

Comprehensive Action Plan (with Micro Planning) for Clean Air in Non-attainment Cities of Andhra Pradesh

Eluru City



Andhra Pradesh Pollution Control Board

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Comprehensive Action Plan for Clean Air - Non-attainment Cities: Eluru

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

Hon'ble National Green Tribunal, Delhi in its Orders, dated 06.08.2019 in O. A. No. 681 of 2018 on non-attainment cities has issued the following directions to comply with:

1. Actions Plans need to be prepared by States for the additional 20 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.

In this order the Hon'ble National Green Tribunal, Delhi has directed that the "pattern of such plans for 102 cities, already prepared". These earlier plans were made according to the NGT orders, dated 08.10.2018 in O. A. No. 681 of 2018 on non-attainment cities. These have given 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 plan will indicate steps to be taken to check different sources of pollution having speedy, definite and specific timelines for execution.
4. 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.

2. Constitution of Air Quality Monitoring Committee (AQMC)

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/ revision of action plans to control air pollution in the non-attainment cities of Andhra Pradesh. The same committee will look after the newly added eight non-attainment cities.

Table 1: Air Quality Monitoring Committee

S. No.	Member of the Committee	Designation
1	Commissioner, Transport	Member
2	Commissioner, Industries	Member
3	Commissioner & 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

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3. Newly Added Non-attainment Cities in Andhra Pradesh

Central Pollution Control Board (CPCB) had earlier identified five cities in Andhra Pradesh, namely, Visakhapatnam, Vijayawada, Guntur, Nellore and Kurnool as non-attainment cities. In addition to the above, Central Pollution Control Board (CPCB) has identified additional 08 cities and towns as non-attainment for not meeting the National Ambient Air Quality Standards (NAAQS) for PM₁₀ in Andhra Pradesh. These include Srikakulam, Vizianagaram, Rajamahendravaram, Eluru, Ongole, Chittoor, Kadapa and Anantapur. (see table 2: PM 10 values in the new Non-attainment cities of Andhra Pradesh)

CPCB has 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 stakeholder departments for control air pollution in the said cities and towns.

Table 2: PM 10 values in the new Non-attainment cities of Andhra Pradesh

S. No.	Cities	Particulate Matter (PM 10) $\mu\text{g}/\text{m}^3$							Annual standard
		2014	2015	2016	2017	2018	2019	2020	
1	Srikakulam	-	-	-	68	70	63	57	60 $\mu\text{g}/\text{m}^3$
2	Vizianagaram	-	-	-	63	65	65	59	
3	Rajamahendravaram	70	61	62	65	75	63	56	
4	Eluru	97	79	70	70	70	63	60	
5	Ongole	63	67	65	65	65	60	50	
6	Chittoor	68	69	63	69	61	54	42	
7	Kadapa	-	-	-	69	61	52	43	
8	Anantapur	76	86	85	72	71	67	60	

The Air Quality Monitoring Committee has prepared the multi-sector clean air action plans based on the information available from the concerned departments and implementing bodies.

The AQMC has considered the guiding principles linked with the National Clean Air Programme (NCAP), the Air (Prevention and Control of Air Pollution) Act, 1981 and other concerned regulations in different sectors and the good practices that have bearing on the quality and effectiveness of the plans to meet the NCAP target of 20-30 percent reduction by 2024.

Accordingly, the approved action plans by AQMC for additional eight non-attainment cities namely Srikakulam, Vizianagaram, Rajamahendravaram, Eluru, Ongole, Chittoor, Kadapa & Anantapur in the state of Andhra Pradesh have been submitted to CPCB on 27.12.2019 for further approval. CPCB vide letter dt: 23.01.2020 has issued certain recommendations to revise the action plans.

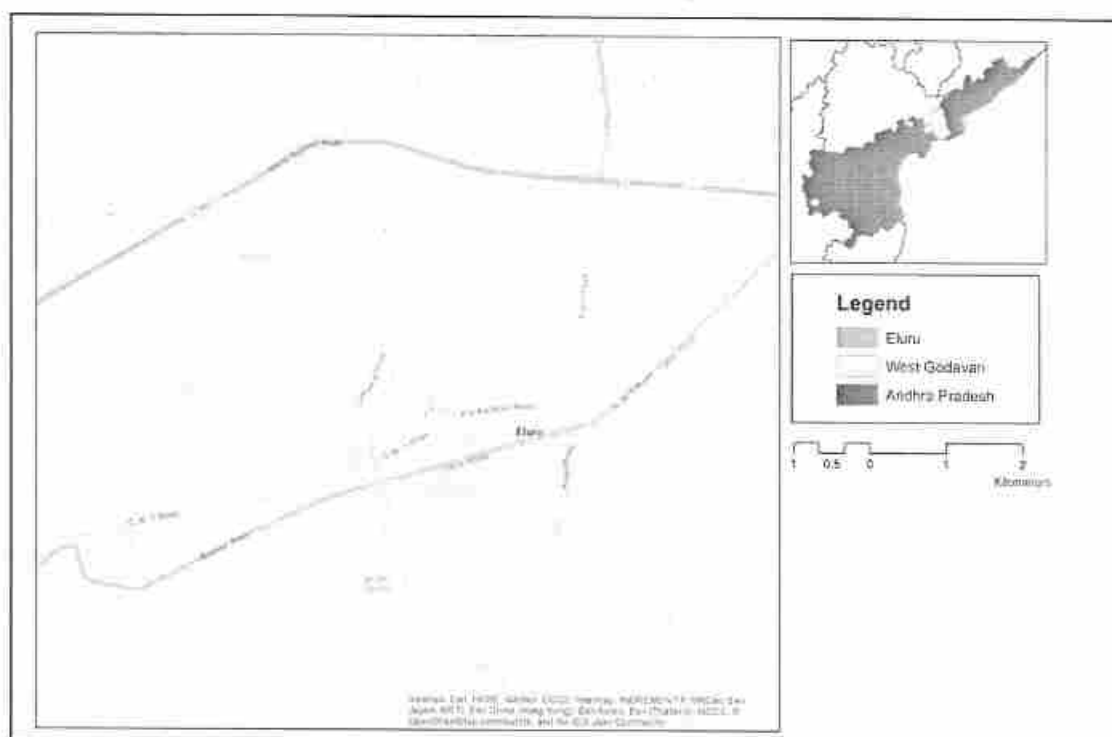
The multi-sector plans have drawn upon the regulatory requirements in each sector and have sought robust pollution source assessment, monitoring and advanced air quality management strategies for measurable improvement in air quality. Measures that are part of the national and state regulatory requirements are common to all cities. Some measures are unique to a city depending on the local imperatives. The plans also seek to align the budget lines of the different sectors for more effective leveraging of the available resources. The plans include measurable outcomes and service level benchmarks and also indicate the improvement needed in the processes. The plans seek to promote equitable, affordable and innovative solutions. This also seeks air shed approach to reduce the regional influence on local air quality. This has outlined the institutional arrangement for effective implementation.

4. Eluru City and its Air Quality

Eluru is the district headquarters of West Godavari District, Andhra Pradesh. The city is situated on the Eastern Coastal Plains at a distance of 50 km inland from of the Bay of Bengal. Eluru city is located at 16.7°N 81.1°E The city has a population of 2.18 lakh as per 2011 census.

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Figure 1: Map of Eluru city limits



APPCB has been monitoring the ambient air quality of Eluru city at four stations under National Ambient Air Quality Monitoring Programme (NAMP) till date for the parameters, PM₁₀, PM_{2.5}, SO₂ and NO₂ as against 12 as per Notification No B-29016/20/90/PCI-L dated 18 November 2009 of CPCB. All of these are manual stations and there are no real time monitoring stations in the city. APPCB has started monitoring PM_{2.5} at two stations located at Eluru Ashram Diagnostic Centre and District Head Quarters Hospital on the building for assessing the fine particulate concentration in Eluru City. Ambient air quality of Eluru City is monitored in four locations. (See Table 3: Location and type of monitoring stations in Eluru).

According to the CPCB criteria Eluru has adequate number of manual monitoring stations. But it needs to plan and expand its real time monitoring to generate real time data.

Table 3: Location and type of monitoring stations in Eluru

S. No.	Location	NAMP / CAAQMS	Types of pollutant monitored	Category of station
1	Asram Diagnostics, DCMS Compound, Eluru	NAMP	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	Commercial
2	District Head Quarters Hospital (Government Hospital), Eluru	NAMP	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	Silent/ Sensitive
3	Zilla Samakhya, ITDC Building, Satrampadu, Eluru,	NAMP	PM ₁₀ , SO ₂ , NO ₂	Industrial
4	Somalingeswara Nilayam, Thorp veedhi, Paidichintaapadu	NAMP	PM ₁₀ , SO ₂ , NO ₂	Residential

The NAMP data of four stations indicate the non-attainment status of Eluru. Based on the NAMP database, most of the other pollutants are well within the limits, PM₁₀ has continuously been above the standards since 2014. The overall trend in PM₁₀ shows a declining trend (See Annexure I). The air quality within the city is also influenced by the pollution sources around the city. Air quality of the Eluru city is given below.

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Table 4: Air Quality Monitoring Results of Eluru City

S. No	Parameter	2014	2015	2016	2017	2018	2019	2020	Annual average Standard
1	PM10	97	79	70	70	70	63	60	60
2	SO ₂	-	4.9	5.2	5.2	5.0	4.8	4.7	50
3	NO ₂	-	24.3	29.5	25.9	22.6	18.9	17.4	40
4	NH ₃	-	-	-	27.9	30.1	28.6	24.8	100
Average of no. of stations		1	1	1	2	4	4	4	---
5	PM _{2.5}	-	-	-	-	-	19.7	23	40
Average of no. of stations		-	-	-	-	-	2	2	---

Note: All values are expressed in $\mu\text{g}/\text{m}^3$

5. National Air Quality Index and daily emergency response

The non-attainment cities under the NCAP are also required to adopt graded response action plan for short-term emergency response during smog episodes or high pollution days. The Ministry of Environment, Forest and Climate Change (MoEF & CC) had notified the National Air Quality Index (NAQI) and a corresponding health advisory in 2015. Based on this index, daily pollutant concentrations are classified and graded as good, satisfactory, moderate, poor, very poor and severe and color-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 5: National Air Quality Index of India and Table 6: Health Advisory at different AQI levels in India). This 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. Short-term policy action can control further loading of emissions and prevent higher smog peaks.

Table 5: 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 6: 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

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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

Eluru City would need to install real time Continuous Ambient Air Quality Monitoring (CAAQM) station for generation of real time air quality data and enable implementation of the air quality index and graded response action plan. Following that and based on the AQI categories emergency action can be defined and codified for implementation. The Air Quality Index (AQI) of all the cities of Andhra Pradesh state is being prepared by APPCB and placed in its website.

6. Air Pollution Sources at Eluru City

As of 2020, pollution source inventory and source apportionment studies have not been carried out for the city. Broad review shows that the major sources contributing to PM₁₀ in Eluru City are road dust, vehicular emissions and construction activities. The reasons for higher values of PM₁₀ could be attributed to the re-suspension of road dust, emissions from vehicle movement, biomass burning, municipal solid waste & garbage, construction activities, transportation of construction material such as sand, crusher metal, soil, congested roads, vehicle service centers, use of wood & coal for domestic & commercial cooking activities, etc. It is however not possible to assess their relative contribution. No thermal power station and cement industries are located near by the Eluru city within a radius of 40 kilometers. Hence, the dust pollution from these industries is negligible.

Industrial Emissions

The city does not house any industries within the city premises. As per CPCB classification there are 2 red category and 10 orange category of industries within the 15 km radius of the city. (See Table 7: List of red category industries within and upto 15 km radius of the Eluru City)

Though all the major industries are registered under the APPCB, granular data collection on stack emissions, fuel used and status of air pollution control devices is required, along with data on the state of implementation of Continuous Emission Monitoring System (CEMS), management of fugitive emissions and use of clean fuel.

Table 7: List of Red category industries within and upto 15 km radius of the Eluru City

S. No.	Name of the industry	Line of Activity	Distance from city in km
1	Sri Kusuma Harnatha Agro Fural Ltd.	Agro products	11.62 km
2	Creamline dairy products (P) Ltd.	Dairy	10.28 km

Source: Andhra Pradesh Pollution Control Board.

Fuels containing high levels of sulphur lead to high emission of particulates, and 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, lime kiln, calcium carbide and gasification industries are allowed to use this as feedstock but not fuel. Further, vide 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 these 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 is considering restricting the usage of all pet coke in India—domestic and imported. In future, policy instruments

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such as tax incentives might be explored as an option to incentivize industries to upgrade technologies and fuel that will bring down emissions. Following this CPCB has asked state governments to frame a policy to discourage pet coke and furnace oil as combustion fuels.

In addition, following the Supreme Court order dated 29 January 2018, CPCB notified NO_x and SO_x standards for 16 groups of industries out of 35 industries as directed by the Supreme Court. This will have to be enforced nation-wide. Accordingly the 16 category of industries need to be identified for implementation.

Since most are large scale units, there needs to be thorough inspection to collect granular and transparent data on the following aspects to promote Best Available Technology (BAT):

- Stack emissions
- PM emission load per unit per day
- State of Air Pollution Control (APC) Devices
- State of CEMS monitoring
- Stack height
- Management of fugitive emissions
- Extent of green cover, buffer zones and plantations around major plants
- Paved roads within and around the factories to minimize dust due to freight and raw material transportation
- Detailed Environment Health and Safety norms inventory for all operating units

Address management and disposal of industrial waste in industrial areas that are vulnerable to open burning. Also to address emissions from large number of small and medium scale units adopt detailed mitigation strategies including common boiler policy, and clean fuel and pricing strategy.

Industrial Siting Policy

Like many other states, Andhra Pradesh Pollution Control Board has a siting policy in place. There are specific guidelines for the establishment of cement factories, stone crushers, dairies, LPG bottling units, processing units, rice mills, pesticide units and sponge iron manufactures. All units with investment of Rs. 10 Crores and above must be away from residential areas, educational institutions and national highways. Additionally, they must also have clearly demarcated buffer zones, which can only be used for the following.

1. Vehicle parking.
2. Administrative building and security office.
3. Green belt.
4. Electrical Substation / transformers.
5. Fuel Station.
6. Water supply sumps and
7. Other non-Industrial activities

Brick Kilns and Stone Crushers

There are no stone crushers or brick kilns within the city limits and upto 15 km radius from the city.

Thermal Power Plants

There are no power plants located within the city limits and upto 50 km radius from the city limits.

Municipal Solid Waste

The city generates 79 MT of solid waste and 3 MT home composting from 173 micro pockets of Eluru Municipal Corporation.

Dry and Wet waste segregation is carried out at the door-to-door level manually. The segregated dry waste is sent to MRF centre and wet waste is sent to Vermi Composting unit. The city has one waste dumping site at Ponangi.

There is no biomedical waste management facility within the district. Bio-Medical waste is separately collected by M/s. Safe Environ, Nallamadu (V), Unguturu (M), West Godavari (D)

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located at a distance of about 34.61 km from Eluru city for further processing. There are no bio-incinerators within the city limits and none are proposed for the near future. 100 percent processing and treatment of waste and recycling will have to be planned to avoid any possibility of open burning of waste.

Construction and Demolition Waste

Due to a vast number of residential and commercial projects that are ongoing in the city limits, there is a continuous problem of generation and management of construction and demolition waste (C&D). As of 2020, there are about 250 active construction sites within the city limits and about 4-8 tonnes per day of C&D waste are generated in Eluru. Most of it being stored at Ponangi MSW dump site without any scientific processing.

Infrastructure for collection, segregation, in-situ re-utilization in the construction sites, transportation, recycling plants and market uptake of recycled products in the construction industry will have to be planned according to the Construction and Demolition Rules, 2016.

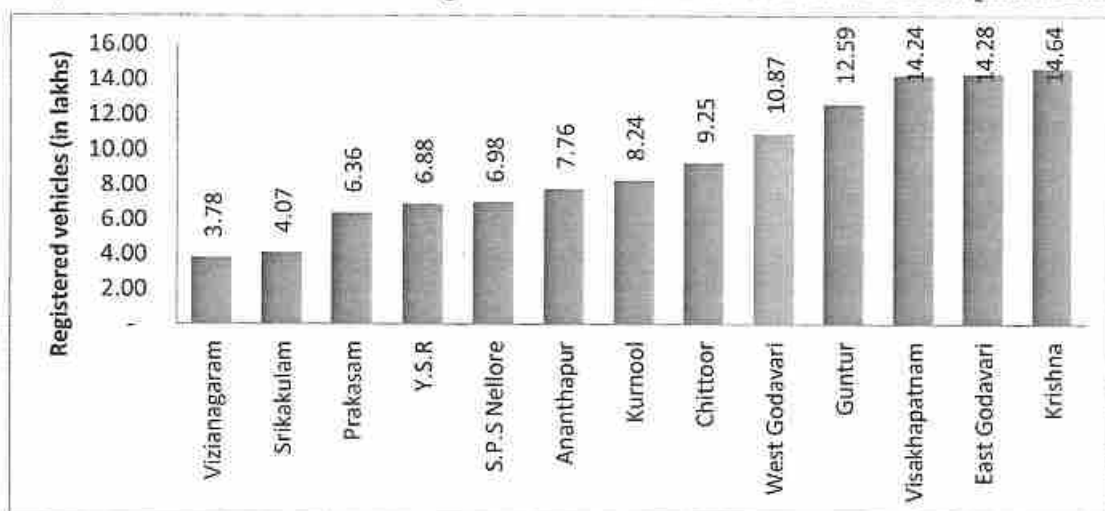
The guidelines are available for dust control from construction. These include adequate covering, barricades at construction sites, sprinkling, washing of vehicles, covering, use of gunny bags while plastering etc. Planning secretaries are creating awareness among the Builders, site owners and Building owners about the CPCB guidelines and rules. Those not following the guidelines are penalized, and the building plan approvals are promptly cancelled.

Vehicular Emissions

Vehicles are among the dominant sources of air pollution and are responsible for high toxic exposure. Therefore, mobility strategy is a critical intervention point to control toxic emissions and exposure from vehicles.

As of March 2019, the West Godavari district had about 9.1 percent (i.e. 10.87 lakhs) of the total registered vehicles in the state of Andhra Pradesh (i.e. 1.19 crores) (see Graph 1: District-wise number of registered motor vehicles in Andhra Pradesh [March 2019]). Between the years 2015-19, the vehicles in the district have grown at a rate of 9.1 per cent annually (see Graph 3: Year-wise growth of registered motor vehicles in West Godavari district).

Graph 1: District-wise number of registered motor vehicles in Andhra Pradesh [March 2019]



Source: Statistical abstract, 2019, Directorate of Economics and Statistics, Government of Andhra Pradesh

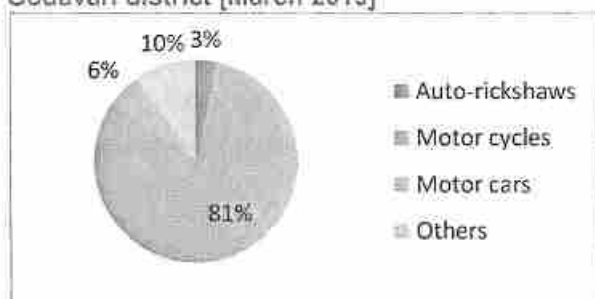
The share of two-wheelers (i.e. motor cycles) in the district is quite high and dominates the fleet (i.e. 81 per cent of the total registered vehicles) (see

Graph 2: Percentage distribution of registered vehicles as per vehicle category in West Godavari district [March 2019]). The district is fifth highest in terms of total registered vehicles and third

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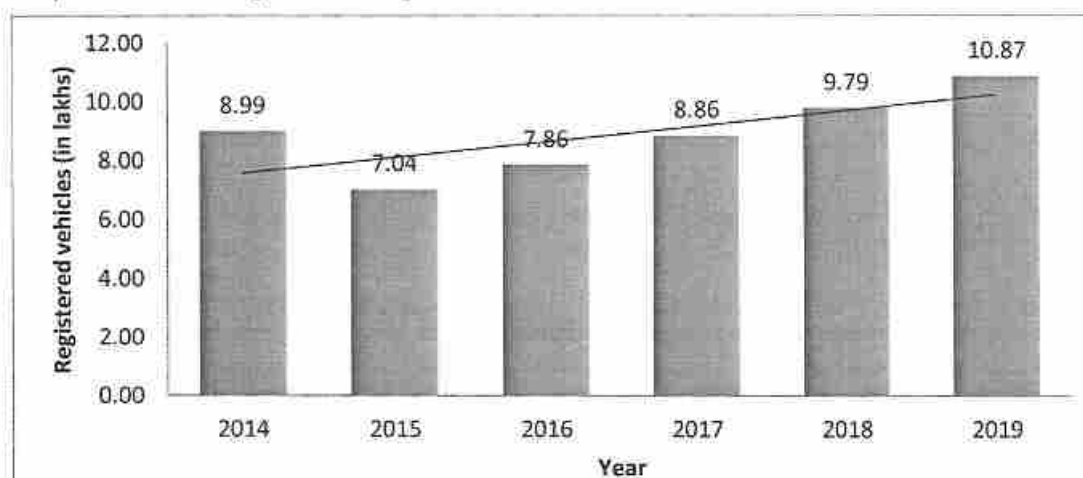
highest in terms of vehicle per thousand population (i.e. 272) in the state (see Graph 4: District-wise registered motor vehicles per thousand population [March 2019]).

Graph 2: Percentage distribution of registered vehicles as per vehicle category in West Godavari district [March 2019]



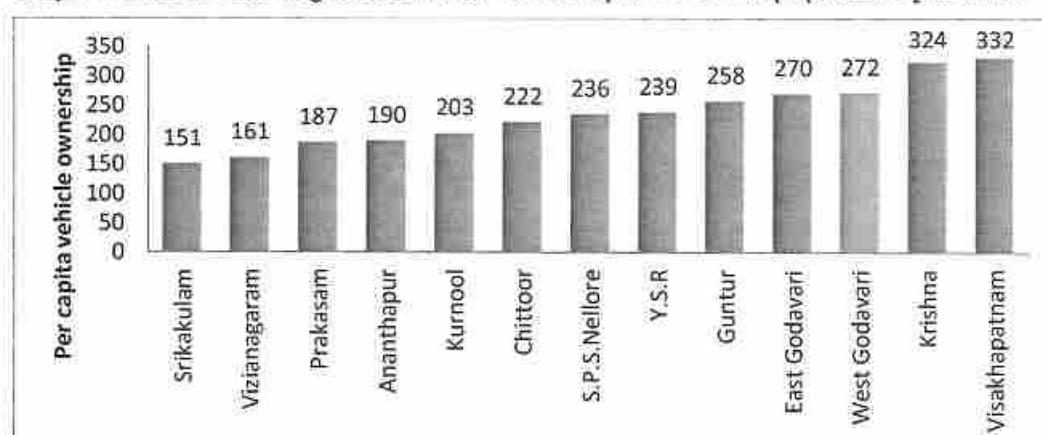
Source: Statistical abstract, 2019, Directorate of Economics and Statistics, Government of Andhra Pradesh

Graph 3: Year-wise growth of registered motor vehicles in West Godavari district



Source: Statistical abstract, 2014-19, Directorate of Economics and Statistics, Government of Andhra Pradesh

Graph 4: District-wise registered motor vehicles per thousand population [March 2019]

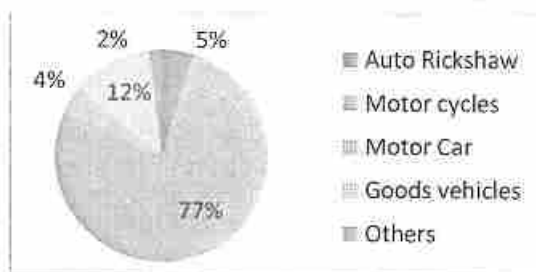


Source: Statistical abstract, 2019, Directorate of Economics and Statistics, Government of Andhra Pradesh
Eluru city has around 5.22 lakhs registered vehicles. Motor cycle dominates and constitutes to 77 per cent share followed by goods vehicles (i.e. 12 per cent), auto-rickshaws (i.e. 5 per cent) and others (see

Graph 5: Percentage distribution of registered vehicles as per vehicle category in Eluru city).

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Graph 5: Percentage distribution of registered vehicles as per vehicle category in Eluru city



Source: Regional Transport Authority (RTA), Eluru

There are several policy initiatives in place to address emissions from the on-road vehicular fleet. These include pollution under control certificate programme (PUC); checking of visibly polluting vehicles, green tax and gaseous fuel programme and electric vehicle programme.

There are 17 PUC centres in the West Godavari district out of which seven are in the Eluru city. PUC centres are linked to the database of the transport department. There are 28 check post to check the PUC certificate and the transport department has collected Rs. 40,000 during the period April to June, 2020. Also, PUC centres have to submit monthly returns by 5th of preceding month to the licensing authority concerned furnishing information as to the number of vehicles inspected, results of the inspections and number of pollution under control certificates issued.

At the city level, the traffic police also have a surveillance programme for detecting visibly polluting vehicles. These vehicles are heavily penalized.

This is an opportunity to expand the CNG programme especially for the public transport, intermediate public transport like autos and taxis, and small commercial vehicles. This requires a roadmap for targeted replacement of existing fleet with the vehicles on alternative fuels.

The State Government has also issued guidelines for levying "green tax"ⁱⁱⁱ, wherein older polluting vehicles are taxed higher to discourage them to ply. Vehicles over a certain age have to pay green tax, in accordance to the polluter pay's principle. Vehicles operating on LPG, CNG, Battery or Solar Power are exempt for paying green tax. This is expected to accelerate fleet renewal and phase out older vehicles. It must be noted that the green tax currently is very low (Transport vehicles are expected to pay only Rs 200 per annum after 7 years of registration and non-transport vehicles are expected to pay between Rs 250-500 for five years after 15 years of registration). It is recommended to incorporate a scrappage policy for older vehicles and implement green taxes more strictly.

Electric Mobilityⁱⁱⁱ

The Andhra Pradesh government notified the electric vehicle policy in the year 2018. The policy emphasizes on manufacturing of Electric Vehicles (EV) and its components, charging infrastructure, hydrogen generation and refuelling infrastructure, demand creation for EVs, and research and development.

The policy aims to achieve the following targets:

- Attract combined investments of over INR 30,000 Crore in the next 5 years across the electric mobility ecosystem with an employment potential for 60,000 people.
- Target to bring in manufacturing units of high density energy storage of at least 10GWh capacity in the next 5 years to cater to both domestic as well as export market.
- Target to convert 100 per cent of APSRTC bus fleet of over 11,000 buses into electric buses by 2029, with the first phase of 100 per cent conversion of bus fleet in top 4 cities by 2024.
- Phase out all fossil fuel based commercial fleets and logistics vehicles in top 4 cities by 2024 and all cities by 2030.

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- All forms of government vehicles, including vehicles under government corporations, boards and government ambulances etc. will be converted to electric vehicles by 2024.
- Target to have 10 lakh EVs, combined across all segment of vehicles, by 2024.
- Target to have 1,00,000 slow and fast charging stations by 2024.

This is an opportunity to scale up zero emissions mobility in Eluru city. The state level policy may be complemented by a city level electric vehicle policy with targeted electrification over the next five years. Eluru city can set the milestones in terms of charging infrastructure and targeted electrification of three-wheelers, two-wheelers, small commercial vehicles, feeders and delivery fleet.

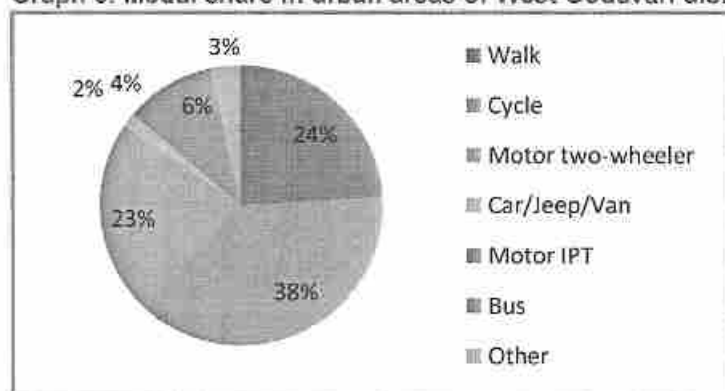
City Connectivity and Mobility

The Eluru city is well connected via road, rail, and airways. The city is strategically located between major cities of Andhra Pradesh (Vijayawada and Visakhapatnam) on the Chennai-Kolkata National Highway along the proposed Visakhapatnam and Chennai Industrial Corridor (VCIC).

The Eluru railway station lies on the Howrah-Chennai main line and is administered under Vijayawada railway division of south coast railway zone. For air commute, the nearest airport is located 38.5 km away in Vijayawada.

At the district level, according to the 2011 Census, 62 percent of the total work trips in urban areas of the district are being made by walk and bicycle followed by motor two-wheeler and others (see *Graph 6: Modal share in urban areas of West Godavari district*). Cycle trips dominate at about 38 percent followed by walk (i.e. 24 percent), motor cycle (23 percent). Car share is 2 percent. Share of bus transport is mere 6 per cent.

Graph 6: Modal share in urban areas of West Godavari district

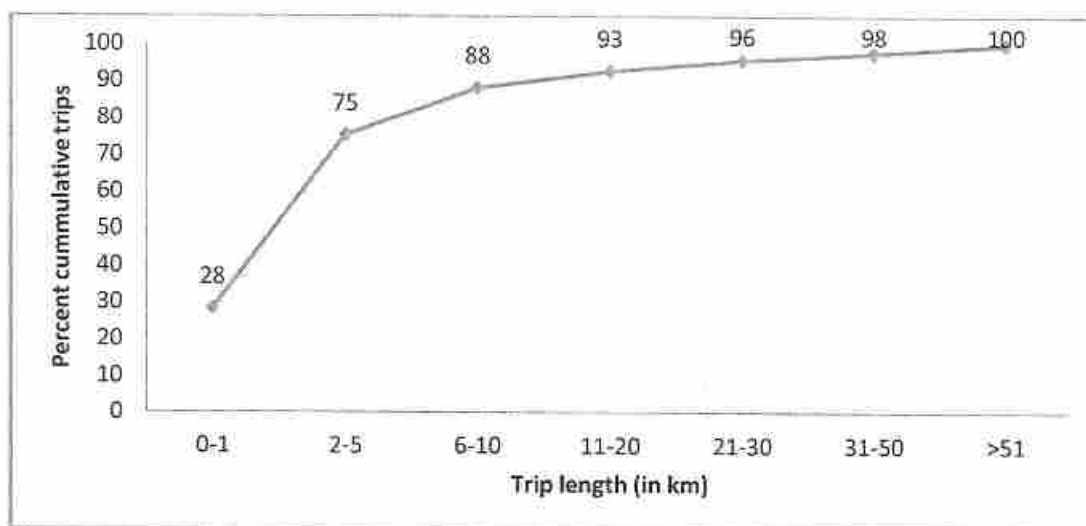


Note: Data does not include "no travel" and "distance not stated" category in Census statistics
Source: Census of India 2011

The distribution of trips as per trip length shows that more than 50 per cent of the trips end within bicyclable distance which shows a potential to attract people towards bicycling provided adequate infrastructure is made available (see *Graph 7: Distribution of trip length from place of residence to workplace as per trip length in West Godavari district*).

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Graph 7: Distribution of trip length from place of residence to workplace as per trip length in West Godavari district



Note: Data does not include "no travel" and "distance not stated" category in Census statistics.

Source: Census of India 2011

Public Transport Service

Eluru city does not have dedicated bus transport system and is served by the buses of Andhra Pradesh State Road Transport Corporation (APSRTC) that runs inter-city bus service in the state. Based on the travel pattern, road network pattern, and road inventory of the city, intra-city bus transport can be introduced. For a city size of Eluru, mini /midi buses can be used for operation. This service should have routes that penetrate within the city and should be in accordance to accepted level as per MOUD service-level benchmark

Para Transit System

There exists only unorganized Intermediate Para Transit (IPT) in form of auto rickshaw, which runs as a substitute for buses. The bulk of the public transport service in the city is provided by IPT systems including 25,278 autos and shared services. These are low occupancy but high frequency services that meet the local requirement and provide efficient connectivity including the last mile connectivity. There is a need to reorganize and modernize this system and upgrade these services with GPS, route rationalization, service level benchmark. This is an important opportunity to reduce dependence on personal vehicles. These vehicles can also be linked with electric vehicle programme.

Walking and Cycling

The condition of existing footpath is poor which forces pedestrians to walk on the carriage way. The existing hawking activities should be accommodated with design such that they do not encroach upon the road side walking space. Also, the roads lack zebra markings and other safety measures that increase accident risk. But given the fact that walking and cycling share constitutes 62 per cent of the modal share and more than 50 per cent trips end within bicyclable distance in urban areas of West Godavari district, this presents an immense opportunity to promote infrastructure for walking and cycling to move towards zero emissions. This is an opportunity to reduce dependence on motorized travel for short distances. This can promote clean and active mobility for clean air.

Parking Strategy to Reduce Traffic Volume

Rapid urbanization, motorization, haphazard development, narrow streets, and unorganized parking are all contributing to traffic congestion in the city. Most of the city roads are encroached with haphazardly parked vehicles. The hawking activities are not regularized. The city needs to adopt a city wide parking policy and rules at the early stages that will enable adoption of parking area management plan. This will help to identify the legal parking area and lead to demarcation in all land uses enable enforcement against illegal parking, allow parking charges to manage demand

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and reduce parking pressure, and prevent parking from happening in green areas, parks, on footpaths and near intersections. This can help to improve integrated management of off-site and on-site parking management, maximise utilisation of the available parking spaces. This can help to promote park and walk strategies. This city wide approach can reduce parking chaos, congestion and pollution. Parking management is considered an important demand management and pollution reduction measure.

Traffic Management and Enforcement

Traffic management and enforcement of traffic rules is handled by the city's traffic police. There are total 10 major junctions in the city out of which 4 are signalized and 6 are non-signalized and none of them are equipped with CCTV cameras. The total number of traffic violations recorded between January to July, 2020 was 35 which generated revenue of Rs 35,000. On a daily basis, around 10,000 trucks enter the city through 2 entry points. To avoid them mixing with city's traffic, these vehicles are not allowed from Morning 8 AM to 12 Noon and 4 PM to 8 PM as these hours are treated as peak hours. Awareness campaigns are being conducted frequently with the common public where they are educated about the steps taken to control air pollution such as using vehicles only in emergency and necessary purposes to control the air pollution. Further, they are asked to get their vehicles tested at the authorized pollution centre frequently, maintain lane discipline, and not to come opposite direction on the plea of short cut to avoid collision of vehicles on the paths.

Road Dust

The city has about 87 percent metalled and 13 percent unmetalled roads. The municipal corporation has employed two mechanical sweeping machines which cover 18 km per day within the city limits.

Most roads have end to end paving with green buffers along major traffic corridors, totaling a stretch of 5 km. However, a detailed plan is needed for metalling of the rest of the road network, green barriers, and paved footpaths to control dust generation.

7. Comprehensive Clean Air Action Plan (CAP) for Eluru City

This pollution source-wise comprehensive action plan has been developed for Eluru city to meet the NCAP objective of 20-30 percent reduction in particulate pollution by 2024. This plan indicates the nature, scale, scope and depth of action needed for effective reduction in different sectors.

This plan has integrated the on-going action of the state government in each sector and has further built upon that based on good practices. Sufficient indicators are included in the plan to define the nature and scope of each strategy.

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.

This section deals with department-wise clean air action plan and compliance strategy to meet clean air standards. The following tables indicate the short, medium and long-term action along with agencies responsible for implementation of the action points in the city of Eluru. This plan indicates short term as six months; medium term as up to one year and long term 1-2 years.

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Comprehensive Action Plan (CAP): Short, medium and long-term measures Source-wise clean air action plan and compliance strategy for non-attainment cities to meet clean air standards.

1. Air Quality

S. No.	Source	Action Points	Micro level Action points	Present status	Agency responsible	Timeline	Budget
1.1.	Air quality monitoring and assessment	Installation and commissioning of CAAQM stations as per CPCB criteria.	Install and commission one or more CAAQM station as per CPCB criteria as real time monitoring is needed for GRAP. All stations should monitor parameters as specified in NAAQS, 2009 and weather parameters to have real time data.	There are 4 manual monitoring stations. Need minimum 1 real time station	APPCB and CPCB	One year	Departmental funds/ NCAP funds
1.2.	Air quality monitoring and assessment	Reporting daily air quality data to public	Plan for public dissemination— web-based, billboard-based, through audio visual media, etc. Adopt as per graded response action plan.	The AQI data is available on APPCB website and paryavaran app.	APPCB	Continuous	Departmental funds/ NCAP funds
1.3.	Air quality monitoring and assessment	Quality control and quality assurance system for air quality data.	Ensure all monitors are functioning and recording data. Adopt detailed protocol for transparent reporting of CEMS data (wherever applicable) for industrial emissions monitoring and NAMP data	The NAMP data is being uploaded in the CPCB website for public dissemination.	APPCB	Continuous	Departmental funds
1.4	Air quality monitoring and assessment	Adopt satellite-based monitoring complement ground-based air quality monitoring	Adopt an airshed approach for rural and peri-urban areas as recommended by NCAP and MoEF & CC Explore application of sensor based monitoring for areas where there is no regulatory monitors and cover unmonitored areas and agricultural burning/forest fires that impacts urban air quality.	To be initiated	APPCB, CPCB, India Meteorological Department (IMD), Ministry of Earth Sciences (MoES)	One year	Departmental funds
1.5	Air quality monitoring and assessment	Adopt protocol for assessing annual and daily air quality trend for reporting compliance with the NAAQS and NCAP targets.	Adopt detailed protocol for transparent reporting of CEMS data (wherever applicable) for industrial emissions monitoring and NAMP data	The CEMS data of industries is connected to central server at APPCB head office and is being monitored for any abnormalities.	APPCB, CPCB	Six months	Departmental funds
1.6	Assessment of pollution sources	Source apportionment and Emission inventory studies to be carried out for the city	The SA study may be directed to a competent institution. The SA study must include the surrounding airshed along with a Health Impact Study incorporating exposure impacts.	National Knowledge Network (NKN) act as an advisory board to the CPCB.	APPCB, CPCB	One year	Departmental funds/ NCAP funds

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				CPCB along with the advisory board identified the Institute of Repute (IoR) to carry out the SA&EI studies in all the states of Non-attainment cities.			
1.7	AQI forecasting	Adopt pollution forecasting system for implementation of graded response action plan.	This will also require monitoring of weather data and prior support from MOES and IMD. The system to be adopted could be on the lines of SAFAR	-	Department of Environment, APPCB, CPCB, MoES	One year	Departmental funds/ NCAP funds

2. Industries

S. No.	Source	Action Points	Micro Level Action points	Present Status	Agency responsible	Timeline for action	Budget
2.1	Industrial emissions	Implement SO ₂ and NO _x standards	Standards notified by MoEF & CC on 29 January 2018 for 16 categories of industries in and around the city – as applicable.	Under implementation	APPCB	Six months	Nil
2.2	Industrial emissions	Management of emissions from MSME sector	Inspection and monitoring surveillance of small, medium and large-scale category of industries and necessary penal action for violation of standards	Regular and random inspections are being taken up by the APPCB	APPCB, CPCB	One year	Departmental funds
2.3	Industrial emissions	Introduction of Clean Fuels Notify approved fuel list for the state and ban use of pet coke and furnace oil.	Notify approved list of fuels for the state Ban use of pet coke and furnace oil Ensure conversion to CNG/PNG from pet coke/ furnace oil Strict enforcement against use of high sulphur content fuels and levying fines on the violators. Implement phase-in plan to promote clean fuels in industry like natural gas.	A condition of not to use pet coke in industries is being included in the CFO as per Hon'ble NGT order.	APPCB	One year	Nil
2.4	Industrial emissions	Use of CEMS	Enforce monitoring of polluting industries within urban air-shed zones via CEMS. Check for installation, upkeep and data collection.	The CEMS data of industries is connected to central server at APPCB head office and is being monitored for any abnormalities.	APPCB	Six months	Nil
2.5	Industrial emissions	Control of fugitive emissions across all industries	Implementation of control measures during various industrial processes (in ancillary units, material transfer and handling etc). Construction of paved roads around all major industrial belts and estates; Installation of dust suppression system and green belt	All the required conditions are kept in the CFO and are being implemented by the concerned industries.	APPCB	Six months	Nil

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S. No.	Source	Action Points	Micro Level Action points	Present Status	Agency responsible	Timeline for action	Budget
2.6	Agro Products						
2.6.1	Industrial emissions	Control of emissions during material handling	Implementation of control measures during various industrial processes (in ancillary units, material transfer and handling etc). Construction of paved roads around all major industrial belts and estates; Installation of dust suppression system and green belt	-	APPCB	Six months	Nil

3. Vehicles

S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
3.1	Vehicular emissions	Emission standards and fuel quality for new vehicles	Ensure implementation of Hon'ble Supreme Court order of October 24, 2018 and subsequent Central Government notification by MoRTH- Only BS VI compliant fuels and vehicles to be registered after April 1, 2020.	Only BS VI compliant vehicles are being registered after April 1, 2020. Regular / random checks are being conducted by RTO's to ensure the implementation of Hon'ble Supreme Court order.	Transport Department and Auto Industry Associations	Ongoing	Nil
3.2	Vehicular emissions	Gaseous fuel programme for vehicles	Shifting/ replacement of petrol/diesel driven vehicles viz., auto rickshaws, taxis and buses to CNG/LPG based vehicles.	-	Transport Department of ICE, MoPNG	1 year	Nil
3.3	Vehicular emissions	Encourage clean fuels	Introduce favorable fiscal measures such as reduction in road tax to promote clean fuels and vehicles.	The State Government has issued guidelines to exempt levy of green tax on vehicles operated by LPG, CNG, battery and solar power.	Transport Department	1 year	Nil
3.4	Tail pipe emissions	Strengthen periodic auditing and over-sight of PUC centres and calibration of equipment and third-party checks.	- Ensure PUC centers are upgraded to be capable of testing all the notified parameters and vehicles including BS-VI. - Ensure further strengthening of ongoing linking of PUC centers with NIC vahan server to eliminate manual intervention in PUC testing. - Ensure all vehicles obtain valid PUC certificate vehicles without PUC certificates are not allowed to ply. Link PUC certificate with annual vehicle insurance.	Communication has made to the MoRTH for taking necessary action in this matter. Integration with NIC vahan software is initiated. PUC program in place, though all not linked to e-Vahan server	Transport Department	1 year	Departmental Funds

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S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
3.5	Tail emissions	Ensure 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.	-	Transport Department	6 months	Nil
3.6	Tail emissions	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.	Presently there is no OBD system within the city.	Transport Department	6 months	Departmental funds
3.7	Tail emissions	Ensure availability of ammonia based urea for BS VI diesel vehicles	Ensure availability of the auto grade urea for the vehicles fitted with SCR system (selective catalytic reducing system) for NOx control in BS VI vehicles in coordination with the oil companies.	Steps will be taken to ensure availability of ammonia based urea in fuel stations as and when BS VI fuels available in the market.	Transport Department of Civil Supplies and Oil companies	6 months	Nil
3.8	Tail emissions	Penalising the visibly polluting vehicles	Remove/impose penalty/ challans, and launch extensive awareness drive against visibly polluting vehicles.	Traffic department is imposing and collecting the penalties from owners of visibly polluting vehicles.	Transport Department	Continuous	Nil
3.9	Tail emissions	Set up modern centralized inspection centres for upgraded emissions	Ensure annual fitness and road worthiness tests for commercial vehicles and diesel vehicles are conducted in well-equipped centralised testing centres. These centres can cater to the region	Transport department is regularly conducting the fitness checks to phase out vehicles which are 15 years & above and or completing the 2,50,000 km	Transport Department	6 months	Departmental funds
3.10	Emissions from older vehicles	Green Tax And Vehicle labelling or sticker programme to phase out old vehicles	Ensure measures to increase the green tax on petrol and diesel vehicles to encourage the LPG, CNG and battery operated vehicles. Ensure phasing out of old vehicles with the help of color coded sticker programme and age linked road tax policy. Set up scrapping infrastructure for scientific dismantling and disposal of old vehicles and material recovery as per the CPCB guidelines. Set up recycling units that are authorized with	The State Government has issued guidelines to exempt levy of green tax on vehicles operated by LPG, CNG, battery and solar power. Green tax need to be paid by Transport vehicles and Non-transport vehicles based on the age cap from the date of their registration.	Transport Department	6 months	Nil

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S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
3.11	Freight Transport						
3.11.1	Emissions from trucks	Diversion of truck traffic	proper environmental guidelines and integrate the current informal scrapping units - Rationalise movement pattern of heavy-duty trucks, and their routes and logistic infrastructure, spacing of warehouses/wholesale marts etc, entry points and timing to reduce exposure levels - Provide truck rest areas/parks along national and state highways to prevent entry of trucks into cities during the day time or peak hours to continue. - Local trucks can shift to LNG/CNG - Use of off-peak passenger travel times to move freight and restrict the entry of heavy vehicles into cities during the day to continue.	On a daily basis, around 10,000 trucks enter in the city through 2 entry points. To avoid them mixing with city's traffic, these vehicles are not allowed from Morning 8 AM to 12 Noon and 4 PM to 8 PM as these hours are treated as peak hours.	District and local administration, Municipal Corporation and PWD, NHAI	6 months	Nil
3.11.2	Emissions from trucks	Ensure fitness of trucks	Ensure fitness and road worthiness of trucks and compliance to set standards. Install weigh in motion bridges in all city entry points to control overloading	-	Transport Department	6 months	Departmental funds
3.12	Fuel Quality and Clean Fuel standards						
3.12.1	Poor fuel quality	Fuel quality testing to check adulteration	Ensure to create system to carry out regular/periodic checks for fuel adulteration and monitoring the fuel quality through surprise fuel testing for all transport and non-transport fuels.	Department of Civil Supplies is ensuring the regular fuel checks through oil companies. Total 423 Retail Outlets were inspected and 524 Petrol & 580 Diesel samples were tested by Oil Industry Mobile Labs in 2019-20 in Andhra Pradesh.	MoPNG, Oil marketing companies, Department of Civil Supplies	Continuous	Departmental funds
3.12.2	Poor fuel quality	Emission control at Fuel Stations Install vapor recovery systems in fuel refuelling outlets to reduce benzene and VOC emissions in cities.	Install vapour recovery systems in fuel outlets to reduce benzene and VOC emissions to comply with the Hon'ble NGT directions in respect of installation of stage I and Stage II vapour recovery system in all new retail outlets with capacity 300 KL MS per month in cities with population more than 1 lakh.	There is no monitoring system for VOC emissions in the city.	Department of Civil Supplies, Transport department, State Oil Coordinator	6 months	Nil
3.12.3	Poor fuel quality	Adopt favourable	Reduce VAT and cess on CNG	-	Transport	6 months	Nil

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S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
		taxation policy for clean fuels			Department		

4. Urban Mobility

S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
4.1	City Bus Service Improvement						
4.1.1	Vehicular emissions	Ensure setting up of Public transport intra city bus services	- Implement intra-city bus services based on travel demand of city population. For a city size of Eluru, mini /midi buses can be used for operation - Service level benchmark of Ministry of Housing and Urban Affairs should be followed to decide fleet size and network for adequate city penetration - Implement phase wise requirement of bus fleet, transit infrastructures i.e. depots, terminals and bus queue shelters etc. - Ensure adoption of EV buses through FAME II and notified state EV Policy. - Use modern technologies like Global Positioning Device (GPS), Public Information System (PIS) etc. to manage the services, locate buses and also to make it more attractive to commuters. - Introduction of Electronic Ticketing Machine for ticketing purposes. It helps to record and manage trip details, number of users, and other trip characteristics of public transport users.	Presently, city does not have a dedicated bus service	Bus Transport Undertaking	1 - 2 years	Departmental Funds
4.2	Intermediate Para Transit (Autos, Shared IPT, Taxis, and electric rickshaws)						
4.2.1	Vehicular emissions	Regularization of IPT through registration and planning	- Implementation of IPT operation plan and IPT route network connecting residential areas to important nodes (transport nodes, shopping areas, or other areas with high footfall) - Implement well planned dedicated parking and pick-up and drop-off points for IPT - Shared IPT/Autos – specify route, fix fare and	IPT system is un-organized.	RTO, Transport Department, GcAP, Urban Local Bodies	1 – 2 Years	Departmental Funds

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S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
4.3	Non-Motorized-Transport Network						
4.3.1	Vehicular emissions	Build adequate street network that is walkable, cycleable and provides safe mobility for all road users	All major arterial and sub-arterial roads should be redesigned to have dedicated/protected space for walking, cycling. Earmark street vending activities with respect to complete street principles and universal accessibility <i>(For good street design, refer to Design Standards can be followed from Indian Road Congress (IRC); 103-2012, or improved draft IRC code on road design, or any other adopted standards and good practices. Street design Guidelines document in Delhi, published by UTPIPEC can also be considered as a base document for improved road design needs)</i>	The condition of existing footpath is poor which forces pedestrians to walk on the carriage way. Also, the roads lack zebra markings and other safety measures that increase accident risk.	Urban Bodies Local	1 year	Departmental Funds
4.4	Traffic Management						
4.4.1	Vehicular emissions	Enforcement of traffic movement to prevent congestion and ensure road safety	Ensure installation of traffic signals at all major junctions within the city. Levying and collection of hefty fines for traffic violation Ensure removal of encroachments along the road stretches within the city Explore use of Intelligent Transport Management System (ITMS) based monitoring for effectiveness and enforcement Periodic safety audits of all the junctions within the city to ensure better planning, improvement and implementation.	There are total 10 major junctions in the city out of which 4 are signalized and 6 are non-signalized and none of them are equipped with CCTV cameras.	Traffic Police and Urban Bodies Local	6 months	Departmental Funds
4.5	Parking Management						
4.5.1	Vehicular emissions	Implement city-wide Comprehensive Parking Policy and Parking Area	Physically identify, demarcate and delimit on-street and off-street parking areas in all municipal wards based on local area	In the city there are no designated paid parking areas. As of now parking is free of	Urban Bodies Local	1 year	Departmental Funds

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S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
		Management Plans (PAMP) (Examples/Reference documents – Delhi parking Rules 2019, Punjab Parking Policy for Municipal towns of Punjab 2017)	assessment: • Ensure no parks and green spaces are converted into parking and all streets have at least one lane available all the time for free flow of traffic especially emergency vehicles. • Introduce strict fines for illegal parking of vehicles in non-designated areas. • Introduce variable parking fees as per the location and time duration in all commercial and mixed use areas • In areas where both on-street and off-street parking is available, on-street parking charge should be higher than off-street parking charges • Wherever MLCP exists, it should be integrated with area level parking plan • On-street parking price should be higher than MLCP to maximize use of MLCP • Introduce residential parking permit for residential areas • Implement commuter information system on availability of parking spaces in off street parking facilities. • Identify streets for parking/night time parking of commercial vehicles	charge. And Most of the city roads are encroached with haphazardly parked vehicles..			

Adoption of Electric Mobility

S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
4.6	Adoption of Electric vehicles (Implement the state's notified EV policy) (As EV technology is new and continuously evolving, the ideas may change further to comply with most updated technology)						
4.6.1	Vehicular emissions	Implementation of Electric Mobility policy notified by State Government. Integrating EV Infrastructure to create	• Identify vehicle segment like IPT, buses, Two-wheelers – for targeted electrification • Ensure provision of required infrastructure like charging stations, maintenance depots/places, availability of spare parts, etc. • Amendment of Model building bye-laws and	The electric vehicle policy is yet to be implemented. The electric vehicles are not much in use and public awareness programmes	Transport Department, Urban Local Bodies, New and Renewable Energy Development	1-2 year	Departmental Funds

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S. No.	Source	Action Points	Micro level action points	Present status	Agency responsible	Timeline	Budget
		EV ecosystem (facilitate EV adoption through integrating EV in infrastructure changes through amendment in existing byelaws and regulations)	- state level building byelaws and design code to integrate these changes w.r.t electric vehicle ecosystem. - Introduce charging facilities at residential locations by installing a dedicated metering system in accordance with electricity and energy board - Implement based on ground assessment dedicated parking facilities or priority parking of electric vehicles in designated parking areas	needed to be planned.	Corporation of Andhra Pradesh Ltd. (NREDCAP).		
4.6.2	Battery waste	Management and Disposal of Batteries	- Develop and implement a policy for safe disposal of batteries after completion of their life time as per the Waste Management Rules, 2016 issued by MoEF & CC. - Notify the potential and authorized recycling facilities within the city	The electric vehicle policy is yet to be implemented.	APPCB, Transport Department and New & Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP)	1 year	Nil
4.6.3	Vehicular emissions	Enhance EV adaptation in IPT segment which is an important mode of public transport	- Incentives/schemes to IPT owners to transition from ICE vehicles to EV such as road tax rebate, concession on charges, credit on transition to EV, etc. - Provide registration for e-rickshaws	--	Transport Department, Local Urban Bodies, APERC	2 years	Nil
4.6.4	Vehicular emissions	Priority parking for EV (Provision of dedicated on-street parking spaces for commercial and personal electric vehicles)	- Carry out inventory of area where dedicated EV parking is feasible - Implement incentives like waiver of parking fees for electric vehicle among others.	--		1 year	Nil

4. Waste Management

S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
5.1	Municipal Waste	Ensure Implementation of Solid Waste Management Rules, 2016 notified by MoEF &	Implement a plan for collection and management of waste based on the quantity of solid waste collected daily. Quantify waste stream for each municipality and per urban	The Eluru Municipal Corporation has issued a circular to implement Solid Waste Management Rules,	Municipal Corporation, Office of the District Magistrate	6 months	Nil

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S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
		CC.	- areas to plan infrastructure for collection and recycling. - Implement household level segregation, segregated transport, recycling facilities and composting facilities - Ensure GPS tracking of waste collection and transportation vehicles to dump yards and mobile spot check squads for enforcement. - Implement a plan to monitor garbage burning within city limits through sanitation team. - Levy and collect hefty fines from the violator's viz., dumping of solid waste in open areas or unauthorised places, burning of solid waste/ biomass and other waste. - Stringent implementation of amended by laws and collect fine from the violators - Mapping of all waste dumping grounds in the region as well as mobile spot check squads for enforcement.	2016 in city limits. Regular inspection is done by Ward Sanitation and environment secretaries to control open burning of solid waste. As per "SWACCHA BHARAT" Guidelines burning of solid waste is prohibited, separate byelaws has to prepare. Regular inspections are being done on daily basis			
5.2	Municipal Waste	Management of Dumping yards and treatment facilities	- Plan to convert Ponangi dumping yard into scientific processing facility to ensure further processing of municipal solid waste. - The processing facility should be planned and grounded in a time bound manner to avoid further open dumping of the collected solid waste - Ensure safety measures and management at dump yard to avoid spontaneous fire at the site. Use landfill management techniques based on CPCB guidelines.	The solid waste collected from the household is being dumped at the Ponangi dump yard without any further treatment. Water facility is provided to arrest the fire in emergency situations.	Municipal Corporation, Office of the District Magistrate	1 Year	Departmental Funds.
5.3	Municipal Waste	Zero landfill policy	Adopt roadmap for zero landfill policy by promoting decentralized waste segregation, reuse and recycling	Ponangi is the dumping/ landfill site and is monitored for spontaneous fire.	Municipal Corporation, APPCB	1 Year	Departmental funds.
5.4	Solid Waste	Control of burning of biomass and crop residue and	- Ensure proper collection of horticulture/ garden waste (bio-mass) from parks and open areas and its disposal through composting within the premises. - Ensure ban on burning of agriculture waste	Extensive programmes were launched by agriculture department like Polambadi & Polam pilustondi, for creating awareness in Farming	Agriculture department, MA & UD	6 months	Departmental Funds.

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S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
5.5	Municipal Waste	Installation of waste to energy plant.	- and crop residue and its implementation. - Ensure to avoid installation of Waste to Energy plant if the city is having an efficient waste segregation system in place. - If required develop a proper plan with strong siting policy to locate the Waste to Energy plant away from habitation and sensitive areas including neighbourhoods of low-income groups. - Ensure stringent emission norms and real time monitoring of the emissions data through CEMS; Use of state-of-the-art technology and provide real time emissions data to APPCB.	Community not to burn agricultural waste/ Stubbles No waste to energy plant is located either within the Eluru city or West Godavari district.	Municipal Corporation, Office of the District Magistrate and APPCB	1 year	Departmental funds
5.6	Incinerators	Siting policy and CEMS	Develop a siting policy for biomedical incinerators. Implement CEMS for incinerators and provide data on emissions on an open platform progressively.	GPCB siting policy is in place and no incinerators planned at this stage.	APPCB	1 year	Departmental funds
5.7	Construction and Demolition waste	Ensure implementation of Construction & Demolition Waste Management Rules, 2016 and its subsequent amendments.	- Provide a C&D waste management facility for segregation and disposal of collected waste from the construction sites across the city. - The Waste Management Plan should be combined with building permits and made compulsory before any construction/demolition/remodeling activity by the bulk waste generators. - Adopt and implement dust control measures for all types of construction - buildings and infrastructure. - 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 in all construction sites. - The preventive measures as mentioned in CPCB guidelinesiv. Construction agencies to be made liable. Impose penalty for non-compliance.	Around 4-8 TPD of C&D waste is being generated and dumped at the existing MSW dump site without further processing.	Municipal Corporation & APPCB	6 months	Departmental funds

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S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
5.8	Construction and Demolition waste	Zoning of construction activities	Enforce restrictions on construction activities within urban airshed zones during high pollution period	Guidelines were issued by the Municipal Corporation in line with the C&D Waste Management Rules, 2016 with respect to the dust generation and its management at the construction sites.	Municipal Corporations	6 months	Departmental funds
5.9	Construction and Demolition waste	Notify rules to segregate construction and demolition waste in accordance to the C&D waste management rules notified in 2016 by CPCB.	Provide a network of decentralized C&D waste segregation and collection sites across the city. For material handling, construction and demolition, it should be obligatory on part of the developers to provide evidence of debris on-site recycling and/or disposal at designated sites.	A notification was issued by Municipal Corporation, Eluru for handling of C&D waste within the city limits.	Municipal Corporations	1-2 years	Departmental funds
5.10	Construction and Demolition waste	Set up facilities to recycle construction and demolition waste	Quantify C&D waste generation from both building and infrastructure construction. 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 of 2016.	-	District and local administration, Municipal Corporation, APPCB	1-2 years	Departmental funds

5. Household emissions and other miscellaneous sources

S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
6.1	Renewable Energy Policy and Household Emissions	Maximum access of LPG by low-income neighbourhoods, as well as roadside eateries/dhabas/restaurants etc.	- A targeted programme towards 100 percent coverage of LPG supply to all the households and commercial activities like road site eateries/dhabas/restaurants, etc. - Mandate and link commercial license to clean fuels. - Create schemes like PMUY for low turnover eateries to access LPG	As of Q1 of 2020-21 total 1.38 Crs LPG Connections are released in Andhra Pradesh which is 110% penetration of HHs as per 2011 Census. Additionally, Non-Domestic LPG connections are released by Oil Companies on continuous basis.	Department of Civil Supplies and Oil Companies	1 Year	Departmental Funds.
				All of the BPL families have			

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S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
6.2	Gensets	Control of emissions from Diesel Generator (DG) sets.	- Ensure all the DG sets are meeting the emission norms and provided with acoustic enclosures. - Ensure power supply of 24/7 in the city to prevent usage of alternate power generating equipment. - Curtail use of DG sets in social events by providing temporary electric connections - Explore rooftop solar programme to reduce dependence on DG sets. - Ensure to obtain power connection prior to construction of large construction projects to avoid use of DG sets.	been provided with LPG connections. Total EWS households with LPG connections are 47,472. There is 100% LPG users within the municipal corporation limits. There is no or rare power cut in all over the state of Andhra Pradesh. In Eluru district the power is being generated from renewable sources like wind, solar and biomass.	APPCB, APTRANSCO, APGENCO	Immediate	Departmental funds
6.3	Multiple Sources	Public Awareness Campaign	- Organizing the continuous public awareness campaigns engaging the schools, colleges and other academic institutions. - 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.	-	APPCB in collaboration with a local Civic Society Organizations	6 months	Departmental Funds.
6.4	Others	Public Grievance Redressal Portal (PGRP)	- An online portal need to be created to register the complaints by public on air pollution along with a supervisory mechanism for its disposal at time bound manner. - Ensure to publicize about the online portal and its usage to all the citizens for deeper and better improvements. - Create a portal or a citizen's charter on APPCB website	A PGRP system has been established in the APPCB website and concerned officers are attending the complaints lodged by the public.	APPCB and other concerned departments.	6 months	Departmental Funds.
6.5	Others	Urban Green and Forests	At least 15 - 20 % of the area in new development projects in urban areas should be	Around 15.36% of the city is under green cover and it will be	Forest Department,	1 year	Departmental Funds.

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S. No.	Source	Action Points	Micro level Action points	Present Status	Agency responsible	Timeline	Budget
			- developed as green cover. - 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.	maintained	Municipal corporations		
6.6	Episodic events: All kinds of fires, leakages and explosions	Use satellite-based monitoring and on-ground enforcement to control such episodes.	An online platform needs to be developed to integrate the meteorological and air quality data of the city for prompt and immediate actions from the emergency response system/ disaster management authority.	Andhra Pradesh State Disaster Management Authority is in the process of developing an online system for emergency situations.	APSDMA and APPCB	1 Year	Departmental Funds.
6.7	Seasonal/ Episodic events	Firecrackers during festival season	Ensure to regulate and control usage of fire crackers including restrictions on timing as per the Supreme Court and CPCB and PESO guidelines.	During Diwali festival PESO is taking steps to observe the safety like awareness programmes in public interest through print and electronic media, providing licenses for sale of the local fireworks and regular inspections to the ensure only licensed vendors are selling the crackers.	District and local administration, Police Department, APPCB, RWAs, Supported by Chief Controller of Explosives, Petroleum and Explosive Safety Organization (PESO)	Immediate	Departmental Funds.

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a. Graded Response Action Plan (GRAP) proposed for Eluru 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 includes set of measures to be implemented with greater vigor 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 APPCB 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 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.

Graded Response Action Plan (GRAP) for Reducing Air Pollution in Non-attainment Cities of Andhra Pradesh

Moderate to poor	
Poor - When PM_{2.5} levels are between 91-120 µg/m³ or PM₁₀ levels are between 251-350 µg/m³	
Moderate - When PM_{2.5} is between 61-90 µg/m³ or PM₁₀ is between 101-250 µg/m³	
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

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Very Poor When PM2.5 levels are between 121-250 µg/m ³ or PM10 levels are between 351-430 µg/m ³	
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 and cardiac problems to avoid polluted areas and restrict outdoor movement.	State Pollution Control Board

Severe When PM2.5 levels are above 250 µg/m ³ or PM10 levels are above 430 µg/m ³	
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 coal based polluting industrial units and plants, if emissions are found to be beyond permissible limit; Allow plants on cleaner fuels like natural gas, electricity etc.	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 mine

Severe + or Emergency When PM2.5 levels cross 300 µg/m ³ or PM10 levels cross 500 µg/m ³ (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 (odd/even scheme) or introduce low emissions zones in the city to stop entry of polluting vehicles (old and ageing and polluting diesel vehicles etc).	Transport Department Traffic Police
State Pollution Control Board Task Force to take decision on any additional steps including shutting of schools	SPCB

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 tire pressure)
	Minimize unnecessary travel, use public transport & avoid using private vehicles

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b. 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.

MoEF & CC vide its Letter No. D.O.No. Q-16017/12/2019-CPA Dated: 24.04.2019, requested to constitute three committees at state level for effective implementation of NCAP. Accordingly Govt. of Andhra Pradesh, vide G.O. Rt. No. 46, dated 11.06.2020 has constituted three committees namely **Steering Committee**: Headed by the Chief Secretary, **Monitoring Committee**: Head of the Departments and **Implementation Committee**: District Head/ In-charge for effective implementation of NCAP to control air pollution in the 13 Non-attainment cities and towns of Andhra Pradesh.

The Action Plans will further be communicated to all the stakeholders for compliance for control of ambient air quality in Eluru city. Regular meetings will be convened by Implementation Committee to ensure implementation of the action plans at District level and the 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 SECRETARY

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Annexure I - Eluru City: Ambient Air Quality monitoring data - PM10 values

2014															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	Standard
1	Asram Diagnostics, DCMS Compound, Eluru	99	108	110	113	112	95	83	93	84	71	107	84	97	60
2015															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	Standard
1	Asram Diagnostics, DCMS Compound, Eluru	82	95	82	74	110	79	77	81	54	76	70	70	79	60
2016															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	Standard
1	Asram Diagnostics, DCMS Compound, Eluru	73	67	66	64	66	63	61	61	64	82	91	86	70	60
2017															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	Standard
1	Asram Diagnostics, DCMS Compound, Eluru	91	84	75	74	78	53	72	70	65	71	74	82	74	60
2	District Head Quarters Hospital (Government Hospital), Eluru	---	---	---	---	---	66	52	52	49	52	55	68	56	
	City Average	91	84	75	74	78	60	62	61	57	62	65	75	70	
2018															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	Standard
1	Asram Diagnostics, DCMS Compound, Eluru	79	81	80	80	80	76	71	73	73	60	75	73	75	60
2	District Head Quarters Hospital (Government Hospital), Eluru	64	69	68	64	67	65	71	58	---	61	60	62	64	
3	Zilla Samakhyha, ITDC Building, Satrampadu, Eluru	Monitoring was not started										63	66	64	
4	Somalingeswara Nilayam, Thoorpu veechi, Paidichintaapadu	Monitoring was not started										64	64	64	

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	City Average	72	75	74	72	74	71	71	66	68	61	66	66	70	
2019															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	
1	Asram Diagnostics, DCMS Compound, Eluru	78	75	69	62	73	68	63	70	69	58	66	58	67	
2	District Head Quarters Hospital (Government Hospital), Eluru	64	62	56	57	59	59	57	56	56	58	57	65	59	
3	Zilla Samakhya, ITDC Building, Satrampadu, Eluru	70	67	62	59	69	63	60	65	62	66	62	66	64	
4	Somalingeswara Nilayam, Thoorpu veechi, Paidichintaapadu	70	66	57	57	59	63	58	58	58	64	59	66	61	
	City Average	71	68	61	59	65	63	60	62	61	62	61	64	63	
2020															
S. No.	Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average	
1	Asram Diagnostics, DCMS Compound, Eluru	70	70	67		53	58	64	60	63	55	58	58	61	
2	District Head Quarters Hospital (Government Hospital), Eluru	66	66	65	No Data	No Data						55	55	61	
3	Zilla Samakhya, ITDC Building, Satrampadu, Eluru	68	68	66			51	57	61	58	60	54	54	56	59
4	Somalingeswara Nilayam, Thoorpu veechi, Paidichintaapadu	68	67	66			No Data				57	60	51	52	60
	City Average	68	68	66		52	58	63	58	61	53	55	56	60	

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Annexure II - Air Quality monitoring in the region

Andhra Pradesh Pollution Control Board (APPCB) is the regulatory body to oversee all air pollution activities all over the state. As per the provisions of the Air (Prevention and Control of Pollution) Act, 1981, APPCB is monitoring ambient air quality in cities and important towns including district headquarters of the State of Andhra Pradesh. Details of the cities and towns monitored for ambient air quality are as follows:

Table 8: Number of monitoring stations across Andhra Pradesh

S. No.	City/town	NAMP	SAAQMS	CAAQMS	Total
1	Visakhapatnam	9	1	2	12
2	Vijayawada	9	---	1	10
3	Guntur	4	---	---	4
4	Vizianagaram	4	1	---	5
5	Kakinada	4	---	---	4
6	Rajamahendravaram	4	---	1	5
7	Eluru	4	---	---	4
8	Srikakulam	4	---	---	4
9	Ongole	4	---	---	4
10	Nellore	4	---	---	4
11	Tirupati	4	---	1	5
12	Tirumala	1	---	1	2
13	Chittoor	4	---	---	4
14	Anantapur	4	---	---	4
15	Kurnool	4	---	---	4
16	Yerraguntla	1	---	---	1
17	Eluru	4	---	---	4
18	Amaravati	---	---	1	1
Total		72	2	7	81

Source: APPCB, 2020

Note: NAMP – National Ambient Monitoring Program; CAAQMS: Continuous Ambient Air Quality Monitoring Station; SAAQMS: State Ambient Air Quality Monitoring Program

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