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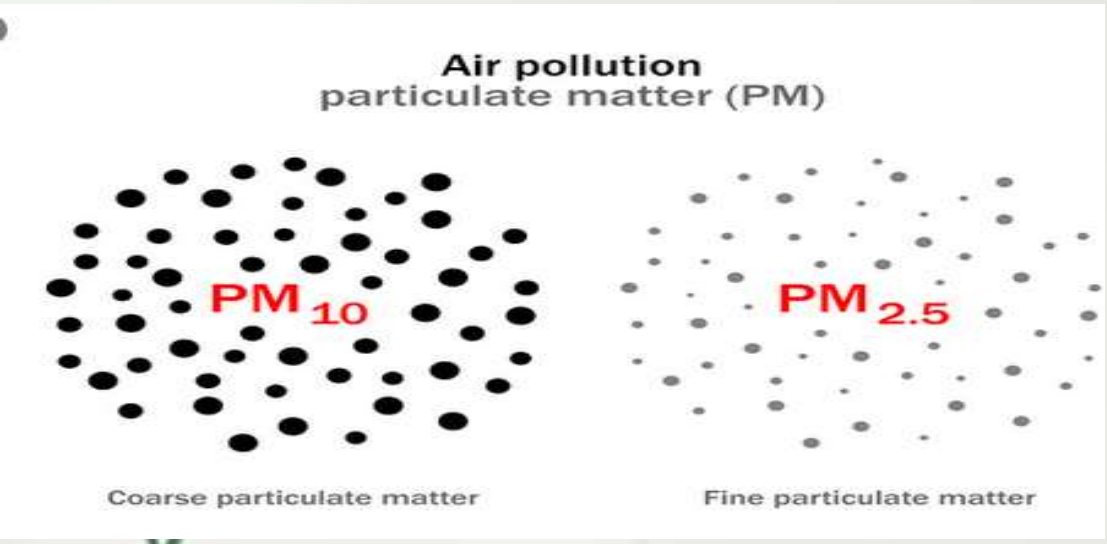
AIR POLLUTION IN URBAN INDIA

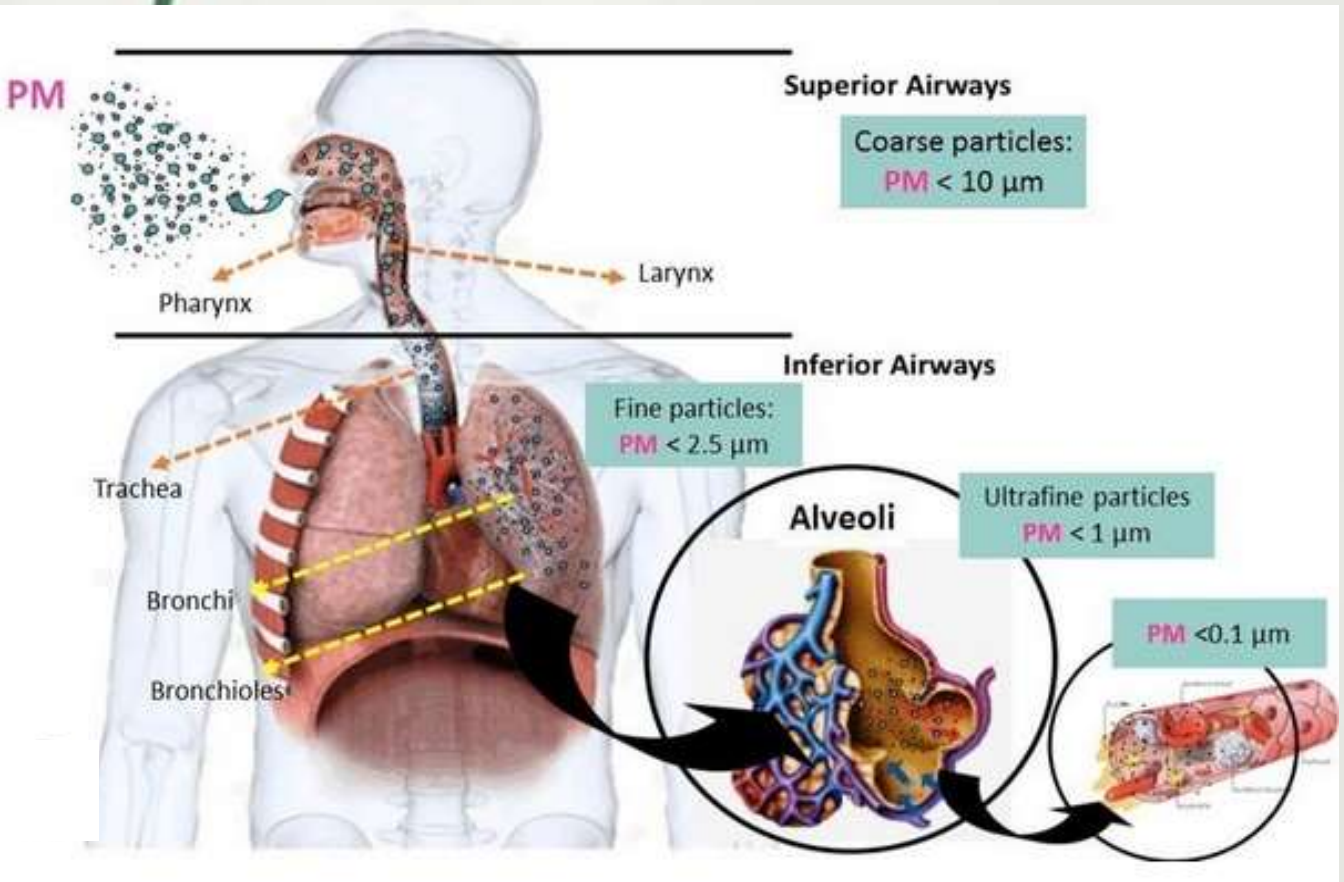
Why in the news?

Delhi, Mumbai, and Kolkata were among the world's 10 most polluted cities, according to a Swiss air quality technology company, IQAir.

		(PM 2.5)
1	Lahore, Pakistan	455
2	Delhi, India	443
3	Karachi, Pakistan	275
4	Dhaka, Bangladesh	222
5	Kolkata, India	198
6	Mumbai, India	172
7	Jakarta, Indonesia	155
8	Hanoi, Vietnam	152
9	Baghdad, Iraq	143
10	Ho Chi Minh City, Vietnam	133

World's most polluted cities in real time. (Screenshot/IQAir)





- The report used PM-2.5 air quality data from over 30,000 ground-based monitors in 131 countries.
- PM 2.5 refers to fine particulate matter that can cause serious health problems when inhaled.

Status of Air Pollution in India?

- According to the World Air Quality Report by IQAir, in 2022, India was the eighth most polluted country in the world, and
- Delhi was the most polluted capital city for the fourth consecutive year.

The report also found that 39 out of the 50 most polluted cities in the world were in India, with Bhiwadi (Rajasthan) and Ghaziabad topping the list.

Reasons behind Air Pollution in India

- **Excessive Motorized Transport**: Motorized transport, such as cars and commercial vehicles, is a major contributor to urban pollution.
- It is estimated to be the **cause of 60% of urban pollution** due to vehicular emissions.
- The **major pollutants** released as vehicle/fuel emissions are, **carbon monoxide** (CO), **nitrogen oxides** (NOx), **photochemical oxidants**, air toxics, namely **benzene** (C_6H_6), **aldehydes, 1,3 butadiene** (C_4H_6), **lead** (Pb), **particulate matter** (PM), **hydrocarbon** (HC), oxides of sulphur (SO_2) and **polycyclic aromatic hydrocarbons** (PAHs).
- These **pollutants create smog**

Smog

Smog = smoke + fog

➢**Smog is a harmful mixture of fog, dust and air pollutants such as nitrogen oxides, volatile organic compounds, etc. which combine with sunlight to form a dense layer of ground-level ozone and other oxidants.**

➢**two distinct types of smog are recognized: sulfurous smog and photochemical smog.**

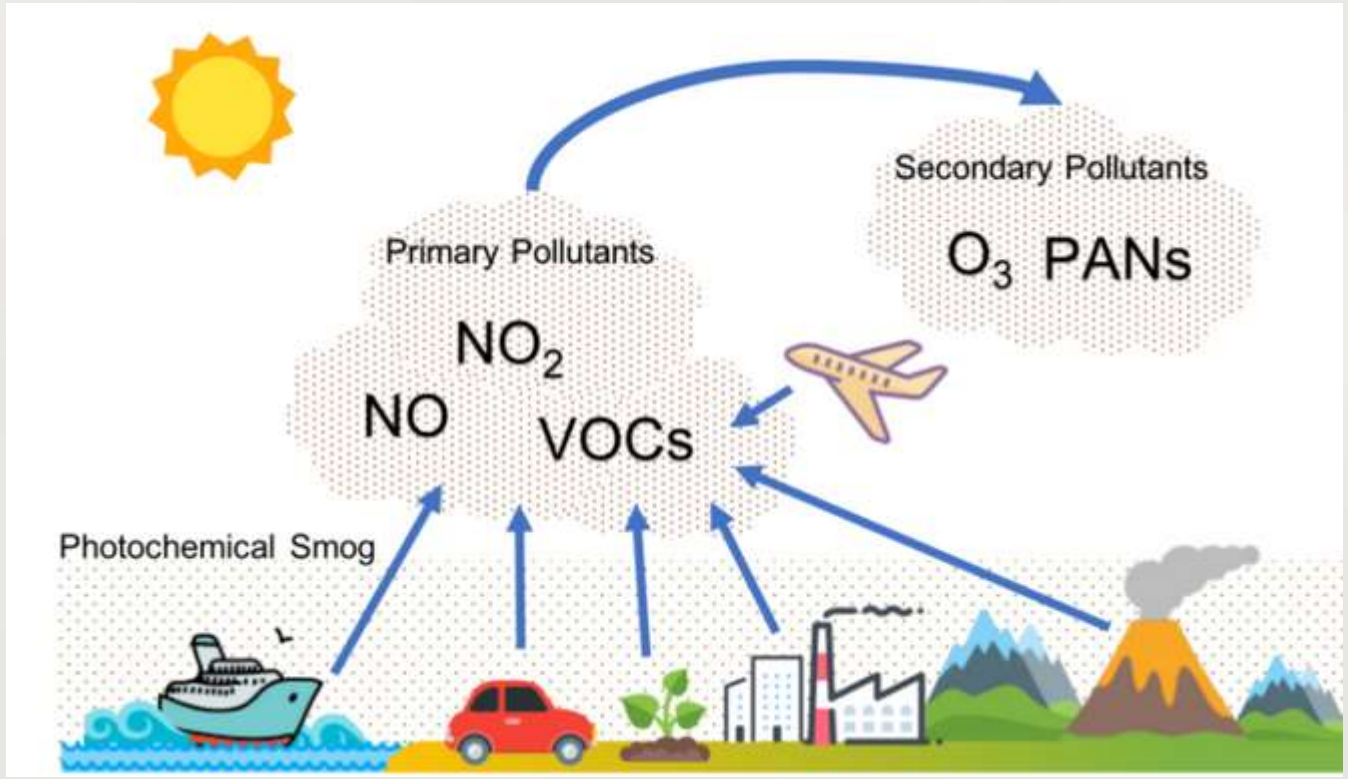
Sulfurous smog

- Sulfurous smog is also called "London smog 1952," (first formed in London).

- Sulfurous smog results from a high concentration of SULFUR OXIDES in the air and is caused by the use of sulfur-bearing fossil fuels, particularly coal

Photochemical smog

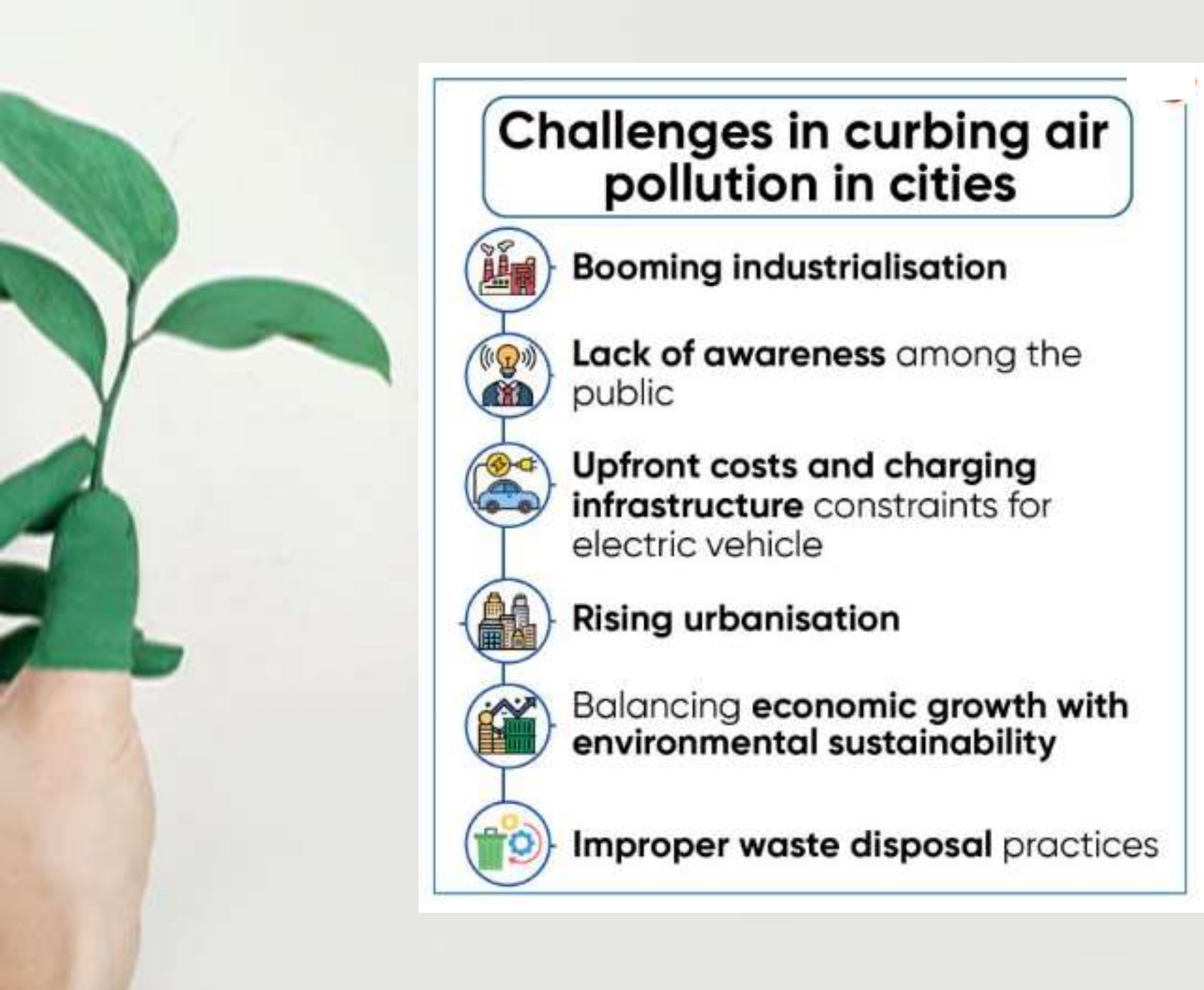
- **Photochemical smog is also known as "Los Angeles smog".**
- **Photochemical smog occurs most prominently in urban areas that have large numbers of automobiles (Nitrogen oxides are the primary emissions).**
- **Nitrogen Dioxide + Sunlight + Hydrocarbons = Ozone / photochemical smog**



Reasons behind Air Pollution in India

Burning of Paddy Straw (Parali):

While not the primary source of pollution, the seasonal burning of paddy straw, particularly in Haryana and Punjab, exacerbates smog and particulate matter pollution during North India's winters.


Challenges in curbing air pollution in cities
Booming industrialisation
Lack of awareness among the public
Upfront costs and charging infrastructure constraints for electric vehicle
Rising urbanisation
Balancing economic growth with environmental sustainability
Improper waste disposal practices

Measures to Control Air Pollution

Alternative Strategy of City Building: city building, where the focus is on more public transport, having secure pedestrian paths and bicycle lanes

Promote Public Transport: There needs to be good public transport, with investment in buses for towns and cities.

Control of Private Vehicles

- A **congestion tax** being levied **on private car owners driving during peak hours** can be thought of.
- Likewise, an **odd number-even number plate formula** can be another important intervention.
- Some cities have a **no-car day on certain days** — an example that should be put into practice by those in power and with influence.
- For Example, **World Car Free Day is celebrated annually on 22nd September** to **encourage** the use of **alternative modes of transportation.**

Solutions for Transportation Air Pollution

Catalytic converters
in conjunction with unleaded gasoline and low sulfur levels significantly reduce hydrocarbon & nitrogen oxide emissions

Fuel standards
reduce exposure to pollutants like lead and benzene

Renewable fuels reduce CO_2 emissions

Engine technologies
like computer controls, variable valve timing, multi-valve engines, turbo charging & gasoline direct injection improve fuel economy & reduce CO_2 emissions

Transmission technologies
like 7+ speeds, dual clutch transmissions (DCTs), & continuously variable transmissions (CVTs) improve fuel economy & reduce CO_2 emissions

Diesel filters
reduce particulate matter from on road & off road diesel engines

Alternative vehicle technologies
like plug-in electric vehicles & fuel cells = zero tailpipe emissions

Better transportation planning
for passengers & freight reduce emissions & fuel use

EPA United States Environmental Protection Agency

Government initiatives

- **National Air Quality Monitoring Programme:** In India, the Central Pollution Control Board has been executing a nationwide program of ambient air quality monitoring known as National Air Quality Monitoring Programme (NAMP). It is undertaken in India

- To determine the status and trends of ambient air quality.
- To ascertain the compliance of NAAQS.
- To identify non-attainment cities.
- To understand the natural process of cleaning in the atmosphere.
- To undertake preventive and corrective measures.

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