

# To minimize Vehicular Emissions of Nagpur, India

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**Abstract-** Rapid urbanization and growth of motor vehicles impose a serious effect on human life and the environment in recent years. Air pollution has become a growing problem in megacities and large urban areas throughout the globe, and transportation is recognized as the major source of air pollution. Motor vehicles are a significant source of urban air pollution and are increasingly important contributors of anthropogenic carbon dioxide and other greenhouse gases. Nagpur has the distinction of being the geographical center of the Indian Peninsula. Nagpur is situated on the Deccan Plateau at an elevation of 310 meters above sea level, and it is the 3 largest city and Maharashtra is a major commercial and political center of the state. In Nagpur Maximum number of Vehicles also responsible for CO<sub>2</sub> Emission. In this research paper used efficient method or concept for controlling & minimize Emission in Nagpur City.

**Keywords-** Emission, Air Pollution, Vehicles, Greenhouse Gases, Global Warming, Climate Change, Nagpur, CO<sub>2</sub>

## I. INTRODUCTION

Nagpur, which is located right in the heart of India in the state of Maharashtra. Nagpur is also known as the "Orange City", because of its famous oranges. Nowadays Nagpur has become the Metropolitan City. It is also the seat of the annual winter session of the Maharashtra State Assembly. In general Nagpur has a moderate climate, however during the summer it is one of the most heat affected areas of India with an average temperature of 45°C. Today's Global issue of Emission with increases of populations and increase use of resources both artificial and natural. The growing cities, increasing traffic, trajectory growth, rapid economic development and industrialization with higher levels of energy consumption have resulted in an increase in pollution load in an urban environment (CPCB, 2010). Air Pollution is a major environmental risk to health and Estimated to be about 2 million premature Worldwide deaths per year (WHO, 2005). In addition to this Health effects, air pollution also contribute to this Tremendous economic losses, especially in the sense of Financial resources needed to deliver medicine Assistance to affected people.

## Vehicle Emissions-

The anthropogenic sources of urban air pollution are classified broadly into three categories; viz. point (industrial), area (mainly domestic cooking/heating) and line (vehicular).

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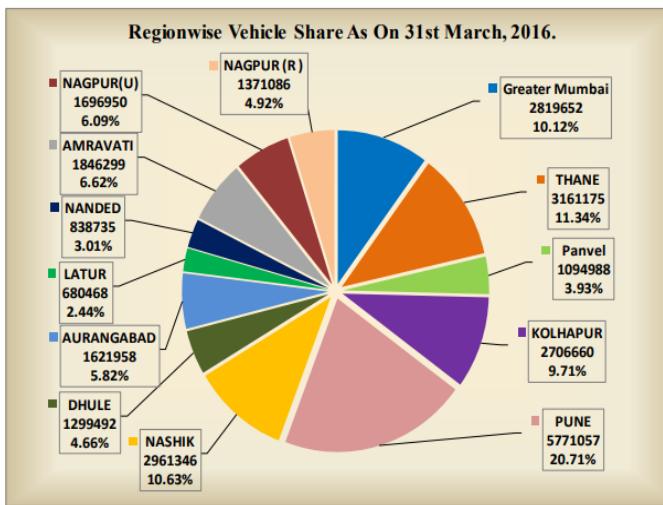
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Vehicle emissions are one of the primary contributors to the disposal of harmful greenhouse gases responsible for bringing our current state of climate change. According to the U.S. Energy Information Administration, whenever a vehicle burns one gallon of gasoline, about 20 pounds of carbon dioxide (CO<sub>2</sub>) are produced. A little more than 22 pounds of CO<sub>2</sub> emissions are produced for every gallon of burned diesel. In 2013, an estimated 1,522 million metric tons of CO<sub>2</sub> was produced by vehicles alone. These ways will not only help give us the opportunity to improve the air we breathe, but to minimize the greenhouse gas effect as well.

## II. VEHICULAR POPULATION IN NAGPUR, MAHARASHTRA

As per the 2011 census, the population of the Maharashtra state is 11.24 crores and is the second largest populous state. Population share is 9.3 percent against total population of India. Urban Population is 45.2 percent whereas rural population is 54.8 percent.

**Growth of Vehicles From 1971 - 2016 :** The total number of registered motor vehicles in Maharashtra State, increased from 3,07,030 as on 31<sup>st</sup> March, 1971 to 2,78,69,866 as on 31st March, 2016. The growth in vehicle population stood at 9077% during 45 years. Two wheelers contribute 73.04% of total vehicles on roads, as on 31.03.2016 whereas it was 28.25% as on 31.03.1971. The share of cars, jeeps and taxis in the total number of vehicles on roads was at 14.99% as on 31st March, 2016 making a steep decline from 44.55% as on 31st March, 1971. Percentage of buses decreased from 2.93% as on 31st March 1971 to 0.47% as on 31st March, 2016. Goods vehicles, accounted for 17.39% as on 31st March, 1971 decreased to 5.17% in the State as on 31st March, 2016. Other vehicles, which include tractors, trailers, three wheelers (passenger) and other miscellaneous vehicles, marginally decreased from 6.87 % as on 31st March, 1971 to 6.32% as on 31st March, 2016.



(Chart:1 Region Wise Vehicle Share 2016)

(Table 1: Vehicular Population in Nagpur)

Vehicles Category	Population
Two Wheelers	1075807
Motor Cars	109181
Jeeps	31484
Passenger Autos	4805
Private Autos	4076
AC Tourist Taxis	2891
Non-AC Tourist Taxis	1018
Stages Carriages	1764
Cont Carriages	913
Sleeper Coaches	22
School Buses	752
Pvt Service Vehicle	1317
Cranes	143
Ambulances	639
Delivery Vans 3W	7307
Delivery Vans 4W	15325
Goods Trucks	12086
Water Tankers	318
Kerosene Tankers	844
Petrol Tankers	275
Other Tankers	659
Agri Tractors	5486
Agri Trailers	5405
Other Vehicles	1256

(Source: Nagpur Today)

### III. PROPOSED METHODOLOGY

The main source of vehicular pollution is the fuel itself. The way it undergoes combustion inside the engine determines the amount of pollutant emissions from the engine. Any strategy then has to aim at the use of cleaner fuel, reduction in fuel consumption, adoption of efficient engines and installation of pollution control device at the tail end pipes of vehicles. Use of adulterated fuel and poor inspection and maintenance practices are identified as the two major cause of vehicular pollution, which are to be tackled by Government as well as the people of Nagpur.

#### Use for a hybrid or electric vehicle:

Nagpur becomes first city to use electric vehicles for public transport: Massive carbon emission cut-down predicted (Source India Today). Orange City, Nagpur has become the first city in India with electric mass mobility system. It will

have a fleet of 200 electric vehicles, which include taxi, bus, e-rickshaw and autorickshaw, all owned by Ola. With this, Maharashtra has become the first state to offer various incentives to e-taxis. Nitin Gadkari, Minister of Road Transport and Highways, along with Maharashtra Chief Minister Devendra Fadnavis, inaugurated India's first multi-modal electric vehicle project in the premises of Nagpur Airport. With an eye on promoting environmentally friendly transportation, the government will be ready with its Electric Vehicle Policy till December.

According to the Niti Aayog's joint report with Rock Mountain Institute earlier this month, accelerated adoption of electric and shared vehicles could save USD 60 billion in diesel and petrol cost while cutting down as much as 1 gigatonne (GT) of carbon emission for India by 2030.



(Figure:1 Nitin Gadkari, Minister of Road Transport and Highways, along with Maharashtra Chief Minister Devendra Fadnavis, inaugurated India's first multi-modal electric vehicle project)

Electric vehicles for public transport is 'one of the necessary ingredients of a smart city', Nagpur being one of them.

#### Use Plantation:

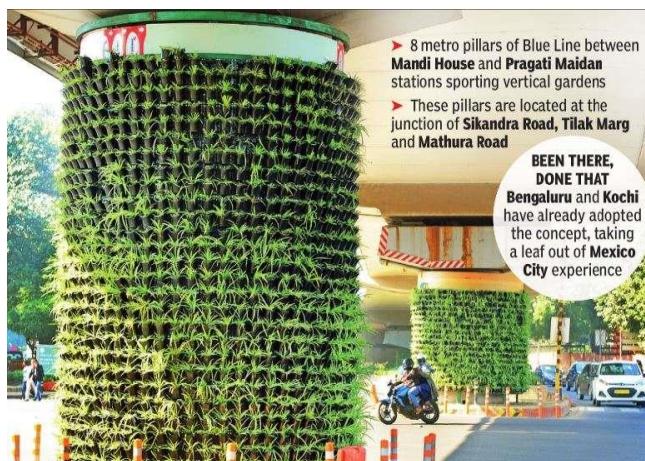


(Figure:2 PROMOTING SUSTAINABLE LOW-CARBON MOBILITY IN NAGPUR)

Nagpur Metro is a developed rapid transit system for Nagpur city of India. Its cost is estimated at 60,8260 million (US \$ 1.1 billion). In February 2014, the Maharashtra government approved the Metro project, while the Ministry of Urban Development, Government of India, gave the "in-principle" approval for the project. On August 20, 2014, the Union Cabinet approved the development of

the project, and Prime Minister Narendra Modi laid the foundation stone on August 21 on the city's journey. Construction of the project started on May 31, 2015, the trial run began on September 30, 2017 and on February 1, 2019, an estimated partial commercial operation began on Line 1 i.e. orange line.

Different types of plant crops use road side dividers, it also reduces emissions. I think the use of this concept in the Nagpur metro should be fully utilized by the plants. Plantation use in Metro Pillars Reduce Emissions. Like a garden type rest room for passenger near by the metro station, it is beneficial and also reduces emissions, and Improve Nagpur attracts tourism.



(Figure:3 Plantation On metro ;Source: Delhi Metro)

#### Use a proven liquid fuel catalyst:

If you are not the owner of an electric or hybrid vehicle, the Green Plus® fuel fuel catalyst is a simple, yet harmful vehicle emission reduction, improving engine power and increasing fuel economy. There is a simpler way. It works at the molecular level to make your vehicle drive cleaner and greenery.

India's first pilot project to test ethanol-run environment-friendly public buses was launched in Nagpur by Union Transport Minister Nitin Gadkari on Friday.

The "Green Bus" project is a brain child of Mr Gadkari, who claimed the carbon-dioxide emissions from the bus

will be as low as 75 per cent to 90 per cent -- depending on the purity of ethanol.

Nonetheless, the emissions will be monitored for the next three months by the Nagpur Municipal Corporation, the state and the central governments.

A massive ₹ 6 lakh crore annual fuel bill has ruined the economy, Mr Gadkari said. Using ethanol is expected to reduce the fiscal deficit and fuel imports by ₹ 2 lakh crore. Plus, ethanol being currently priced at ₹ 50 a litre, it would mean cheaper transport for the people.

"This was my dream. Now I want to ensure that the entire automotive industry moves onto indigenous fuels," Mr Gadkari said. "Ethanol can be produced here in large quantities, and it will reduce our dependence on traditional fossil fuels."



(Figure:4 India's First Ethanol-Run Bus Rolls out in Nagpur India's First Ethanol-Run Bus Rolls out in Nagpur)

#### Carpool or Ride Shares at least one day in the week:

If you are able to share carpool or ride to work at least one day in a week, then it is advisable to do so. In cases where all this seems impossible, find public transportation options or other forms of biotechnology. It can make a difference by taking your vehicle on the road only once a week. Then just imagine the effect that all vehicle owners can be able to park their ride at least one day in a week.

## VI. CONCLUSION

Today's Nagpur has become a metropolitan city. Due to improper management of Nagpur, emissions of vehicles, industrial emission tends to Respiratory and heart problems, Global warming, Acid Rain, Effect on Wildlife, Depletion of Ozone layer, etc.

The population of Nagpur is going to increase further which will require more infrastructure and transport facilities. More movement of vehicles will result into more emissions, which will ultimately deteriorate the air quality of Nagpur.

We know that how is Delhi now a days? Due to inappropriate management of Delhi Government, it is completely polluted. Therefore, use proper management in Nagpur. It reduces all types of emissions. Various methods have been used in this research paper, such as plantation in Nagpur Metro, establishment of new gardens in urban areas, launch concept of Green Buses, etc. are decreasing vehicle emissions.

## REFERENCES

- [1] Stem A.C. Air pollution, Vol. I to VIII Academic Press.
- [2] Rao M.N. & Rao H.V.N. Air Pollution, Tata McGraw-Hill 1989.
- [3] Rao C.S., Environmental pollution control engineering, Wiley Eastern Ltd. / New Delhi.
- [4] Department of Central Pollution Control Board <http://cpcb.nic.in/faq.php>
- [5] Delhi Metro <http://www.delhimetrorail.com/>
- [6] Nagpur Metro <http://www.metrorailnagpur.com/>
- [7] OLA <https://www.olacabs.com/>
- [8] Wikipedia <https://timesofindia.indiatimes.com/city/nagpur/Nagpur-is-now-Orange-City-officially/articleshow/50967857.cms>
- [9] <https://www.ndtv.com/india-news/indiolas-first-ethanol-run-bus-rolls-out-in-nagpur-652406>
- [10] [livemint.com/Politics/Q9BdWQsvIUpnMWuedLWFVM/How-Nagpur-is-driving-Indias-green-public-transport-missio.html](http://livemint.com/Politics/Q9BdWQsvIUpnMWuedLWFVM/How-Nagpur-is-driving-Indias-green-public-transport-missio.html)
- [11] "Provisional Population Totals". Government of India (2011). Census of India. Retrieved 2011-07-23.
- [12] Largest cities and towns and statistics of their population. World gazetteer. <http://www.world-gazetteer.com/> checked on 3rd Jan. 2012.
- [13] Society of Indian Automobile Manufacturers (SIAM) Checked on 20th Jan, 2012.
- [14] Motor Transport Statistics of India. Transport and Highways. Source: Transport Research Wing, Ministry of Road
- [15] Transport & Highways, Government of India, New Delhi. Various issues.
- [16] CPCB: 2001, Transport Fuel Quality for Year 2005, PROBES/78/2000-01, Central Pollution Control Board, Delhi.
- [17] A special presentation by center for science and environment, to the committee on auto fuel policy (Mashelkar Committee) New Delhi, India (2001). (<http://www.geospatialworld.net.>).
- [18] Air pollution in megacities of world, UNEP and WHO Publication (1992). Blackwell Publications. Oxford, (UK).
- [19] Siddique, S., Ray, M.R. and Lahiri, T. (2011). Effects of air pollution on the respiratory health of children: a study in the capital city of India, Air Qual. Atmos. Health, 4: 95–102.
- [20] Technical Report (1998). Evaluation of emission characteristics and compliance of emission standards of use petrol driven vehicles and critical appraisal of the pollution checking system in Delhi. Central Road Research Institute, New Delhi, India.
- [21] Sood, P.R., (2012). Air pollution through vehicular emission in urban India and preventive measure. International Conference on Environment, Energy and Biotechnology, IPCBEE vol. 33 IACSIT Press, Singapore, 45-49.