



The Plain English Guide to the Clean Air Act

Cleaning Up Commonly Found Air Pollutants

Six common air pollutants (also known as "criteria pollutants") are found all over the United States. They are particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These pollutants can harm your health and the environment, and cause property damage. Of the six pollutants, particle pollution and ground-level ozone are the most widespread health threats. Details about these two pollutants are discussed below. For information about the other common pollutants, visit EPA's website at www.epa.gov/air/urbanair.

EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health is called primary standards. Another set of limits intended to prevent environmental and property damage is called secondary standards. A geographic area with air quality that is cleaner than the primary standard is called an "attainment" area; areas that do not meet the primary standard are called "nonattainment" areas.

EPA has been developing programs to cut emissions of these commonly found air pollutants since the Clean Air Act was passed in 1970. It's a big job, and although a great deal of progress has been made, it will take time to make the air healthy throughout the country. For the latest information on air quality trends in the U.S., visit www.epa.gov/airtrends. There are still several areas of the country, including many large cities, that are classified as nonattainment for at least one of the six common pollutants. Despite continued improvements in air quality, millions of people live in areas with monitoring data measuring unhealthy levels of pollution.

To see whether your area is attainment or nonattainment, contact your local air pollution control agency or visit EPA's website at: www.epa.gov/air/urbanair.

Particle Pollution

Particle pollution, also known as particulate matter (PM), includes the very fine dust, soot, smoke, and droplets that are formed from chemical reactions, and produced when fuels such as coal, wood, or oil are burned. For example, sulfur dioxide and nitrogen oxide gases from motor vehicles, electric power generation, and industrial facilities react with sunlight and water vapor to form particles. Particles may also come from fireplaces, wood stoves, unpaved roads, crushing and grinding operations, and may be blown into the air by the wind.

EPA scientists and other health experts are concerned about particle pollution because very small or "fine" particles can get deep into the lungs. These fine particles, by themselves, or in combination with other air pollutants, can cause increased emergency room visits and hospital admissions for respiratory illnesses, and tens of thousands of deaths each year. They can aggravate asthma, cause acute respiratory symptoms such as coughing, reduce lung function resulting in shortness of breath, and cause chronic bronchitis.

The elderly, children, and asthmatics are particularly susceptible to health problems caused by breathing fine particles. Individuals with pre-existing heart or lung disease are also at an increased risk of health problems due to particle pollution.

Particles also cause haze reducing visibility in places like national parks and wilderness areas that are known for their scenic vistas. These are places where we expect to see clearly for long distances. In many parts of the United States, pollution has reduced the distance and clarity of what we see by 70 percent.

Pollution Prevention in Consumer Products

Hair sprays, interior and exterior paints, foam plastic products (such as disposable foam cups), charcoal fire starter - all are consumer products whose production, use, or disposal can contribute to air pollution.

Volatile organic compounds (VOC) emitted from the use of organic compounds (VOC) emitted from the use of consumer products can cause or contribute to ozone levels that violate the air quality standards EPA set for ground-level ozone.

In 1998, EPA issued a rule limiting VOC emissions from consumer products. It requires many United States manufacturers, importers, and distributors to limit the VOC content of their products. EPA also issued a rule limiting emissions from architectural coatings (exterior and interior house paints, wood and roof coatings).

Protecting the Public from Particle Pollution

EPA is tackling particle pollution in several different ways.

- EPA's health-based standards include limits for smaller-sized or "fine" particles. States are taking actions to meet these standards. To learn more, visit www.epa.gov/particles.
- EPA's rule for Clean Diesel Trucks and Buses will result in a fleet of heavy-duty trucks and buses that will be 95 percent cleaner than today's trucks and buses. To learn more, visit www.epa.gov/otaq/diesel.
- Visibility protection regulations are designed to reduce emissions that cause haze in our national parks and wilderness areas. States are working together on strategies to improve visibility in these natural areas. To learn more, visit www.epa.gov/visibility.
- EPA created the Air Quality Index (AQI) to provide simple information on local air quality, the health concerns for different levels of air pollution, and how people can protect their health when pollutants reach unhealthy levels. To learn more, visit www.airnow.gov.

Fine particles can remain suspended in the air and travel long distances with the wind. For example, over 20 percent of the particles that form haze in the Rocky Mountains National Park have been estimated to come from hundreds of miles away.

Particles also make buildings, statues and other outdoor structures dirty. Trinity Church in downtown New York City was black until a few years ago, when cleaning off almost 200 years worth of soot brought the church's stone walls back to their original light pink color.

Before the 1990 Clean Air Act went into effect, EPA set limits on airborne particles smaller than 10 micrometers in diameter called PM10. These are tiny particles (seven of these particles lined up next to each other would cover a distance no wider than a human hair). Research has shown that even smaller particles (1/4 the size of a PM10 particle) are more likely to harm our health. So in 1997, EPA published limits for fine particles, called PM2.5. To reduce particle levels, additional controls are being required on a variety of sources including power plants and diesel trucks.

Ground-level Ozone

Ground-level ozone is a primary component of smog. Ground-level ozone can cause human health problems and damage forests and agricultural crops. Repeated exposure to ozone can make people more susceptible to respiratory infections and lung inflammation. It also can aggravate pre-existing respiratory diseases, such as asthma. Children are at risk from ozone pollution because they are outside, playing and exercising, during the summer days when ozone levels are at their highest. They also can be more susceptible because their lungs are still developing. People with asthma and even active healthy adults, such as construction workers, can experience a reduction in lung function and an increase in respiratory symptoms (chest pain and coughing) when exposed to low levels of ozone during periods of moderate exertion.

The two types of chemicals that are the main ingredients in forming ground-level ozone are called volatile organic compounds (VOCs) and nitrogen oxides (NOx). VOCs are released by cars burning gasoline, petroleum refineries, chemical manufacturing plants, and other industrial facilities. The solvents used in paints and other consumer and business products contain VOCs. The 1990 Clean Air Act has resulted in changes in product formulas to reduce the VOC content of those products. Nitrogen oxides (NOx) are produced when cars and other sources like power plants and industrial boilers burn fuels such as gasoline, coal, or oil. The reddish-brown color you sometimes see when it is smoggy comes from the nitrogen oxides.

The pollutants that react to form ground-level ozone literally cook in the sky during the hot summertime season. It takes time for smog to form-several hours from the time pollutants get into the air until the ground-level ozone reaches unhealthy levels. For more information on days when air quality is expected to be unhealthy, visit EPA's website at www.airnow.gov.

Weather and the lay of the land (for example, hills around a valley, high mountains between a big industrial city and suburban or rural areas) help determine where ground-level ozone goes and how bad it gets. When temperature inversions occur (warm air stays trapped near the ground by a layer of cooler air) and winds are calm, high concentrations of groundlevel ozone may persist for days at a time. As traffic and other sources add more ozone-forming pollutants to the air, the ground-level ozone gets worse.

How the Clean Air Act Reduces Air Pollution Such as Particle Pollution and Ground-level Ozone

First, EPA works with state governors and tribal government leaders to identify "nonattainment" areas where the air does not meet allowable limits for a common air pollutant. States and tribes usually do much of the planning for cleaning up common air pollutants. They develop plans, called State/Tribal Implementation Plans, to reduce air pollutants to allowable levels. Then they use a permit system as part of their plan to make sure power plants, factories, and other pollution sources meet their goals to clean up the air.

But I Thought the Ozone Layer Was a Good Thing?!

It is! In the upper atmosphere, called the stratosphere, ozone naturally occurs and forms a protective layer that shields the Earth from some of the sun's ultraviolet (UV) light. Exposure to some forms of UV light has been linked to cataracts (eye damage), skin cancer, and plant damage. This high-altitude ozone, therefore, protects human health and the environment.

Ground-level ozone, on the other hand, is harmful. It can cause serious health problems and damage forests and crops. Ground-level ozone affects the respiratory system, aggravating asthma and causing lung inflammation.

So, whether ozone is "good" or "bad" depends on its location - at ground level, it is "bad," in the upper atmosphere, it is "good."

Wood Stoves and Fireplaces

Residential wood smoke (from wood stoves, fireplaces, and outdoor wood-fired hydronic heaters) contributes 6 percent (420,000 tons) of the total amount of fine particle pollution (PM2.5) directly emitted in the United States each year. That contribution can be significantly higher in some areas with increased wood burning. EPA and state and local agencies are working on a number of fronts to help reduce residential wood smoke pollution. To learn more, visit www.epa.gov/woodstoves.

If you use wood:

- replace your old wood stove or fireplace with an EPA-certified model, and get more heat and less pollution while burning less wood;
- burn only clean, dry, "seasoned" wood;
- regularly remove ashes from your wood stove and store outside away from wood.

The Clean Air Act requirements are comprehensive and cover many different pollution sources and a variety of clean-up methods to reduce common air pollutants. Many of the clean-up requirements for particle pollution and ground-level ozone involve large industrial sources (power plants, chemical producers, and petroleum refineries), as well as motor vehicles (cars, trucks, and buses). Also, in nonattainment areas, controls are generally required for smaller pollution sources, such as gasoline stations and paint shops.

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