Sources of Air Pollution

There are two major categories in terms of sources of air pollution: anthropogenic sources (man-made sources) and biogenic sources (natural sources). Man-made air pollution is mostly related to burning fossil fuels (coal, petroleum, and natural gas). In particular, the transportation sector has been the largest single source of air pollution in the United States.

Also, high levels of air pollutants such as sulfur oxides, nitrogen oxides, carbon monoxide, and carbon dioxide have been discharged from power plants, manufacturing facilities, and waste incinerators in the process of burning coal and petroleum. The air pollutants emitted from those sources have negatively affected human health and damaged the environment. Not only humans but the earth itself sometimes contributes to air pollution through volcanic eruptions, wildfires, wind erosion, pollen dispersal, evaporation of organic compounds, and natural radioactivity.

6 Common Air Pollutants

Under the Clean Air Act, the Environmental Protection Agency (EPA) sets air quality standards on a national level, in particular, on the emission of six air pollutants—ozone (ground level), particulate matter (PM), carbon monoxide (CO), nitrogen oxide (NOx)*, sulfur dioxide (SO_2), and lead. Those six air pollutants are recognized as six common air pollutants because they are commonly found across the nation and also known as six criteria air pollutants that need to be addressed to protect health of people and the environment in this country.

*EPA uses NO_2 as the indicator for the larger group of NOx.

OZONE (ground level)

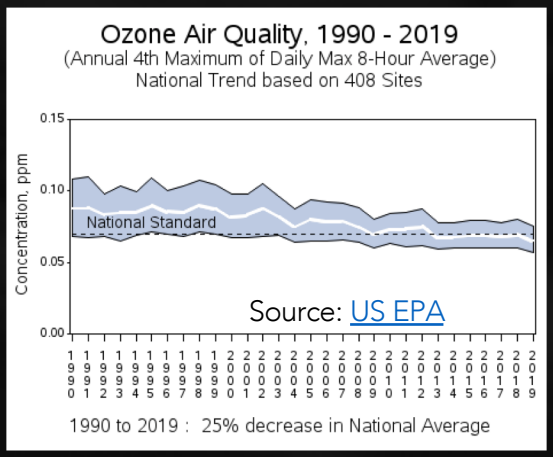
Ozone is found at both ground and upper levels of the atmosphere. While ozone in the upper atmosphere protects our earth from the sun's harmful ultraviolet (UV) radiation, a high concentration of ozone at ground level ends up becoming the main component of smog and haze.

causes

Emissions from industrial and power plants, motor vehicles, gasoline vapors, and chemical solvents are the main ingredients of ground level ozone.

adverse health effects

Exposure to higher levels of ozone can cause lung and throat irritation, shortness of breath, increase frequency of asthma attacks and aggravate respiratory conditions like emphysema and bronchitis.



Ground-level ozone has gradually declined, by 25%, since 1980 in the United States.

PARTICULATE MATTER

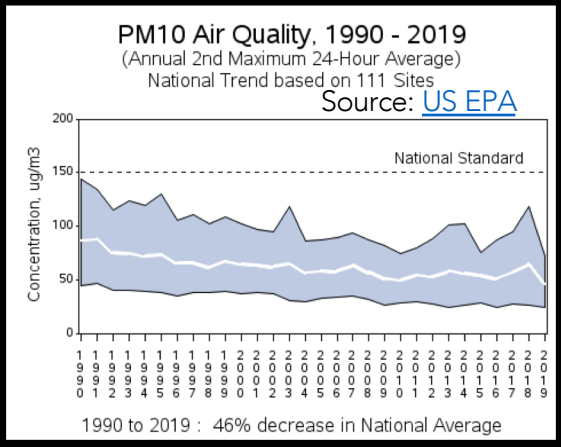
PM is a complex mixture of extremely small particles and liquid droplets found in the air. There are two types: PM_{10} and $PM_{2.5}$. PM_{10} includes inhalable coarse particles (dust, dirt, soot, or smoke with diameters 10-2.5 micrometers) and $PM_{2.5}$ includes fine particle with diameters smaller than 2.5 micrometers.

causes

Some particulates are emitted directly from sources, including construction sites, unpaved roads, fields, smokestacks or fires. Others come from industrial and power plants and motor vehicles.

adverse health effects

PM can cause a variety of health problems, including, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, increased respiratory distress, and premature death.



Levels of $PM_{2.5}$ reduced by 43% and those of PM_{10} decreased by 46% over the last two decades.

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CARBON MONOXIDE

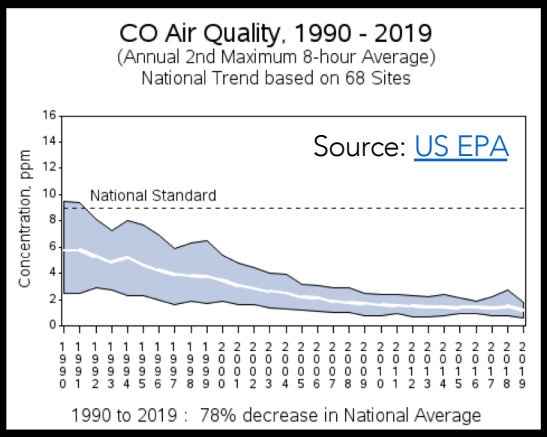
Carbon monoxide (CO) is a colorless, odorless gas emitted from burning processes.

causes

Most CO emissions come from mobile sources such as motor vehicles.

adverse health effects

CO reduces oxygen delivery to the body's organs and tissues and, at extremely high levels, can cause death.



Average CO concentrations have dramatically decreased since 1990.

NITROGEN OXIDE

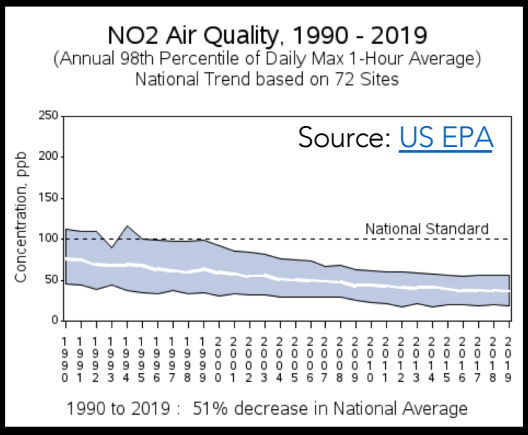
Nitrogen dioxide (NO_2) is one of a group of highly reactive gases known as NOx. NO_2 is a reddish-brown toxic gas and has a sharp biting odor.

causes

NO_2 can be created from emissions from motor vehicles, power plants, and off-road equipment.

adverse health effects

NO_2 can cause airway inflammation in healthy people and increase respiratory symptoms in people with asthma.



Levels of NO_2 reduced by 51% since 1990.

SULFUR DIOXIDE

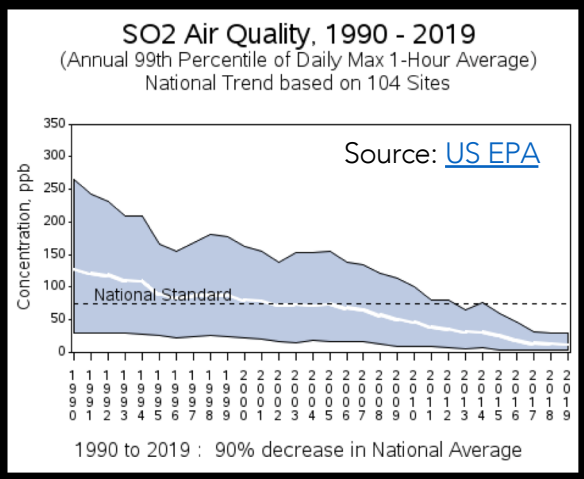
SO_2 is a toxic gas with an irritating smell.

causes

Most SO_2 emissions come from fossil fuel combustion at power plants (73%) and other industrial plants (20%).

adverse health effects

Exposure to SO_2 is linked to bronchoconstriction and increased asthma symptoms.



Levels of SO_2 dropped 90% over the last 20 years.

LEAD

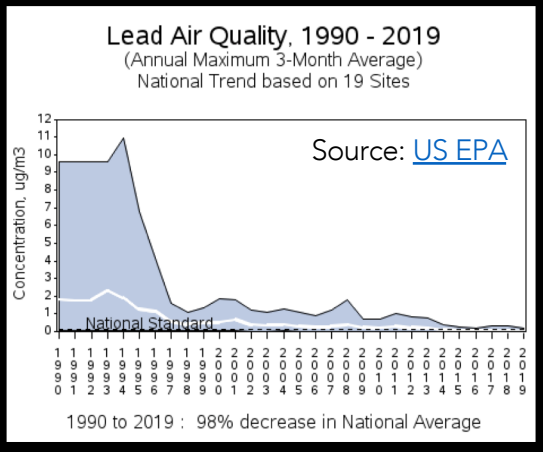
Lead is a heavy metal found naturally in the environment as well as in manufactured products.

causes

Sources of lead emissions in the air include ore and metals processing, waste incinerators, power plants, and motor vehicles.

adverse health effects

Lead can adversely affect the nervous system, kidney function, reproductive and developmental systems, immune system, and cardiovascular system.



Lead air quality has significantly improved.

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