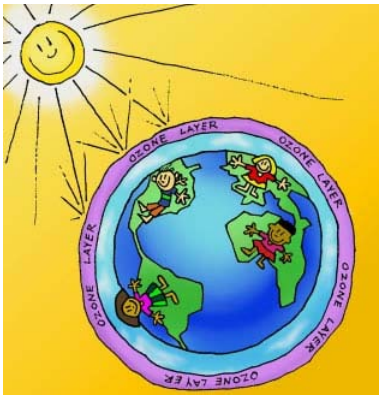


# Quick Facts on Ozone

## *What is Ozone?*

Ozone is a gas composed of three oxygen atoms. Ozone has the same chemical structure whether it occurs miles above the earth or at ground level and can be "good" or "bad," depending on its location in the atmosphere. Ozone that is considered “good” occurs naturally in the stratosphere approximately 10-to-30 miles above the earth's surface and forms a layer that protects life on earth from the sun's harmful rays.

However in the earth's lower atmosphere, ground-level ozone is considered "bad." Ground-level or "bad" ozone is not emitted directly into the air but is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOCs) in the presence of sunlight. Sources of these chemicals can include:

- Motor vehicle exhaust from automobiles, trucks, buses, aircraft, and locomotives
- Emissions from construction equipment
- Emissions from lawn and garden equipment
- Sources that combust fuel, such as large industries and utilities
- Small industries such as gas stations and print shops
- Consumer products, including some paints and cleaners

Ground-level ozone is the primary constituent of smog. The combination of sunlight and hot weather causes ground-level ozone to form in harmful concentrations in the air. Ozone can also be transported long distances by wind. For this reason, even rural areas can experience high-ozone levels.

Breathing ground-level ozone can trigger a variety of health problems. Ground-level ozone also damages vegetation and ecosystems. In the United States alone, ozone is responsible for an estimated $500 million in reduced crop production each year.

Under the Clean Air Act, the U.S. Environmental Protection Agency has set protective health-based standards for ozone in the air we breathe. The Airnow Web site provides daily air quality reports for many areas. These reports use the Air Quality Index (or AQI) as an indicator of how clean or polluted the air is. State or local air quality agencies may declare an Air Quality Action Day for Ozone when ozone levels are forecast to reach unhealthy levels.

# Health Effects

**Q: How does poor air quality affect our health?**

A: In the United States each year, air pollution causes 70,000 deaths – three times the number caused by traffic accidents. In North Carolina each year, air pollution leads to an estimated

- 3,000 premature deaths;
- 6,000 hospital admissions for respiratory disease and another 2,000 for cardiovascular disease;
- 1,500 new cases of asthma and 2,500 cases of chronic bronchitis in adults.

**Who is most susceptible to the effects of air pollution?**

A: Children and the elderly – more than 115,000 in Rowan and Cabarrus – as well as people with lung disease and those who work or exercise outdoors are particularly susceptible.

**Why are children more susceptible?**

A: Since children have a higher breathing rate than adults relative to their body weight and lung area surface, polluted air affects them more. They also have narrower airways than adults. Consequently, air pollution that would produce only moderate irritation in adults can cause serious problems in a young child.

**Q: How does traffic-related air pollution impact us?**

A: A number of diseases have been linked to the air pollution related to vehicle emissions, including asthma, lung cancer, Hodgkin's disease and heart attacks.

**Q: How are children impacted by traffic-related air pollution?**

A: A study in 2005 by the Environmental Defense Fund, reported that the risk of asthma increased 89 percent for each quarter-mile closer children lived to a major roadway. A follow-up study two years later discovered that children who live within about 1,500 feet of major roadway experienced decreased air flow in their lungs.

**Q: Can unborn children be affected by air pollution?**

A: A study released in August 2009 suggests that smog may have an adverse affect on the developing brain. Children whose mothers were exposed to the most pollution before birth scored an average of 4-5 points lower on IQ tests than children whose mothers experienced less exposure.

**Q: How does dirty air impact people with asthma?**

A: Smog and soot worsen asthma and trigger attacks. Some evidence suggests that ozone and diesel exhaust particles may actually cause asthma in some cases. Nearly 2/3 of those who suffer from asthma live in an area where at least one federal air-quality standard is not being met.

**Q: How does air pollution impact our health costs?**

A: North Carolinians paid $100 million in 2001 for treatment of children with asthma, an air pollution-related illness. Our state's citizens miss an estimated 500,000 days of work each year because of illness caused by air pollution.

# Potential Economic Impacts

**Q: What would happen if the Environmental Protection Agency designated the Metro-Charlotte area as "serious"?**

A: Industries would face additional restrictions and limitations under those circumstances. Industries currently have to get special federal permits if they emit more than 100 tons of certain pollutants per year. If we're in the serious category, the threshold for having to get one of those permits drops down to 50 tons. And those permits are expensive. It would also require industries to install more emission-control equipment. For more information on the rules, visit NC Division of Air Quality . The N.C. Division of Air Quality has notified about 200 facilities in the seven-county region that could be affected if that happens. A total of 18 are in

Rowan County and 19 are in Cabarrus. The EPA estimates that it generally costs $3,000 - $5,000 per ton to control emissions though those costs can vary widely. For more information on control techniques, visit http://www.epa.gov/air/ozonepollution/SIPToolkit/ctgs.html

**Q: How does a "serious" designation affect economic development?**

A: If industries that are already here want to undergo a major expansion or a major new industry wants to come in, they are subject to a new set of requirements. These include installing the most stringent emissions control equipment available regardless of cost -- plus they have to offset their emissions increase. They can offset the emissions increase by shutting something down or adding more pollution-control equipment to other processes or paying for somebody else's pollution-control measures. That makes it hard to recruit new industry to the area or for existing industries to expand significantly.

**Q: What are the other impacts of the "serious" category?**

A: Gas stations may have to install equipment for collecting gasoline vapors while refueling motor vehicles. That's expensive because there is underground piping involved. It will also cost citizens more money to get repairs if they fail vehicle inspections. Now if you spend $200 on repairs and still fail, you can get a one-year waiver from additional repairs. If we are in the "serious" category, the minimum expenditure bumps up to about $500.

**Q: How does it affect our ability to get federal funds for highways?**

A: Bumping up to "serious" won't affect highways right away. But transportation planning has other problems related to the air quality standards. When the state puts together the State Implementation Plan, (SIP), the N.C. Division of Air Quality asks the transportation officials to project their highway needs in the future. They have to ensure that emissions will not contribute to worsening air quality. If growth exceeds their expectations, they find it difficult to meet the budget set up by the SIP. If a region is out of compliance, it stands to delay or lose funding the federal government pays for highway construction and repair.

EDITOR'S NOTE: This was excerpted from a Q&A with Donnie Redmond, then planning section chief of the N.C. Department of Environment & Natural Resources Division of Air Quality.

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