motion bridges / machines (WIM) and Weigh bridges at entry points to 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.</p>	District and urban local administration, Traffic Police, Transport department	Within 6 months
6.1.7.6	<p>Develop urban freight consolidation centres in relation to location of warehouses relative to suburban areas.</p>	District and urban local administration, Transport Department	1 year
6.1.7.7	<p>Create management systems for loading and unloading of goods in city areas.</p>	District and local administration, Transport department	6 month
6.1.7.8	<p>Develop a Safe-to-Load programme to ensure fitness and roadworthiness of trucks.</p>	Transport Department,	6 month
6.1.7.9	<p>Intra-state freight transport plan: Prepare plan for inter- and intra- state freight transport plan to improve rail-based freight traffic to reduce dependence on trucks.</p>	Transport Department, Railways	2 years

6.1.7.10	FUEL QUALITY TESTING TO CHECK ADULTERATION Prepare an action plan to check fuel adulteration and random monitoring of fuel quality data. To ensure that periodic routine and surprise fuel testing is done for all transport and non-transport fuels. For this an action plan need to be prepared in consultation with oil companies and ministry of petroleum and natural gas.	Local Administration Department of Energy Oil marketing companies	6 month
6.1.7.11	Emission Control at Refueling Stations Install vapour recovery systems in fuel refueling outlets to reduce benzene and VOC emissions. CPCB has issued direction for installation of stage I and Stage II vapor recovery system in all retail outlets with capacity 3000 kilolitre and more in 46 million plus cities by December 2017. Retail outlets across the city should comply with this	Department of Energy Oil marketing companies Transport Department	1 year
6.1.8	Public Transport System		
6.1.8.1	Intermediate public transport (IPT) and bus system		
6.1.8.2	Define routes, permits, fares, vehicle design and safety standards, and vehicle technology standards for para-transit vehicles. Strengthen para-transit driver training and licensing procedures. This strategy is very important for smaller cities.	Transport Department	1–2 years
6.1.8.3	Enforce through IT-based systems that track traffic violations, with repeat violations leading to increased penalties including fines, increased insurance, and cancellation of licenses	Transport Department	1–2 years
6.1.8.4	Ban and phase out diesel auto-rickshaws. Introduce CNG/electric auto- rickshaws. Provide appropriate fiscal or regulatory incentives	Transport Department	1–2 year
6.1.8.5	Regulate the taxi industry in as integrated a manner as possible as a feeder service or otherwise to complement and promote NMT and public transport	Transport Department	1 year
6.1.8.6	Assess and introduce a city bus system of appropriate fleet size of small buses and desirable bus type replete with GPS tracking, ETVMs for fare collection and Passenger Information Systems. Develop route plan for bus operation; target trunk roads	Urban local body	1–2 years

6.1.9	Non-motorized transport and safe access	
6.1.9.1	<p>Develop pedestrian and cycling friendly corridors and street clusters. To do so, adopt urban street design guidelines that will prioritize design for public transport access, walking and cycling infrastructure, safe and universal access, street furniture, facilities for parking, inter-modal transfer hubs, road markings, signage and traffic signals, pick up and drop off points for taxi, auto, three-wheelers stands, spaces for street vending and service lanes. Design drainage to provide co-benefit of capturing run-off and prevent flooding. Assess feasibility of constructing a bypass road</p>	<p>Urban local body/ NHAI</p> <p>1–2 years</p>
6.1.9.2	<p>Prepare and implement zonal plans for developing an NMT network. This should include the following action:</p> <ul style="list-style-type: none"> • Implement network plan for footpaths on all roads • Target specific lengths of footpaths and cycle tracks to be completed in a phased manner and cover the entire city • Implement a network plan for more secondary street networks and un-gated streets to provide direct shortest routes for pedestrians and cyclists. Vehicular traffic can also be redistributed from major junctions through multiple routes to decongest. Signal-free corridors should be avoided as more road-space only attracts more traffic and impedes people's movement • Plan and upgrade pedestrian/NMT crossings atleast every 250 m, with pedestrian signals and signages. These should preferably be at-grade. Reduce block sizes to reduce walking and cycling distances • Implement synchronization of signals on a priority basis with an integrated IT-based traffic management system so that despite having frequent at-grade pedestrian crossings, traffic can move swiftly across signals. Introduce cycle sharing systems and expand as feeders to public transport. • Identify and notify key commercial areas 	<p>Urban local body</p> <p>1–2 years</p>

	<p>with high footfalls and good public transport connectivity to create pedestrian plazas</p> <ul style="list-style-type: none"> • Make safety and walkability audits of walking and cycling infrastructure mandatory • Make encroachment of NMT lanes punishable offence under the current provision of law • Need dedicated funding 		
6.1.10	Compact city development to reduce distances and improve access		
6.1.10.1	Adopt compact urban form code for all new development and redevelopment to create high density, mixed-use, mixed-income development and high-density accessible streets to reduce travel distances and emissions	Urban local body	1–2 years
6.1.10.2	Visakhapatnam has both high density and low density areas. In low density areas and in urban sprawl maximize densities and planned mix land use with good transport connectivity, in order to facilitate maximum number of people walking or cycling or use NMT or feeder services easily to access public transport.	Urban local body	1–2 years
6.1.10.3	<p>Travel demand management and restraint measure: Parking Management:</p> <p>Implement Parking Area Management Plan (PAMP) for all delineated neighborhoods 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. This should include among others:</p>		
6.1.10.4	Demarcate the emergency vehicle route on all public roads within the neighbourhood	Municipal Agencies/ Development Authorities	6 months
6.1.10.5	Ensure no parks and green areas are converted to parking	Municipal Agencies/ Development Authorities	6 months
6.1.10.6	Where shared Multilevel Parking facility is provided demarcate ingress-egress plan and ensure that no major disruption occurs	Municipal Agencies/ Development	6 months

	on main thoroughfare traffic. Also indicate pedestrian circulation plan.	Authorities	
6.1.10.7	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.	Municipal Agencies/ Development Authorities	6 months
6.1.10.8	Do not allow annual or monthly lump sum payment for parking in commercial areas. Annual passes allow unlimited use and do not reduce demand.	Municipal Agencies/ Development Authorities	6 months
6.1.10.9	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	Municipal Agencies/ Development Authorities	1–2 years
6.1.10.10	Penalty for illegal/wrong parking esp. parking within the emergency lanes and non-designated areas to be prohibitive.	Municipal Agencies/ Development Authorities	1–2 years
6.1.10.11	Bundle existing/planned public parking facilities and on-street and off-street parking (including multi-level) facilities for management by a single agency/ operator. New stand-alone parking only sites are mostly not required since parking is permitted in all use zones.	Municipal Agencies/ Development Authorities	1–2 years
6.1.10.12	Earmark a part of parking revenue for local area improvement that includes footpaths, public amenities and parking facilities within the PAMP area	Municipal Agencies/ Development Authorities	1–2 years
6.1.10.13	Introduce residential parking permit for regular parkers for use of public parking space and these may be monitored	Municipal Agencies/ Development Authorities	1–2 years
6.1.10.14	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.	Municipal Agencies/ Development Authorities	1–2 years
6.1.10.15	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 Contractor will have to make for upgradation of the PAMP area including metering, ITS application for commuter information,	Municipal Agencies/ Development Authorities	1–2 years

	signage		
6.1.10.16	Plan and implement parking provision for buses, commercial vehicles and IPT-NMT modes, and for the differently abled.	Municipal Agencies/ Development Authorities	1-2 years
6.1.10.17	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.	Municipal Agencies/ Development Authorities	1-2 years
6.1.10.18	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.	Municipal Agencies/ Development Authorities	1-2 years
6.1.11	Traffic management		
6.1.11.1	Create electronic monitoring of traffic violations	Traffic Police	6 months
6.1.11.2	Conduct audit of traffic intersections and install functional traffic signals at all major intersections	Traffic Police	6 months
6.1.11.3	Enforce lane driving through heavy fining	Traffic Police	6 months
6.1.11.4	Prepare traffic management plan for the city and continuously update it and monitor its performance.	Traffic Police/ Development Authorities	1-2 years
6.1.11.5	Introduce early alarm system during traffic congestion for the benefit of commuters on major routes, to facilitate route diversion	Traffic Police/ Development Authorities	1-2 years
6.1.11.6	Consider introducing plan for flexi/staggered timings to minimize peak movement of vehicles on roads	Traffic Police/ Development Authorities	1-2 years
6.1.11.7	Formulate action plan for controlling decongestion of fuel stations including increasing the number of dispensing machines	Traffic Police/ Development Authorities	1-2 years
6.1.11.8	Examine existing framework for removing broken down buses / trucks from roads and create a system for speedy removal and ensuring minimal disruption to traffic from such buses / trucks	Traffic Police/ Development Authorities	1-2 years

6.1.12	Generator Sets		
6.1.12.1	Ensure that only those DG sets that meet the standards in terms of emission or design of chimneys/exhaust and acoustic enclosures, also verify and check whether design specifications are followed or not thereafter the genset to be allowed to operate.	APPCB, District and local administration	6 months
6.1.12.2	Curtail use of DG sets in social events by providing temporary electric connections	APPCB, District and local administration, Power Distribution companies	6 months
6.1.12.3	Alternate power systems should be promoted in cell towers, and use of DG sets discouraged	APPCB, district and local administration, Department of Energy, Power Distribution Companies	1 year
6.1.12.4	Leverage roof top solar programme to reduce dependence on DG sets		1 year
6.1.12.5	Ensure access to quality electricity supply		1–2 year
6.1.13	Open burning (including solid waste and agricultural residues)		
6.1.13.1	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	Municipal corporations, Regional Development Authority, Resident Welfare Associations, APPCB, District and local administration	6 months
6.1.13.2	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.) of vegetative waste to prevent burning.		6 months
6.1.13.3	Make source segregation mandatory. Decentralized waste management for hotels, apartments, institutions as per Solid Waste Management Rules, 2016 to become mandatory. Implement provisions of Solid Waste Management Rules 2016 (and all rules related hazardous rules); Implement penal provisions to spot fine on waste burning. Also impose polluter pay cess.		6 months

	Strictly ban, open burning of hazardous industrial waste.		
6.1.13.4	Use of satellite based monitoring as well as mobile spot check squads for enforcement	Municipal corporations, Regional Development Authority, RWAs, State Police Department, PCB Andhra Pradesh Space Application Centre (APSAC)	1–2 years
6.1.13.5	Proper management of landfill sites to prevent spontaneous fire		
6.1.13.6	Adopt roadmap for zero landfill policy to promote decentralized waste segregation, reuse and recycling		
6.1.13.7	With good decentralized and segregated waste management system Waste To Energy Plant will not be needed. In case any location requires strong siting policy should be adopted to keep it away from habitation; stringent implementation of emissions norms; use state of the art technology and provide emissions data to SPCB.		
6.1.14	Common Biomedical waste Treatment facility system		
6.1.14.1	Implement emission norms for incinerators and examine the feasibility of less polluting alternatives in compliance to Biomedical waste treatment rules. Assess feasibility of installing common facility for processing and safe disposal / incineration of biomedical waste	APPCB, municipal corporation, Regional development authority, incinerator facility operators, hospital associations	6 months
6.1.14.2	Implement CEMS for incinerators and provide data on emissions on an open platform progressively.		6 months
6.1.14.3	Develop a siting policy for biomedical incinerators.		1 year
6.1.15	Cooking fuels and open eateries		
6.1.15.1	A targeted programme to be implemented for 100 per cent coverage of households by distribution of LPG/PNG in all non-compliant cities. Leverage policies like Deepam and other state government schemes etc	EFS&T, Department of Energy, District and local administration	1–2 years
6.1.15.2	In low-income neighborhoods, as well as		EFS&T, Dept.

	roadside eateries/dhabas/ restaurants etc. promote and give access to LPG and electricity. Man- date and link commercial license of eateries etc to clean fuels.	of energy, power and Natural gas, municipal corporation, urban local bodies	years
6.1.15.3	Prohibit use of coal in hotels and restaurants, phase out use of kerosene for cooking in the city and incentivize move to LPG also check feasibility of natural gas pipeline for residential and commercial use	EFS&T, Department of energy, power and Natural gas, civil supplies department	1-2 years
6.1.16 Road Dust			
6.1.16.1	As, currently because of lying of other utilities, most of the Visakhapatnam roads are dug up so there is lots of road dust and construction dusts. Sprinkling of recycled water (without compromising other uses); introduce water fountains at major traffic intersections, wherever feasible.	District and local administration, PWD, Road owning agencies	6 months
6.1.16.2	Phase-in mechanical/vacuum-based street sweeping wherever feasible; introduce wet / mechanized vacuum sweeping of roads		6 months
6.1.16.3	Implement truck loading guidelines; use of appropriate enclosures for haul trucks; gravel paving for all haul routes.	Department of Transport, Traffic Police, District and local administration	1-2 years
6.1.16.4	Maintain pot hole-free roads for free flow of traffic to reduce emissions and dust.	Municipal corporation, regional development authority, District and local administration	1 year
6.1.16.5	Increase green cover in the region. Undertake greening of open areas, gardens, community places, schools and housing societies. Create tree barriers towards mining areas in the district	EFS&T, Municipal corporation, regional development authority, local	1-2 years

		bodies, RWAs	
6.1.16.6	Enforcement of air pollution control in concrete batching (use of water spray and wind breakers, bag filter at silos and enclosures, hoods, curtains etc).	APPCB, Department of industries, District and local administration	1–2 years
6.1.16.7	Adopt and mandate street design guidelines for paving of roads and footpaths (hard and soft paving) and vegetative barriers.		1–2 years
6.1.17 Construction Dust			
6.1.17.1	Develop and implement dust control measures for all types of construction activities -- buildings and infrastructure. This should be strictly enforced. Regulators can refer the check list for inspection of construction sites prepared under directions of NGT and EPCA.	District and local administration, Municipal corporation, RWAs	6 months
6.1.17.2	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.	District and local administration, Municipal corporation, RWAs	6 months
6.1.17.3	Enforce restrictions on construction activities within urban airshed zones during high pollution period	District and local administration, Municipal corporation and Real estate companies	6 months
6.1.17.4	Frame and implement policy for segregation of construction and demolition waste and provide a network of decentralized C&D waste segregation and collection sites across the city.	District and local administration, Municipal corporation,	1–2 years
6.1.17.5	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.	District and local administration, Municipal corporation, Real estate companies and RWAs	1–2 years
6.1.17.6	Set up facilities to recycle construction and demolition waste. Mandate certain percentage of the material for new	District and local administration,	1–2 years

	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. Make it mandatory to use certain percentage of recycled C&D waste in new construction of buildings and infrastructure. Include these materials in the schedule of rates.	Municipal corporation, Real estate companies and RWAs	
6.1.18 Mining Areas			
6.1.18.1	Covering of trucks even for internal transport of coal in stone field present in Visakhapatnam city. Implement measures for effective dust suppression during mining and allied activities such as crushing, loading, unloading blasting etc.	District and local administration, APPCB, Department of Mines	6 months
6.1.18.2	<i>Dust suppression system</i> - sprinkling of hydrophilic solvents so that water can be attracted and dust can be suppressed. Chemicals such as CaCl, MgCl ₂ , sodium silicate can be used as wetting agents	District and local administration, APPCB, Department of Mine	6 months
6.1.18.3	Constant electronic surveillance to enforce water sprinkling	District and local administration, APPCB, Department of Mines	6 months
6.1.18.4	Dust extraction system- This includes network of suction heads and ducting connected to wet wall cyclone for separating dust from the air stream. Air outlet of cyclone collectors will have to be connected, so as to discharge clean air to atmosphere and collected dust from the cyclone shall be disposed off suitably. All related provision of the SPCB action plan for critically polluted area should be implemented.	District and local administration, APPCB, Department of Mines	1 year
6.1.19 Episodic Events			
6.1.19.1	Measures to control forest fire/biomass/ crop residue burning: Use satellite based monitoring and on-ground enforcement to control biomass burning episodes.	APPCB, Andhra Pradesh Space Application Centre (APSAC),	Ongoing

		Department of Agriculture, Department of Science and Technology, District and local administration	
6.1.19.2	Firecrackers: regulate and control its usage including restrictions on timing as per the Supreme Court and CPCB and PESO guidelines.	District and local administration, Police Department, APPCB, RWA's, Chief Controller of Explosives, Petroleum and Explosive Safety Organization (PESO)	Ongoing
6.1.20	Renewable Energy		
6.1.20.1	<p>Solar rooftop policy should be implemented and 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.</p> <p>Identify canals and open spaces for installation of solar power system</p> <p>Identify and target commercial and industrial establishments for installation of roof top solar system</p> <p>Organise consumer outreach programme on solar rooftop programme</p>	Department of renewable energy, Department of power/ energy, Andhra Pradesh Renewable Energy Development Agency, District and local administration, NRED- CAP	1-2 years
6.1.21	Urban Greens and Forests		
6.1.21.1	<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</p>	EFS&T, Department of Forest	1 year

	<p>projects. At least 15-20 per cent 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>		
6.1.22	Improve training and capacity		
6.1.22.1	<p>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.</p>	EFS&T, Department of Personnel and Training, District and local administration	Ongoing
6.1.23	Need for public awareness and cooperation		
6.1.23.1	<p>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.</p> <p>Formation of a public grievance redressal portal for redressal of public complaints on air pollution along with a supervisory mechanism for its disposal at time bound manner.</p>	EFS&T, APPCB, District and local administration	Ongoing

6.2 Graded Response Action Plan (GRAP) proposed for Visakhapatnam city :

The proposed Graded Response Action Plan is meant to be temporary measures for duration of smog episodes and is implemented according to the severity of the daily 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.

The proposed GRAP 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 GRAP implementation the scientific Task Force under APPCB will advise the High-powered committee on the daily pollution levels and forecasting based on real time monitoring. Accordingly the High-powered Committee may issue notices to the city authorities to implement the pre-defined action. The action notified for moderate and poor 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 which such situation develops especially during calm and inversion conditions.

This will require daily air quality data reporting on the SPCB website and public dissemination system on air quality and health alert.

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 odd and even scheme 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	
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	State Pollution Control Board, District Administration Police
Shut down / minimize operation of polluting coal based power plant and incentivize power generation from existing natural gas based plants	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
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
Stop use of diesel generator sets	State Pollution Control Boards
Increase parking fee by three to four times	Municipal Corporations
Augment public transport services by increasing frequency	Department of Transport State Transport Corporation
Stop use of coal/firewood in hotels and open eateries	Municipal Corporations
Residential societies and individual house owners to provide electric heaters during winter to security staff to avoid open burning	Municipal Corporations Resident Welfare Associations
Alert in newspapers/TV to advise people with respiratory and cardiac patients to avoid polluted areas and restrict outdoor movement.	State Pollution Control Board
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

Action to be taken by public:

While the National Air Quality Index (AQI) 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	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

7. Monitoring mechanism for implementation:

As per the directions of the Hon'ble National Green Tribunal, dated 08.10.2018, the Air Quality Monitoring Committee (AQMC) with six members has been constituted by the Govt. of Andhra Pradesh, vide G.O. Rt. No. 167, dated 14.11.2018 for the preparation of Action Plans. The Committee, as directed will function under the overall supervision coordination of Principle Secretary, Environment. This will further be supervised by Chief Secretary by ensuring intra sectorial coordination. The meeting of the AQMC was convened on 08.01.2019 and has approved the above given Comprehensive Clean Air Action Plan (CAP) and Graded Response Action Plan (GRAP) for Visakhapatnam city.

These Action Plans will further be communicated to all the stakeholders for compliance for control of ambient air quality in Visakhapatnam city. Compliance of the Action Plan points by the concerned stakeholder departments will be reviewed at regular intervals by the Principal Secretary, Environment & the Chief Secretary, Government of Andhra Pradesh.



MEMBER SECREARY

National Air Quality Index

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+

Source: Ministry of Environment and Forest and Climate Change

Health advisory linked with National Air Quality Index

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

Annexure

Visakhapatnam city

Ambient Air Quality Monitoring Data - PM10 values

S. No.	Stations	2014												Annual average	Standard
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Mindi	39	51	43	53	50	68	58	70	33	44.8	72	74	55	60
2	Industrial Estate	82	78	110	86	60	52	34	58	45	61	51	51	64	
3	Pedagantiyada	48	63	48	60	55	88	52	50	25	41	57	63	54	
4	Police Barracks	85	60	76	147	161	93	85	68	77	63	81	108	92	
5	Gnanapuram	71	125	69	82	118	63	102	56	40	85	89	115	85	
6	Ramky	51	55	45	47	39	39	43	43	43	43	43	122	51	
7	ESI	42	43	37	68	60	51	48	52	46	77	72	80	56	
8	Seetammadhara	62	57	53	86	52	84	38	38	38	38	38	38	52	
9	GVMC building (CAAQMS)	101	63	50	69	112	127	95	77	89	88	---	158	94	
10	APIIC (104 area) (CAAQMS)	---	---	---	105	98	120	85	73	82	83	123	145	102	
City average		65	66	59	80	81	79	64	59	52	62	70	95	70	

S. No.	Stations	2015												Annual average	Standard
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Mindi	50	82	78	72	52	29	42	52	48	90	65	70	61	60
2	Industrial Estate	44	52	96	70	69	38	32	59	50	70	64	65	59	
3	Pedagantiyada	47	80	51	49	75	38	46	47	33	42	49	71	52	
4	Police Barracks	89	148	62	71	79	97	67	82	113	130	93	78	92	
5	Gnanapuram	66	67	84	102	73	52	49	63	57	88	84	88	73	
6	Ramky	44	43	41	97	60	43	47	37	32	87	64	69	55	
7	ESI	38	38	62	56	56	39	38	51	53	48	60	52	49	
8	Seetammadhara	38	59	53	43	57	33	56	62	46	62	63	48	52	
9	GVMC building (CAAQMS)	124	129	96	64	99	78	102	78	84	100	92	125	98	
10	APIIC (104 area) (CAAQMS)	120	135	118	78	92	70	88	69	66	86	77	106	81	
City average		60	78	69	70	71	52	57	60	58	80	71	77	67	

Note: All values are expressed in ug/m3.

Visakhapatnam city

Ambient Air Quality Monitoring Data - PM10 values

S. No.	Stations	2016												Annual average	Standard
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Mindi	77	69	83	77	73	66	72	77	74	72	84	70	75	60
2	Industrial Estate	77	80	68	76	75	71	63	81	68	76	85	72	74	
3	Pedagantyada	82	82	82	82	66	65	68	92	77	80	87	74	78	
4	Police Barracks	98	85	82	82	69	77	89	90	96	93	97	91	87	
5	Gnanapuram	97	75	74	89	87	77	84	102	80	91	98	79	86	
6	Ramky	81	71	70	72	70	67	67	71	72	78	93	62	73	
7	ESI	76	67	65	68	66	60	65	69	66	73	73	66	68	
8	Seetammadhara	79	69	69	87	65	72	75	80	82	76	76	63	74	
9	GVMC building (CAAQMS)	152	109	87	33	88	39	89	86	81	140	180	156	103	
10	APIIC (104 area) (CAAQMS)	133	91	97	79	96	49	51	---	---	94	131	132	95	
City average		91	79	76	75	76	64	72	83	77	87	100	87	81	

S. No.	Stations	2017												Annual average	Standard
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Mindi	72	84	70	60	53	56	57	61	43	74	67	67	64	60
2	Industrial Estate	76	85	72	59	63	58	71	64	64	89	61	78	70	
3	Pedagantyada	80	87	74	62	65	71	58	64	53	79	63	90	71	
4	Police Barracks	93	97	91	78	83	85	81	85	57	91	85	137	89	
5	Gnanapuram	91	98	79	81	80	80	78	79	63	94	77	124	85	
6	Ramky	78	93	62	59	60	52	44	50	41	65	82	106	66	
7	ESI	73	73	66	61	86	82	57	55	46	62	60	90	68	
8	Seetammadhara	76	76	63	64	72	77	59	55	66	89	56	72	69	
9	GVMC building (CAAQMS)	154	147	94	108	89	86	101	106	86	107	82	142	109	
10	APIIC (104 area) (CAAQMS)	129	127	84	100	94	72	81	66	63	72	71	---	87	
City average		88	93	75	73	75	72	69	69	58	82	70	101	77	

Note: All values are expressed in ug/m3.

Visakhapatnam city
Ambient Air Quality Monitoring Data - PM10 values

S. No.	Stations	2018												Annual average	Standard
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Mindi	86	67	67	67	67	52	54	72	72	72	72	72	68	60
2	Industrial Estate	125	97	92	72	58	68	74	74	77	73	86	109	84	
3	Pedagantyada	103	91	82	61	47	56	51	51	51	51	51	95	66	
4	Police Barracks	146	121	91	60	62	68	73	75	76	111	112	109	92	
5	Gnanapuram	134	108	106	83	70	69	77	73	85	95	100	98	92	
6	Ramky	55	66	63	46	38	50	46	58	51	94	91	113	64	
7	ESI	87	66	95	56	50	57	55	62	62	75	86	144	75	
8	Seetammadhara	85	66	66	47	52	65	50	57	64	62	79	77	64	
9	MVP Raitu Bajar	---	---	---	---	---	---	---	---	72	148	75	85	95	
10	GVMC building (CAAQMS)	198	163	117	72	75	107	97	96	106	142	110	133	117	
City average		113	94	87	63	58	66	64	69	72	92	86	104	81	

Note: All values are expressed in ug/m3.

